CONTENTS VOLUME V.

72. The Philippine Plants collected by the Wilkes United States Exploring Expedition. Philip. Journ. Sci. 3 (1908) Bot. 73-86, t. 1-4.

73. Notes on Philippine Botany. l.c. 95-127 (with R. A. Rolfe).

74. New Philippine Plants from the collections of Mary Strong Clemens. l.c. 129-165.

75. Philippine Freycinetia l.c. 307-315.

76. The Oaks of the Philippines. l.c. 317-330.

77. The Genus Radermachera Hassk. in the Philippines. l.c. 331-338.

78. The Philippine Species of Garcinia l.c. 359-368.

79. Philippine Ericaceae. l.c. 369-382.

80. On a Collection of Plants from the Batanes and Babuyanes Islands. l.c. 385-442.

81. A Revision of Philippine Connaraceae. Philip. Journ. Sci. 4 (1909) Bot. 117-128.

82. A Revision of Philippine Loranthaceae. l.c. 129-153.

83. A Preliminary Revision of Philippine Combretaceae. l.c. 641-650.

84. Medical Survey of the Town of Taytay, Part V, The Principal Foods utilized by the Natives. Philip. Journ. Sci. 4B (1909) 219-223.

85. An Enumeration of Philippine Leguminosae, with keys to the Genera and Species. Philip. Journ. Sci. 5 (1910) Bot. 1-136.

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formations. To make the present article as nearly as possible complete in itself and for the benefit of those who may not have access to Dr. Whitford's work, the following passages are quoted from the introduction of his paper:

"The portion of Mount Mariveles with which this paper deals (the Lamao River Reserve) lies on its eastern slope and comprises an area of approximately 4,426 hectares. It is known as the Lamao River Reserve and has a water frontage on Manila Bay of nearly 5 kilometers, extending from Cape Magarhas on the south, in a northerly direction, to Cape Quitang. These two points mark the lower ends of the main ridges which, respectively, are the northern and southern boundaries of the reserve."

THE PHILIPPINE
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VOL. I APRIL 15, 1906 SUPPLEMENT I

THE FLORA OF THE LAMAO FOREST RESERVE.

By ELMER D. MERRILL.
(*From the Botanical Section of the Biological Laboratory, Bureau of Science.*)

INTRODUCTION.

The Lamao Forest Reserve was established in October, 1903, as a permanent station for the working out of various problems presented by the Philippine forests, and, as a preliminary to other investigations, an attempt has been made to enumerate the constituent species of the flora of the reserve. Although, at this time, it has been impossible to determine all the material collected within its limits, the present paper has been prepared to supplement a forthcoming article, entitled "The Vegetation of the Lamao Forest Reserve," by Dr. H. N. Whitford, formerly of this Bureau. The reader is referred to Dr. Whitford's paper, which is to appear in this JOURNAL in the near future, for a map of the region, illustrations of vegetative types, geology and physiography, climate, humidity, temperature, soil, and an extensive ecological discussion of the various types of vegetation and the plant formations. To make the present article as nearly as possible complete in itself and for the benefit of those who may not have access to Dr. Whitford's work, the following passages are quoted from the introduction of his paper:

"The portion of Mount Mariveles with which this paper deals (the Lamao River Reserve) lies on its eastern slope and comprises an area of approximately 4,426 hectares. It is known as the Lamao River Reserve and has a water frontage on Manila Bay of nearly 5 kilometers, extending from Cape Magarhas on the south, in a northerly direction, to Cape Quitang. These two points mark the lower ends of the main ridges which, respectively, are the northern and southern boundaries of the reserve."

"The northern ridge extends from Cape Quitang westward on the ridge leading to Buenavista Peak (altitude, 1,165 meters); from thence it follows the rim of the crater to Cabcaben Peak (altitude, 1,406 meters). The southern boundary is the ridge which starts at Cape Margahas and runs through Limay Peak to Caybubu Peak (altitude, 1,368 meters) and on the rim of the crater. The western and northwestern boundaries of the reserve are formed by lines which descend from Cabcaben on the south and Caybubu on the north, meeting at the bottom of the crater, near the headwaters of the Balanga River."

"Between the north and south ridges are two main rivers—the Lamao and the Alangan. The Lamao River rises just south of the lowest point of the rim of the crater which connects Buenavista with Caybubu Peak. From its source down to within 3.5 kilometers of the shore it lies in a cañon which varies in depth from 75 to 270 meters; below 3.5 kilometers the latter feature of the river disappears."

"The group of peaks known as Mount Mariveles is on the southern end of the peninsula of land comprising the Province of Bataan, of the Island of Luzon. The meridian of 120° 30′ east of Greenwich and the parallel of 14° 30′ north latitude intersect the mountain near its summit. Rising to the height of approximately 1,400 meters, it, with the Island of Corregidor, is the most conspicuous feature of the landscape at the entrance of Manila Bay."

"The lithographic structure of Mount Mariveles shows it to be of volcanic origin. It is a mass composed largely of andesitic ejecta and of the decomposition products thereof. The physiographic features which point to its being an extinct volcano are almost as striking. Rising from Manila Bay on the east, from the China Sea on the south and west, and from the lowlands near the central part of Bataan on the north, are a series of prominent ridges ending in peaks, which, with their connecting ridges, form a nearly circular chain—the rim of the former crater which has an outlet to the north, by way of the Balanga River. Between these peaks and just beneath the lowest point of the connecting ridges are the sources of the main rivers draining the mountain; the latter have cut deep cañons and have established many branches with smaller ones."

The general vegetative conditions of the Lamao Forest Reserve are characteristic of large portions of the Philippines. From the coast, the land slopes gradually upward, reaching an elevation of about 100 meters at a distance of about 4.5 kilometers, where the sharper slopes of the mountain are encountered. This gently sloping plain region is covered with dense bamboo thickets and low, scrubby forests or thickets, consisting of numerous species of small trees and shrubs, with an intermixture of erect and scandent bamboo, vines, etc., and very few scattered large trees, while here and there are open, grassy parks of varying size. Occasionally one finds traces of cultivation and it is possible that much of this plain region has been cultivated at one time or another. At the distance from

the coast and at the altitude mentioned above there is an abrupt change in the character of the vegetation, the bamboo and scrubby thickets for the greater part giving place to the high forest, the transition usually being sharp and well defined. The high forest, commencing at the upper limits of the thickets, extends without a break to the summit of the mountain, although the character of the vegetation at the higher altitudes is very different from that below, not only in constituent species but also in general appearance. In the typical dipterocarp forests on the lower slopes, mosses, lichens, epiphytes, ferns, and herbaceous plants are comparatively scarce, while the trunks and branches of trees on the exposed, wind-swept ridges above 900 or 1,000 meters are more or less densely covered with many species of mosses and lichens, ferns, orchids, and other epiphytic plants, and the trees themselves are more or less dwarfed, according to their exposure. The ground on these ridges is, for the greater part, densely covered with various species of mosses; herbaceous plants are also more abundant than in the high forests at lower altitudes. In the accompanying paper I have referred to plants found in this location as growing in the mossy forest on exposed ridges. Few of the species found in this habitat extend downward into the high forest, and, when they do, they are usually found in the deep, damp ravines and cañons, and not on the steep slopes.

ORIGIN OF MATERIAL.

The material on which the present paper is based has all been collected within the past two and one-half years, and is deposited in the herbarium of this Bureau. It has been received from the following sources:

Forestry Bureau, by direction of Capt. G. P. Ahern, Chief of Bureau.

	Numbers.
Ahern's collector, Ramos, July–August, 1904	98
Barnes, P. T., October, 1903, to April, 1904	313
Borden, T. E., April, 1904, to May, 1905	1,190
Leiberg, J. B., July, 1904	160
Meyer, R., December, 1904, to June, 1905	435
Total	2,196

Bureau of Science.

Copeland, E. B., mostly ferns and fungi (about)	200
Elmer, A. D. E., November, 1904	302
Merrill, E. D., June, October, 1903; January, 1904; March, 1905	575
Whitford, H. N., April to July, 1904; December, 1904, to May, 1905; September, 1905	892
Total	1,969

Miscellaneous.

Topping, D. Le Roy, May, 1904, presented (about)	100
Aggregate	4,265

In addition to the above numbers, most of which are cited in the present paper, approximately 3,000 sterile numbers have been received from Lamao in the past two years, from the collections of Borden, Meyer, and Whitford. Sterile material was collected by the former two in prosecuting certain investigations for the Forestry Bureau, while that secured by Whitford was for the purpose of determining the constituent species of certain areas, and is discussed by him in his forthcoming paper. This material is not considered in the present paper except in a few instances when it was derived from certain species which could accurately be identified, and which were not found in flower or fruit.

It is admitted that a considerable percentage of the species actually found within the limits of the reserve is not enumerated. In some cases material sent to specialists has not been identified by them in time to be incorporated in the present paper and, as their reports have not been received, the author has not felt at liberty to work on such material. In other cases, such as in the *Euphorbiaceæ*, several species are represented by imperfect specimens which, at present, render accurate identification impossible. In the sterile material collected by Borden, Meyer, and Whitford and not found in fruit or flower, a certain proportion of species occur which I have been unable even to refer to their proper families. Owing to the methods employed in collecting, many species are now represented in our herbarium by numerous specimens, while others, rather common at Lamao, by but one or two. It is very probable that some common species, especially of herbaceous and weedy plants, are still unrepresented in our collections, and that future botanizing in this region will add a considerable number to the present list.

Warburg, Vidal, and Loher have collected on Mount Mariveles, but all three apparently used the town of Mariveles as a base and none of them entered the limits of the Lamao Forest Reserve, unless it might possibly have been along the upper boundary ridges, above an altitude of 1,000 meters. Vidal's specimens from Mount Mariveles are cited in his "Revisión de Plantas Vasculares Filipinas," some of Warburg's in his "Monsunia," and some in Perkins' "Fragmenta Floræ Philippinæ" and other papers by various authors. Loher's material, although it is in greater part identified, has been but little cited, as it has been collected at a comparatively recent date. Mr. R. S. Williams, collector for the New York Botanical Garden, spent several months at Lamao in 1903–4. He made an extensive collection within the limits of the Lamao Forest Reserve, but his material is at the New York Botanical Garden and it has not, as yet, entirely been classified, so that it is not available for enumeration in the present paper.

SEQUENCE AND NOMENCLATURE.

The sequence of families and genera is that adopted by Engler and Prantl in their *Natürlichen Pflanzenfamilien*, and without exception the

families are enumerated without change in nomenclature or terminology. In reference to generic nomenclature, some changes have been found to be necessary, as I have followed the action of the Vienna Botanical Congress and accepted Harms's list of *nomina conservanda*.[1] Specific nomenclature in greater part follows standard monographs, but in some cases old names are adopted, and in others it has been found necessary to propose new ones on account of preoccupation. Citations are generally to standard monographs and floras where descriptions of the species are to be found. No attempt has been made to cite the original publications of all the species. Distributions of species have been compiled from various authentic sources, monographs, etc. Native names are cited in all instances when they were secured by collectors, names in actual use by the natives of the region alone being given.

In the following paper 611 genera and 1,151 species and varieties are enumerated, all found within the limits of the Lamao Forest Reserve. The material comprises *Musci* (*Bryophyta* and *Hepaticæ*), vascular cryptogams, and flowering plants, but not the fungi, algæ, and lichens. The fungi have in part been identified by Mr. P. L. Ricker, of the United States Department of Agriculture, and many genera and species of various families are represented. None of the lichens have as yet been identified, although the same is true in regard to them, especially at the higher altitudes. Both marine and fresh-water algæ are very poorly represented at Lamao.

Summary.

Orders and families.	Genera.	Species and varieties.	Endemic species.	Introduced species.	Woody plants.	Scandent shrubs.	Trees.
HEPATICÆ	8	11					
MUSCI	16	23	3				
FILICALES:							
Hymenophyllaceæ	2	8					
Polypodiaceæ	37	99	15				
Cyatheaceæ	2	2	1		1		1
Gleicheniaceæ	1	2	1				
Schizaeaceæ	1	3					
MARATTIALES:							
Marattiaceæ	2	2					
OPHIOGLOSSALES:							
Ophioglossaceæ	2	4					
LYCOPODIALES:							
Lycopodiaceæ	1	6					
Selaginellaceæ	1	6	?				
CYCADALES:							
Cycadaceæ	1	1			1		1
CONIFERÆ:							
Taxaceæ	1	2			2		2
Pinaceæ	1	1	1		1		1
GNETALES:							
Gnetaceæ	1	2			2	1	1

[1] *Notizblatt Kgl. Bot. Gart. und Mus. Berl.* (1904), App. **13**, 9–37.

Summary—Continued.

Orders and families.	Genera.	Species and varieties.	Endemic species.	Introduced species.	Woody plants.	Scandent shrubs.	Trees.
PANDANALES:							
Pandanaceæ	2	7	6		7	3	3
GLUMIFLORÆ:							
Gramineæ	26	49	6	2	8	2	
Cyperaceæ	8	23	3				
PRINCIPES:							
Palmæ	6	11	9	1	11	5	5
SPATHIFLORÆ:							
Araceæ	8	12	6		3	3	
FARINOSÆ:							
Flagellariaceæ	1	1			1	1	
Bromeliaceæ	1	1		1			
Commelinaceæ	5	7					
Pontederiaceæ	1	1					
LILIIFLORÆ:							
Liliaceæ	4	5	2		3	2	1
Amaryllidaceæ	1	1					
Taccaceæ	1	1					
Dioscoreaceæ	1	3	1		1		
SCITAMINEÆ:							
Musaceæ	1	3					
Zingiberaceæ	6	9	6				
Cannaceæ	1	1		1			
Marantaceæ	1	1			1		
MICROSPERMÆ:							
Orchidaceæ	20	32	25				
PIPERALES:							
Piperaceæ	2	8	3(?)		2		
Chloranthaceæ	1	2			2		
MYRICALES:							
Myricaceæ	1	1			1		1
JUGLANDALES:							
Juglandaceæ	1	2	1		2		2
FAGALES:							
Fagaceæ	1	6			6		6
URTICALES:							
Ulmaceæ	4	5	3		5		5
Moraceæ	6	41	20		41	11	30
Urticaceæ	7	12	9		6		6
PROTEALES:							
Proteaceæ	1	2	2		2		2
SANTALALES:							
Loranthaceæ	2	5	?		5		
Santalaceæ	1	1			1	1	
Opiliaceæ	2	2			2	1	1
Olacaceæ	2	2	1		2	1	1
Balanophoraceæ	1	1	1				
ARISTOLOCHIALES:							
Aristolochiaceæ	1	1	1				
CENTROSPERMÆ:							
Amarantaceæ	4	5			2	2	
Aizoaceæ	1	1					
RANALES:							
Menispermaceæ	5	6	1		6	6	
Magnoliaceæ	3	3	2		3		3

Summary—Continued.

Orders and families.	Genera.	Species and varieties.	Endemic species.	Introduced species.	Woody plants.	Scandent shrubs.	Trees.
RANALES—Continued.							
Anonaceæ	12	22	14		22	6	16
Myristicaceæ	4	6	6		6		6
Monemiaceæ	1	1	1		1		1
Lauraceæ	8	13	8		13		13
RHOEADALES:							
Hernandiaceæ	1	1	1		1	1	
Capparidaceæ	3	6	2	1	5	5	
Moringaceæ	1	1		1	1		1
SARRACENALES:							
Nepenthaceæ	1	1	1				
ROSALES:							
Crassulaceæ	1	1					
Saxifragaceæ	3	3	3		3		3
Pittosporaceæ	1	3	3		3		3
Cunoniaceæ	1	1	1		1		1
Rosaceæ	5	7	2		6	1	4
Connaraceæ	5	6	4		6	5	1
Leguminosæ	38	68	10	13	41	15	26
GERANIALES:							
Oxalidaceæ	2	2		1	1		1
Rutaceæ	10	13	5		13		13
Simarubaceæ	2	3	3		3		3
Burseraceæ	2	5	5		5		5
Meliaceæ	8	19	17		19		19
Malpighiaceæ	2	2	1		2	2	
Polygalaceæ	2	2	1		1		1
Dichapetalaceæ	1	1	1		1		
Euphorbiaceæ	29	61	26	2	47	2	43
SAPINDALES:							
Buxaceæ	1	1	1		1		1
Anacardiaceæ	7	13	5	3	13		13
Celastraceæ	1	1			1	1	
Hippocrateaceæ	2	3	1		3	3	
Staphyleaceæ	1	1			1		1
Icacinaceæ	2	2	1		2		2
Aceraceæ	1	1	1		1		1
Sapindaceæ	11	16	11		16		16
Sabiaceæ	1	1	?		1		1
RHAMNALES:							
Rhamnaceæ	2	3	2		3	1	2
Vitaceæ	2	11	2		11	8	3
MALVALES:							
Elaeocarpaceæ	1	2	1		2		2
Gonystylaceæ	1	1			1		1
Tiliaceæ	4	7	1	1	5		5
Malvaceæ	8	17		5	7	1	2
Bombacaceæ	2	2		1	2		2
Sterculiaceæ	11	17	7	1	15		14
PARIETALES:							
Dilleniaceæ	3	4	3		4	1	3
Theaceæ	5	5	4		5		5
Guttiferæ	4	8	6		8		8
Dipterocarpaceæ	5	9	7		9		9

Summary—Continued.

Orders and families.	Genera.	Species and varieties.	Endemic species	Introduced species.	Woody plants.	Scandent shrubs.	Trees.
PARIETALES—Cont'd.							
Bixaceæ	1	1		1	1		1
Flacourtiaceæ	1	8	6		8		8
Passifloraceæ	1	2	?				
Caricaceæ	1	1		1	1		1
Datiscaceæ	1	1			1		1
Begoniaceæ	1	2	2				
MYRTIFLORÆ:							
Thymeliaceæ	2	4	4		4		2
Elæagnaceæ	1	1			1	1	
Lythraceæ	1	1			1		1
Sonneratiaceæ	2	3	1		3		3
Lecythidaceæ	2	3	2		3		3
Rhizophoraceæ	6	6	2		6		6
Combretaceæ	3	7	4		7	2	5
Myrtaceæ	5	26	17	1	26		26
Melastomataceæ	4	15	12		15	3	9
Oenotheraceæ	2	2					
UMBELLIFLORÆ:							
Araliaceæ	3	7	3		7	3	4
Umbelliferæ	2	2					
Cornaceæ	2	2	1		2		2
ERICALES:							
Clethraceæ	1	1	1		1		1
Ericaceæ	2	6	6		6		5
PRIMULALES:							
Myrsinaceæ	6	11	11		14	5	5
EBENALES:							
Sapotaceæ	4	11	10		11		11
Ebenaceæ	1	5	4		5		5
Symplocaceæ	1	5	4		5		5
CONTORTÆ:							
Oleaceæ	3	7	6		7	1	6
Loganiaceæ	4	4	2		3	2	1
Apocynaceæ	14	15	9		15	7	7
Asclepiadaceæ	6	8	7		2	2	
TUBIFLORÆ:							
Convolvulaceæ	6	13	2	3	3	3	
Borraginaceæ	4	5	2		4	1	3
Verbenaceæ	7	20	10		19	1	8
Labiatæ	5	7	2	3			
Solanaceæ	3	7	1	2	1		
Scrophulariaceæ	5	7					
Bignoniaceæ	2	2	1		2		2
Pedaliaceæ	1	1		1			
Gesneriaceæ	2	2	2		3		
Acanthaceæ	13	18	7	1	4		
RUBIALES:							
Rubiaceæ	25	54	35		47	6	28
Caprifoliaceæ	2	3	2		3		1
CAMPANULATÆ:							
Cucurbitaceæ	5	6	2	2			
Compositæ	10	17	2	5	3		2
Total	611	1,151	479	54	686	127	548

In examining the above summary it will be noted that 611 genera and 1,151 species and varieties are enumerated from an area of approximately 4,426 hectares. The vascular cryptogams and flowering plants are distributed into 138 families and 584 genera, 1,114 species and varieties being represented. So far as can be determined at this time, 479 species, or 41 per cent of the total number found in the reserve, are endemic to the Philippines, thus emphasizing the insular character of the vegetation; 54 have apparently been introduced, although it is frequently difficult to determine this point and the greater proportion of the latter class are so well established that they must be considered to be constituents of the Philippine flora. Six hundred and eighty-six species, or nearly 60 per cent of the total number, are woody plants—that is, trees, shrubs, scandent shrubs, or undershrubs. Of these, 485, or 42 per cent of the total, are trees; thus the arborescent character of the vegetation is strongly marked. In this classification all plants which in their period of growth may reach a height of 5 or 6 meters, or more, and which have a well-defined trunk and woody tissue, have been considered to be trees. Shrubs and undershrubs are represented by 74 species, and scandent shrubs by 127. Four hundred and sixty-five species are herbaceous, although it has frequently been difficult to define the difference between herbaceous and woody plants. *Musci, Hepaticæ, Filices, Graminæ, Orchidaceæ,* and *Cyperaceæ* account for a large percentage of these, but many of the ferns here classified as herbaceous plants are decidedly woody in character.

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ASIPHONOGAMA.

BRYOPHYTA.

HEPATICÆ.[2]

MARCHANTIALES.

MARCHANTIACEÆ.

1. MARCHANTIA (L.) Raddi.

1. **M. emarginata** Reinw. Bl. et Nees.; Schiffner Consp. Hepat. Arch. Ind. (1898) 47.

(288 *Whitford*) May. On damp rocks in ravines at 800 m. Malaya.

JUNGERMANIALES.

JUNGERMANIACEÆ ANAKROGYNÆ.

1. RICCARDIA S. F. Gray.

1. **R. parvula** Schiffn.?

(3524 *Merrill*) October. On wet bowlders in streams.

JUNGERMANIACEÆ AKROGYNÆ.

1. BAZZANIA S. F. Gray.

1. **B. erosa** (Reinw. Bl. et Nees) Trevis; Schiffner l. c. 154.

(3519 *Merrill*) October. On trees, exposed ridges above 1,000 m. Malaya.

2. **B. praerupta** (Reinw. Bl. et Nees) Trevis; Schiffner l. c. 169.

(3517 *Merrill*, in part) October. On trees, exposed ridges above 1,000 m. British India to Malaya.

2. LEPIDOZA Dum.

1. **L. trichodes** (Reinw. Bl. et Nees) Lindenb.; Schiffner l. c. 192.

(3539 *Merrill*) October. On trees, exposed ridges above 1,000 m. Malaya to Tahiti and (?) Central America.

3. MASTIGOPHORA Nees.

1. **M. diclados** (Brid. et Web.) Nees; Schiffner l. c. 202.

(3522 *Merrill*) October. On trees, exposed ridges above 1,000 m. Tropical Africa and Asia to Malaya, Polynesia, Samoa, and Tahiti.

4. SCHISTOCHILA Dum.

1. **S. aligera** (Nees) Schiffn. l. c. 211.

(263 *Copeland*) January; (3518 *Merrill*) October. On trees, exposed ridges above 1,000 m. British India to Malaya and Polynesia.

5. PTYCHANTHUS Nees.

1. **P. striatus** (Lehm. et Lindenb.) Nees.; Schiffner l. c. 315.

(187 *Whitford*) May. On rocks and logs in forests at 600 m. Madagascar to British India and Malaya.

[2] Determined by Dr. A. W. Evans, New Haven, Conn., U. S. A.

6. FRULLANIA Raddi.

1. **F. integristipula** Nees; Schiffn. l. c. 328.
(3517 *Merrill*, in part) October. On trees, exposed ridges above 1,000 m. Java and Sumatra.
2. **F. orientalis** Sande Lac.; Schiffn. l. c. 335.
(3520 *Merrill*) October. On trees, exposed ridges above 100 m. Java.

ANTHOCEROTALES.

ANTHOCEROTACEÆ.

1. ANTHOCEROS Linn.

1. **A. grandis** Angstr.; Schiffner l. c. 351.
(261, 1100 *Whitford*) May, February. On wet rocks in cañon of the Lamao river 600 to 800 m., and during the wet season in borders of thickets below 100 m. Amboina and Tahiti.

MUSCI.

BRYALES.[3]

DICRANACEÆ.

1. DICRANOLOMA.

1. **D. blumei** (Nees) Ren.
(3557 *Merrill*) October. On trees above 1,200 m. Ceylon to Java and New Guinea.

LEUCOBRYACEÆ.

1. LEUCOBRYUM Hampe.

1. **L. sanctum** Hampe.
(3540, 3549 *Merrill*) October. On trees above 1,200 m. Nepal to Malaya, New Guinea, Samoa, and Fiji.
2. **L. javense** (Brid.) Mitt.
(3550 *Merrill*) October. With the preceding. British India to Japan and Malaya.
3. **L. angustifolium** Wils.
(3548 *Merrill*) October. With the preceding. Ceylon to Malaya and Celebes.

2. OCTOBLEPHARUM Hedw.

1. **O. albidum** (L.) Hedw.
(3681 *Merrill*) January. On prostrate logs in forests. Tropics of the world.

FISSIDENTACEÆ.

1. FISSIDENS Hedw.

1. **F. zollingeri** Mont.
(3560 *Merrill*) October. On damp earth banks at 100 m. Java.
2. **F. zippelianus** Doz. et Molk.
(3554, 3555 *Merrill*) October. On damp shaded banks at about 100 m. Ceylon to Hongkong, Malaya, and New Guinea.

[3] (Compiled from Brotherus "Contributions to the Bryological Flora of the Philippines, I." *Finska Vetenskaps-Societetens Förhandlingar* (1904–5) 47, No. 14: 1 to 12.)

ORTHOTRICHACEÆ.

1. MACROMITRIUM Brid.

1. **M. salakanum** C. Mull.
(433 *Whitford*) June. On trees in forests at 850 m. Java.
2. **M. cuspidatum** Hampe.
(740 *Bordon*) June. On trees at 1,020 m. Borneo to Java and Sumatra.
3. **M. reinwardtii** Schwaegr.
(3558 *Merrill*) October. On trees above 1,200 m. Java and Borneo to Tasmania and Tahiti.

FUNARIACEÆ.

1. FUNARIA Schreb.

1. **F. calvescens** Schwaegr.
(157 *Whitford*) May; (3678 *Merrill*) January; (1409 *Copeland*) August; (6854 *Elmer*) November. On recently burned-over lands near the summit of the mountain. Tropical and subtropical regions of the world.

BRYACEÆ.

1. BRYUM Dill.

1. **B. coronatum** Schwaegr.
(3556 *Merrill*) October. On damp shaded banks in forests. Tropics generally.

RHIZOGONIACEÆ.

1. RHIZOGONIUM Brid.

1. **R. spiniforme** (Linn.) Bruch.
(3548, 3679 *Merrill*) October, January. On trees above 1,200 m. Tropical and subtropical regions of the world.

POLYTRICHACEÆ.

1. POGONATUM.

1. **P. albo-marginatum** (C. Mull.)
(3680 *Merrill*) January; (1410 *Copeland*) August. On bare soil of slides and on recently burned-over ground above 1,000 m. Malaya to Celebes and New Guinea.

SPIRIDENTACEÆ.

1. SPIRIDENS Nees.

1. **S. reinwardtii** Nees.
(266 *Copeland*) January; (3542, 3547 *Merrill*) October; (4447 *Whitford*) June. On trees, exposed ridges above 1,000 m. Malaya to Celebes and New Guinea.

NEKERACEÆ.

1. AEROBRYUM Doz. et Molk.

1. **A. lanosum** Mitt.
(3551 *Merrill*) October. On trees, exposed ridges above 1,000 m. British India to Amboina and Celebes.

SEMATOPHYLLACEÆ.

1. SEMATOPHYLLUM Mitt.

1. **S. hyalinum** (Reinw.) Jaeg.
(741 *Borden*) June; (3541, 3546, 3682 *Merrill*). On prostrate logs and trees, forests and exposed ridges above 500 m. Malaya to Celebes.
2. **S. alto-pungens** (C. Mull.) Jaeg.
(230 *Whitford*) May. On bowlders above 1,000 m. Endemic.

2. TAXITHELIUM Mitt.

1. **T. instratum** (Brid.) Broth.
(3543 *Merrill*) October. On trees in forests. Malaya to New Guinea.

3. ECTROPOTHECIUM Mitt.

1. **E. meyenianum** (Hamp.) Jaeg.
(3544 *Merrill*) October. On wet bowlders in river bed. Endemic.
2. **E. cyperoides** (Hook.) Jaeg.
(1408 *Copeland*) August. On recently burned-over ground at 1,000 m. British India to Malaya and the Caroline Islands.

LESKEACEÆ.

1. THUIDIUM Schimp.

1. **T. trachypodium** (Mitt.) Br.
(2559 *Merrill*) October. On damp bowlders and tree trunks. British India to Sumatra and Java.

HYPNODENDRACEÆ.

1. MNIODENDRON Lindb.

1. **M. fusco-mucronatum** (C. Mull.) Broth.
(281 *Whitford*). On rocks in damp ravines at 940. Endemic.

PTERIDOPHYTA.

FILICALES.[4]

FILICALES LEPTOSPORANGIATÆ.

HYMENOPHYLLACEÆ.

1. TRICHOMANES Sm.

1. **T. auriculatum** Blume.
(6744 *Elmer*) November; (397 *Topping*) May. On exposed ridges in the mossy forests above 1,000 m.
2. **T. motleyi** Bosch.
(3523 *Merrill*) October. On wet bowlders in river bed at 120 m.

[4] This list of vascular cryptogams has been compiled from named specimens in the herbarium, the identifications having been made by Dr. E. B. Copeland, formerly of this office. While in press several additional identifications have been received from Dr. H. Christ, Bâle, Switzerland, these species having been inserted in the proof, the identifications being credited to Dr. Christ in the text.

3. **T. javanicum** Bl.

(263, 513 *Whitford*) May, July; (206, 207 *Copeland*) January; (3121 *Merrill*) October; (2397 *Borden*) January; (2420 *Meyer*) January; (6880 *Elmer*) November; (451 *Topping*) May. In ravines along streams 150 to 600 m.

4. **T. parvulum** Poir.

(177 *Whitford*) May. In ravines 500 to 700 m.

5. **T. pallidum** Blume.

(1106 *Whitford*) February; (455 *Topping*) May; (6799 *Elmer*) November; (205 *Copeland*) January; (3234 *Merrill*) October. On trees and wet cliffs above 1,200 m.

6. **T. maximum** Blume.

(204 *Copeland*) January; (440 *Whitford*) May, July; (435, 446, 448 *Topping*) May; (2421 *Meyer*) January; (1242, 1768 *Borden*) June, August; (6879 *Elmer*) November; (3115 *Merrill*) October. In ravines and on exposed ridges in the mossy forests 100 to 1,200 m.

7. **T. bipunctatum** Poir.

(3123 *Merrill*) October; (175 *Whitford*) May; (6800 *Elmer*) November. On trees and cliffs in forests 100 to 600 m.

8. **T. rigidum** Sw.

(274 *Whitford*) May; (3214 *Merrill*) October. On damp ledges and boulders in forests 400 to 600 m. (det. *Christ*).

2. HYMENOPHYLLUM Linn.

1. **H. multifidum** Sw.

(209 *Copeland*) January; (3231 *Merrill*) October; (7034 *Elmer*) November. On wet cliffs above 1,200 m.

2. **H. smithii** Hook.

(208 *Copeland*) January; (165, 443 *Whitford*) May, July; (454 *Topping*) May; (3233 *Merrill*) October; (6801 *Elmer*) November. On wet mossy cliffs and trees above 1,200 m.

POLYPODIACEÆ.

1. POLYSTICHUM Roth.

1. **P. coniifolium** (Wall.) Presl.; Copeland Govt. Lab. Pub. 28 (1905) 18.

(136, 142 *Barnes*) January; (*Copeland*) January; (433 *Topping*) May; (136 *Whitford*) May. In forests 600 to 800 m. Africa to Polynesia.

2. NEPHRODIUM Rich.

1. **N. canescens** (Blume) Christ; Copeland l. c. 27.

(6970 *Elmer*) November; (3130 *Merrill*) October; (6153 *Leiberg*) July; (250 *Copeland*) January; (381 *Topping*) May. On wet rocks and ledges along the river above 100 m. Java, Celebes.

2. **N. rubidum** Hook.; Copeland l. c. 27.

(272 *Whitford*) May. Along streams in forests 500 to 600 m. Java and Borneo (?).

3. **N. moulmeinense** Beddome; Copeland l. c. 29.

(427 *Topping*) May; (6090 *Leiberg*) July. In forests 100 to 300 m. British India and Malaya.

4. **N. hirsutum** J. Sm.; Copeland l. c. 30.

(1312 *Whitford*) June. In forests at 350 m. Celebes.

5. **N. philippinense** Baker; Copel. l. c. 31.

(224, 225 *Copeland*) January; (108, 371 *Whitford*) April, June. Along streams 75 to 200 m. Endemic.

6. **N. parasiticum** (Linn.) Baker; Copel. l. c. 32.

(226, 1389 *Copeland*) February, August. In forests 250 to 900 m. Tropics generally.

3. ASPIDIUM Swartz.

1. **A. difforme** Blume; Copel. l. c. 35.

(424, 447 *Topping*) May; (6684 *Elmer*) November. Malaya.

2. **A. whitfordi** Copel. l. c. 35.

(201 *Whitford*) May. In forests, river cañon at 550 m. Endemic.

3. **A. cicutarium** (Linn.) Sw.; Copel. l. c. 37.

(1959 *Borden*) October; (217 *Copeland*) February; (533 *Topping*) May. In forests at about 200 m. Tropics generally.

4. **A. irriguum** J. Sm.; Copel. l. c. 38. *A. lamaocuse* Copel. l. c. 35.

(223 *Copeland*) February; (2497 *Meyer*) January. On rocks along streams below 120 m. Endemic.

4. POLYBOTRYA H. B. K.

1. **P. apiifolia** Hook.; Copel. l. c. 40.

(6162 *Leiberg*) July; (1758 *Borden*) August; (6659 *Elmer*) November; (506 *Whitford*) July; (*Copeland*) February; (3129 *Merrill*) October; (73 *Barnes*) November. On rocks and banks along streams 75 to 200 m. Endemic.

2. **P. appendiculata** (Willd.) Blume; Copel. l. c. 40.

(292 1099 *Whitford*) May, February; (6705 *Elmer*) November; (254 *Copeland*) January. In ravines 200 to 800 m. Tropical Asia to Malaya.

5. GYMNOPTERIS Bernh.

1. **G. inconstans** Copel. l. c. 43.

(6076 *Leiberg*) July; (6703 *Elmer*) November; (437, 1124 *Whitford*) June, March; (386, 444 *Topping*) May; (251 *Copeland*) January; (3128 *Merrill*) October. On damp rocks in river bed 100 to 650 m. Endemic.

2. **G. contaminans** (Wall.) Bedd.; Copel. l. c. 43.

(249 *Copeland*) February. In forests along the river at 160 m. British India and Burma.

3. **G. taccaefolia** (Hook.) J. Sm.; Copel. l. c. 42.

(537 *Whitford*) July. In thickets below 75 m. Endemic.

6. DIPTERIS Reinw.

1. **D. conjugata** (Kaulf.) Reinw.; Copel. l. c. 44.

(449 *Topping*) May; (6993 *Elmer*) November; (2091 *Borden*) November; (3228 *Merrill*) October; (250 *Whitford*) May. On exposed ridges in the mossy forest above 1,200 m. Malaya to Formosa and Polynesia.

7. NEPHROLEPIS Schott.

1. **N. cordifolia** Presl.; Copel. l. c. 46.

(143 *Whitford*) May; (3236 *Merrill*) October; (438 *Topping*) May; (6824 *Elmer*) November. On exposed ridges in the mossy forest above 1,200 m. Tropics generally.

2. **N. acuta** Presl; Copel. l. c. 47.

(404 *Topping*) May. In the river cañon. Tropics generally.

8. OLEANDRA Cav.

1. **O. colubrina** (Blanco) Copel. l. c. 48.

(1381 *Copeland*) August; (450 *Topping*) May; (6819 *Elmer*) November; (3238 *Merrill*) October; (1587, 2092 *Borden*) August, November; (248 *Whitford*) May. On exposed ridges in the mossy forest above 1,200 m. Endemic.

9. HUMATA Cav.

1. **H. cumingii** (Hook.) Copel. l. c. 51.

(349 *Topping*) May; (2413 *Meyer*) January. On trees in the mossy forest above 1,000 m. Endemic.

2. **H. repens** (Linn.) J. Sm.; Copel. l. c. 50.

(347 *Barnes*) February; (128 *Whitford*) May; (3210 *Merrill*) October; (*Copeland*) January; (6969 *Elmer*) November. On rocks and trees in the mossy forest, exposed ridges, above 1,000 m. Tropical Asia to Japan, Malaya and Australia.

10. DAVALLIA Smith.

1. **D. solida** Sw., var. **latifolia** Hook.

(220 *Whitford*) May; (6894 *Elmer*) November. With the preceding.

2. **D.** sp.

(3715 *Merrill*) January; (1343 *Borden*) July; (1010 *Whitford*) October. On exposed ridges in the mossy forest above 1,000 m. Malaya and Polynesia.

11. MICROLEPIA Presl.

1. **M. ciliata** (Hook.) Copel. l. c. 55.

(375 *Topping*) May. Endemic.

2. **M. pinnata** Cav.; Copel. l. c. 55.

(6831 *Elmer*) November; (170, 1188 *Whitford*) May, March; (367 *Topping*) May; (6072, 6073 *Leiberg*) July; (232 *Copeland*) January; (1344 *Borden*) July. In forests 100 to 1,300 m. Malaya and Polynesia.

3. **M. pinnata** Cav. var. **gracilis** (Blume) Copel. l. c. 55.

(6988 *Elmer*) November; (154 *Whitford*) May; (354 *Topping*) May; (3213 *Merrill*) October; (1379 *Copeland*) August. With the preceding at higher altitudes.

4. **M. speluncae** (L.) Moore; Copel. l. c. 56.

(*Whitford*) December. In forests at about 100 m. Tropics generally.

12. DENNSTAEDTIA Bernh.

1. **D. cuneata** (Hook.) Christ; Copel. l. c. 57.

(195, 1115 *Whitford*) May, February; (399 *Topping*) May. In ravines 600 to 800 m. Batjan.

2. **D. smithii** (Hook.) Christ; Copel. l. c.

(1133 *Whitford*) March. In ravines, 700 to 1,100 m. Formosa and Java.

13. LINDSAYA Dryand.

1. **L. davallioides** Blume; Copel. l. c. 64.

(1380 *Copeland*) August. Mossy forest on exposed ridges at 1,100 m. Malaya.

2. **L. concinna** J. Sm.; Copel. l. c. 61.

(2396 *Borden*) January; (3779 *Merrill*) January; (228, 231, 271 *Copeland*) January; (235, 1109 *Whitford*) May, February; (6161, 6071 *Leiberg*) July; (395, 425, 432 *Topping*) May; (2419 *Meyer*) January, (6685 *Elmer*) November. In forests 100 to 900 m. Borneo.

3. **L. hymenophylloides** Blume; Copel. l. c. 60.

(158, 1107 *Whitford*) May, February; (3220 *Merrill*) October; (229 *Copeland*) January; (393 *Topping*) May. On exposed ridges in the mossy forest above 1,100 m. Java and New Caledonia.

4. **L. merrilli** Copel. l. c. 61.

(280 *Whitford*) May. Ravines, river cañon at 1,050 m. Endemic.

5. **L. orbiculata** (Lam.) Mett. *L. montana* Copel. l. c. 62.

(230, 1385 *Copeland*) January, August; (351 *Topping*) May; 1162 *Whitford*) March. In forests above 1,000 m.

14. HEMIONITIS Linn.

1. **H. arifolia** (Burm.) Bedd.; Copel. l. c. 67.

(532 *Whitford*) July; (6113 *Leiberg*) July; (3259 *Merrill*) October. In thickets on earth banks below 100 m. India.

2. **H. gymnopteroidea** Copel. l. c. 67.

(1398 *Copeland*) August; (6164 *Leiberg*) July; (6660 *Elmer*) November; (498 *Whitford*) July; (166 *Barnes*) January; (3113 *Merrill*) October; (2124 *Borden*) November. In thickets and forests below 150 m. Endemic.

15. LOXOGRAMME Presl.

1. **L. lanceolata** (Blume) Presl.; Copel. l. c. 68.

(1406 *Copeland*) August; (186, 1125 *Whitford*) May, March; (389, 415, 429 *Topping*) May; (6972 *Elmer*) November. On mossy rocks in river cañon and on ridges in the mossy forest above 600 m. Africa to Japan and Polynesia.

16. CALLIPTERIS Bory.

1. **C. esculenta** (Retz.) Copel. l. c. 71.

(2542, 2552 *Merrill*) June; (6682 *Elmer*) November. On banks of, and on bars in the bed of the Lamao River. Tropical Asia to Formosa and Malaya. T. *Paco.*

17. DIPLAZIUM Sw.

1. **D. polypodioides** Blume; Copel. l. c. 76.

(132 *Barnes*) January; (1238 *Borden*) June; (194 *Whitford*) May; (365, 398 *Topping*) May; (6709 *Elmer*) November; (235 *Copeland*) February. In forests 100 to 800 m. British India and Malaya.

2. **D. sylvaticum** Sw.; Copeland l. c. 73.

(238, 1383 *Copeland*) January, August; (1328 *Borden*) July; (531 *Topping*) May; (6010 *Leiberg*) July; (234 *Whitford*) May. In forests 100 to 700 m. Tropics generally.

18. ASPLENIUM Linn.

1. **A. nidus** Linn.; Copel. l. c. 78.

(6054 *Leiberg*) July; (6798 *Elmer*) November; (401 *Topping*) May. In forests above 600 m. Mauritius to Japan and New Caledonia.

2. **A. subnormale** Copel. l. c. 80.

(236, 1395 *Copeland*) February, August; (445 *Topping*) May; (6154 *Leiberg*) July. In forests at about 100 m. Endemic.

3. **A. tenerum** Forst.; Copel. l. c. 81.

(316 *Whitford*) May; (383 *Topping*) May; (*Copeland*) January. In mossy forests on exposed ridges above 900 m. Tropical Asia to Malaya and Polynesia.

4. **A. macrophyllum** Sw.; Copel. l. c. 83.

(275 *Whitford*) May; (422 *Topping*) May. In river cañon above 500 m. Tropical Asia to Malaya and Polynesia.

5. **A. hirtum** Kaulf.; Copl. l. c. 83.

(385, 412, 428 *Topping*) May; (3212, 3760 *Merrill*) October, January; (6792, 6971 *Elmer*) November; (218, 315 *Whitford*) May; (143 *Barnes*) January; (1345 *Borden*) July. On exposed ridges in the mossy forest above 900 m. Madagascar to Polynesia.

6. **A. laserpitiifolium** Lam.; Copel. l. c. 85.

(371, 382, 384, 414 *Topping*) May; (6712, 6794 *Elmer*) November; (153 *Barnes*) January; (237 *Copeland*) February; (176 *Whitford*) May. On exposed ridges and in ravines above 700 m. Tropical Asia to Malaya and Polynesia.

19. STENOCHLAENA J. Sm.

1. **S. sorbifolia** (Linn.) J. Sm.; Copel. l. c. 88.

(368 *Barnes*) March; (423, 431 *Topping*) May. In forests above 100 m. Tropics generally.

20. BLECHNUM Linn.

1. **B. orientale** Linn.; Copel. l. c. 89.

(1331 *Whitford*) May; (*Copeland*). Eroding river bank at 400 m., and on ridges at 1,200 m. Tropical Asia to Australia and Polynesia.

21. ADIANTUM Linn.

1. **A. alatum** Copel. l. c. 93.

(243, 1399 *Copeland*) January, August; (2576 *Meyer*) February. In thickets and forests 30 to 200 m. Endemic.

2. **A. caudatum** Linn.; Copel. l. c. 93.

(164 *Barnes*) January; (200 *Whitford*) May; (392 *Topping*) May. In thickets and forests 50 to 550 m. Tropical Africa, Asia, and Malaya.

3. **A. diaphanum** Blume; Copel. l. c.

(6986 *Elmer*) November; (1098 *Whitford*); (378, 380 *Topping*) May. On shaded banks in ravines and on exposed ridges above 600 m. China to Malaya and New Zealand.

4. **A. hispidulum** Sw.; Copel. l. c. 94.

(1163 *Whitford*) March; (6974 *Elmer*) November; (355 *Topping*) May; (3256 *Merrill*) October; (1390 *Copeland*) August. On slopes and on exposed ridges in the mossy forest above 1,000 m. Paleotropic.

5. **A. philippense** Linn.; Copel. l. c. 94. *A. lunulatum* Burm.

(6748 *Elmer*) November; (1397 *Copeland*) August. In thickets and forests below 200 m. Tropics generally.

22. HYPOLEPIS Bernh.

1. **H. tenuifolia** Bernh.; Copel. l. c. 95.

(233 *Copeland*) February; (420 *Topping*) May; (466 *Whitford*) July. In cañons and on ridges 100 to 1,200 m. Malaya to New Zealand.

23. CHEILANTHES Sw.

1. **C. farinosa** (Forsk.) Kaulf.; Copel. l. c. 96.

(3192 *Merrill*) October; (1394 *Copeland*) August. On exposed ridges in the mossy forest above 1,000 m., dwarfed forms. Tropics generally.

2. **C. tenuifolia** (Burm.) Sw.; Copel. l. c.

(3143 *Merrill*) October; (6110 *Leiberg*) July. In thickets below 100 m. Tropical Asia to Malaya, New Zealand and Polynesia.

24. PTERIS Linn.

1. **P. cretica** Linn.; Copel. l. c. 100.

(6155 *Leiberg*) July; (3122 *Merrill*) October. On wet banks and ledges at about 100 m. Tropics generally.

2. **P. semipinnata** Linn.; Copel. l. c. 101.

(3790 *Merrill*) January. On exposed ridges in the mossy forest above 1,200 m. Tropical Asia to Japan and Borneo.

3. **P. heteromorpha** Fée.; Copel. l. c. 101.

(2072 *Borden*) October; (6150 *Leiberg*) July; (3772 *Merrill*) January; (1037 *Whitford*) December; (2287 *Meyer*) December. In thickets below 100 m. Celebes.

4. **P. quadriaurita** Retz.; Copel. l. c. 101.

(239 *Copeland*) February. In forests at 120 m. Tropics generally.

5. **P. longipes** Don.; Copel. l. c. 102.

(*Copeland*) January. In forests at 100 m. British India to New Guinea.

6. **P. kleiniana** Presl.; Copel. l. c. 103.

(240 *Copeland*) February. In forests 100 to 160 m. British India.

7. **P. excelsa** Gaud.; Copel. l. c. 102.

(409 *Topping*) May; (1132 *Whitford*) March. In river cañon at 1,000 m. Himalayan region to Hawaii.

8. **P. tripartita** Sw.; Copel. l. c. 103.

(242 *Copeland*) February; (1130 *Whitford*) March; (421 *Topping*) May. River cañon up to 1,000 m. Tropical Africa, Asia to Malaya and Polynesia.

9. **P.** sp.

(3755 *Merrill*); (361, 443 *Topping*) May; (241 *Copeland*) February; (216 *Whitford*) May. In forests 120 to 1,200 m.

25. PTERIDIUM Gleditsch.

1. **P. aquilinum** (Linn.) Kuhn.; Copel. l. c. 104.

On ridges in the mossy forest above 1,000 m. (*Copeland*). Cosmopolitan, tropical, and temperate regions, chiefly northern.

26. HISTIOPTERIS Agardh.

1. **H. incisa** (Thumb.) Agardh.; Copel. l. c. 104.

(439 *Topping*) May; (6982 *Elmer*) November. On exposed ridges in the mossy forest above 1,200 m. Tropical Asia, Malaya, etc.

27. VITTARIA Sm.

1. **V. elongata** Sw.; Copel. l. c. 107.

372 *Topping*) May; (1401 *Copeland*) August. In forests at 1,600 m. Tropics of the eastern Hemisphere.

2. **V. lineata** Sw.; Copel. l. c. 107.

(2412 *Meyer*) January; (1818 *Borden*) September; (6797, 6966 *Elmer*) November; (362, 368 *Topping*) May; (217, 444, 497 *Whitford*) May, July; (221, 222 *Copeland*) January, February; (3742, 3132 *Merrill*) January, October. In forests and on exposed ridges 100 to 1,300 m. Tropics generally.

28. ANTROPHYUM Kaulf.

1. **A. reticulatum** Kaulf.; Copel. l. c. 109.

(6654 *Elmer*) November; (2286 *Meyer*) December; (388, 405, 406, 437 *Topping*) May; (196 *Whitford*) May; (210, 211 *Copeland*) February; (1219 *Borden*) June; (2540 *Merrill*) June. In forests 150 to 1,000 m. Tropical Asia to Malaya and Polynesia.

29. HYMENOLEPIS Kaulf.

1. **H. spicata** (Linn. f.) Presl.; Copel. l. c. 110.

(6967 *Elmer*) November; (213, 1402 *Copeland*) January, August. In forests and on exposed ridges above 500 m. Madagascar, tropical Asia, Malaya, and Polynesia.

30. TAENITIS Willd.

1. **T. blechnoides** Sw.; Copel. l. c. 111.

(430 *Topping*) May. In forests, a characteristic plant of dry ridges. Ceylon to Malaya.

31. CHRISTIOPTERIS Copel.

1. **C. sagitta** (Christ.) Copel. l. c. 111.

(321 *Whitford*) May; (411 *Topping*) May; (1339 *Borden*) July; (7031 *Elmer*) November. On trees, mossy, forest, exposed ridges above 900 m. An endemic, monotypic genus.

32. NIPHOBOLUS Kaulf.

1. **N. flossiger** Blume; Copel. l. c. 113.

(312 *Whitford*) May; (7032 *Elmer*) November; (396, 413 *Topping*) May. In forests at 700 m. British India and Java.

2. **N. nummulariæfolius** (Sw.) J. Sm.; Copel. l. c. 114.

(1393 *Copeland*) August; (3757 *Merrill*) January. On exposed ridges in the mossy forest above 1,200 m. British India to Celebes.

3. **N. varius** Kaulf.; Copel. l. c. 114.

(6060 *Leiberg*) July; (6895 *Elmer*) November. In forests at 800 m. Southern China to Java and Polynesia.

33. POLYPODIUM Linn.

1. **P. jagorianum** Mett.; Copel. l. c. 118.

(3230 *Merrill*) October; (352 *Topping*) May; (*Copeland*) August. On exposed ridges in the mossy forest above 1,100 m. Endemic.

2. **P. setosum** (Blume) Christ.; Copel. l. c. 119.

(215 *Copeland*) January. With the preceding. Java, Celebes.

3. **P. cucullatum** Nees; Copel. l. c. 120.

(1108 *Whitford*) February; (216 *Copeland*) January. On exposed ridges in the mossy forest above 1,300 m. Ceylon to Samoa.

4. **P. obliquatum** Blume; Copel. l. c. 122.

(*Copeland*) August; (214 *Copeland*) January; (244 *Whitford*) May; (350 *Topping*) May; (6816 *Elmer*) November. On exposed ridges above 900 m. British India and Malaya.

5. **P. subauriculatum** Blume; Copel. l. c. 124.

(318 *Whitford*) May; (1382 *Copeland*) August; (3208 *Merrill*) October; (6053 *Leiberg*) July; (416, 453 *Topping*) May. On exposed ridges in the mossy forest above 1,000 m. Himalayan region to Samoa and New Caledonia.

6. **P. accedens** Blume; Copel. l. c. 124.

(3225, 3750 *Merrill*) October, January; (314 *Whitford*) May; (357 *Topping*) May. On exposed ridges in the mossy forest above 900 m. Malaya and Polynesia.

7. **P. rudimentum** Copel. (?); Copel. l. c. 125.

(3244 *Merrill*) October. On exposed ridges at 1,300 m.

8. **P. punctatum** (Linn.) Christ; Copel. l. c. 126.

(197 *Whitford* May; (402, 417 *Topping*) May; (257 *Copeland*) January. Cañon of the Lamao River above 300 m. Tropical Africa, Asia, Malaya, and Polynesia.

9. **P. myriocarpum** Mett.; Copel. l. c. 126.

(2549 *Merrill*) June; (1325 *Borden*) July; (227 *Copeland*) January; (50 *Whitford*) April; (6704 *Elmer*) November. On bowlders and tree trunks in forests and thickets 75 to 200 m. Cochin China to Malaya.

10. **P. triquetrum** Blume; Copel. l. c. 126.

(6062 *Leiberg*) July; (6973 *Elmer*) November; (1391 *Copeland*) August; (126 *Whitford*) May; (353 *Topping*) May; (2414 *Meyer*) January. On exposed ridges in the mossy forest above 900 m. Malaya and Polynesia.

11. **P. glaucum** Kunze; Copel. l. c. 129.

(410 *Topping*) May; (157 *Whitford*) May; (1392 *Copeland*) August; (1340 *Borden*) July. On exposed ridges in the mossy forest above 900 m. Endemic.

12. **P. nigrescens** Blume; Copel. l. c. 130.

(1404 *Copeland*) August; (379 *Topping*) May. Cañon of the Lamao River above 500 m. British India to Malaya and Polynesia.

13. **P. palmatum** Blume; Copel. l. c. 130.

(3235 *Merrill*) October; (219 *Copeland*) January; (142 *Whitford*) May; (6058 *Leiberg*) July; (358 *Topping*) May; (6968 *Elmer*) November. In forests and on exposed ridges above 800 m. Malaya.

14. **P. albido-squamatum** Blume; Copel. l. c. 131.

(1341 *Borden*) July; (*Copeland*) January, August; (6042 *Leiberg*) July; (1170 *Whitford*) March. On exposed ridges in the mossy forest above 900 m. Malaya.

15. **P. ellipticum** Thunb.; Copel. l. c. 132.

(6655 *Elmer*) November; (373, 418 *Topping*) May; 3116 *Merrill*) October; (220 *Copeland*) February. Cañon of the Lamao River above 150 m. Tropical Asia to Japan and Australia.

16. **P. meyenianum** Schott.; Copel. l. c. 133.

(6064 *Leiberg*) July; (221 *Whitford*) May; (6745 *Elmer*) November; (408 *Topping*) May; (1386 *Copeland*) August; (1499 *Ahern's collector*) July; (1346 *Borden*) July; (3224 *Merrill*) October. On exposed ridges in the mossy forest above 650 m., epiphytic. Endemic.

34. LECANOPTERIS Blume.

1. **L. carnosa** Blume; Copel. l. c. 133.

(403 *Topping*) May; (6043 *Leiberg*) July; (334 *Whitford*) May. On exposed ridges in the mossy forest above 900 m., epiphytic. Malaya.

35. DRYNARIA Bory.

1. **D. quercifolia** (Linn.) Bory.; Copel. l. c. 135.

(372 *Whitford*) June; (7023 *Elmer*) November. In forests at 100 m., epiphytic. Tropical Asia to Malaya and Australia.

36. ELAPHOGLOSSUM Schott.

1. **E. conforme** (Sw.) Schott.; Copel. l. c. 136.

(1384 *Copeland*) August; (3250 *Merrill*) October; (Elmer) November; (442 *Topping*) May. Epiphytic, exposed ridges in the mossy forest above 1,200 m. Tropics generally.

37. ACHROSTICHUM Linn.

1. **A. aureum** Linn.; Copel. l. c. 137.

(358 *Whitford*) July. In salt marsh along the seashore. Tropics generally. T., *Lagolo*.

38. CHEIROPLEURA Presl.

1. **C. bicuspis** Presl.; Copel. l. c. 137.

(*Copeland*) January; (6822 *Elmer*) November; (356 *Topping*) May; (331 *Whitford*) May. On exposed ridges in the mossy forest above 1,000 m. Formosa to Java and New Guinea.

CYATHEACEÆ.

1. ALSOPHILA Br.

1. **A. contaminans** Wall.; Christ. Farnkräuter der Erde (1897) 327.
(1134 *Whitford*) March. Cañon of the Lamao River 800 to 1,150 m. Himalayan region to Malaya.

2. CYATHEA J. Sm.

1. **C. caudata** (J. Sm.) Copel. *Alsophila caudata* J. Sm.
(6809 *Elmer*) November; (366 *Topping*) May; (3195 *Merrill*) October; (320 *Whitford*) May. In ravines and on exposed ridges 800 to 1,300 m. Endemic.

GLEICHENIACEÆ.

1. DICRANOPTERIS Bernh.

1. **D. dolosa** Copel. in Perk. Frag. Fl. Philip. (1905) 193.
(249, 445 *Whitford*) May, July; (440 *Topping*) May; (212 *Copeland*) January; (3237 *Merrill*) October. On exposed ridges in the mossy forest above 1,200 m. Endemic.
2. **D. flagellaris** (Spreng.).
(462 *Whitford*) July. On slopes in forests at 1,250 m. Malay to the Mascarens and Fiji.

SCHIZÆACEÆ.

1. LYGODIUM Sm.

1. **L. circinatum** (Burm.) Sw.
(3133 *Merrill*) October; (203 Copeland) February; (491 *Whitford*) July; (532 *Topping*) May; 6002 *Leiberg*) July; (2121 *Borden*) October; (86 *Barnes*) November. In thickets and in forests along the river 75 to 200 m. Southern Asia to Malaya.
2. **L. scandens** Sw.
(3281 *Merrill*) October; (2220 *Meyer*) December; (2025 *Borden*) October. In thickets below 75 m., British India to Malaya and North Australia.
3. **L. japonicum** Sw.
(6120 *Leiberg*) July. In thickets below 50 m. Tropical Asia to Malaya and Australia.

MARATTIALES.

MARATTIACEÆ.

1. ANGIOPTERIS Hoffm.

1. **A. crassipes** Wall.
(3794 *Merrill*) January; (270 *Whitford*) May; (6711 *Elmer*) November. River cañon 75 to 600 m. Tropical Asia and Malaya.

2. MARATTIA Sm.

1. **M. sambucina** Blume.
(2082 *Borden*) October; (6789 *Elmer*) November; (1116 *Whitford*) March. In ravines and on ridges above 700 m.

OPHIOGLOSSALES.

OPHIOGLOSSACEÆ.

1. OPHIOGLOSSUM Linn.

1. **O. nudicaule** Linn. f.
(3273 *Merrill*) October (det. Christ). In shade of thickets below 100 m. Southern United States to Brazil, Malaya, Japan, and West Africa.
2. **O. pendulum** Linn.
(400 *Topping*) May. In ravines, cañon of the Lamao River above 900 m. Tropical Asia to Polynesia, Eastern Australia and the Mascarene Islands.
3. **O. reticulatum** Linn.
(6100 *Leiberg*) July; (530 *Whitford*) July; (3146 *Merrill*) October. In thickets below 100 m.

2. HELMINTHOSTACHYS Kaulf.

1. **H. zeylanica** (Linn.) Hook.
(531 *Whitford*) July; (6099 *Leiberg*) July. In thickets below 100 m. Tropical Asia to Malaya, Australia, and New Caledonia.

LYCOPODIALES.

LYCOPODIACEÆ.

1. LYCOPODIUM Linn.

1. **L. cernuum** Linn.
(2096 *Borden*) November. Exposed ridges in the mossy forest at 1,250 m., terrestrial.
2. **L. filiforme** Roxb.
(2101 *Borden*) November. Exposed ridges at about 1,250 m., epiphytic.
3. **L. phlegmaria** Linn.
(167 *Whitford*) May; (6828 *Elmer*) November. Exposed ridges in the mossy forest above 1,200 m., epiphytic.
4. **L. squarrosum** Forst.
(325 *Whitford*) May; (376 *Topping*) May; (3959 *Merrill*) March. On exposed ridges above 1,000 m., epiphytic.
5. **L. carinatum** Desv. (?)
(166 *Whitford*) May; (359 *Topping*) May; (3219 *Merrill*) October. On exposed ridges in the mossy forest above 1,200 m., epiphytic.
6. **L.** sp.
(*Merrill*) January. Epiphytic, mossy forest on exposed ridges above 1,200 m.

SELAGINELLACEÆ.

1. SELAGINELLA Linn.

1. **S.** sp.
(3749 *Merrill*) January. On exposed ridges in the mossy forest at 1,200 m.
2. **S.** sp.
(3241 *Merrill*) October; (265 *Copeland*) January; (168 *Whitford*) May; (2382 *Borden*) January; (364, 436 *Topping*) May. On exposed ridges in the mossy forest above 1,000 m.
3. **S.** sp.
(3792 *Merrill*) January; (269 *Copeland*) January; (178, 1299 *Whitford*) May; (6156 *Leiberg*) July; (2174 *Meyer*) December. Along the river and on damp shaded banks in forests 100 to 600 m.

4. **S.** sp.

(3118, 3127, 3782 *Merrill*) October, January; (255 *Whitford*) May. On wet rocks along the Lamao River 100 to 800 m.

5. **S.** sp.

(3775 *Merrill*) January. Shaded places along trails at 100 m.

6. **S.** sp.

(1342 *Borden*) July; (3239 *Merrill*) October; (169, 173 *Whitford*) May; (374, 387 *Topping*) May. In ravines and on ridges above 600 m.

SIPHONOGAMA.

GYMNOSPERMÆ.

CYCADALES.

CYCADACEÆ.

1. CYCAS Linn.

1. **C. circinalis** Linn.; Dyer in Hook. f. Fl. Brit. Ind. 5 (1888) 656.

(3257 *Merrill*) October; (269, 1325 *Whitford*) May; (*Meyer*) February. In forests up to 800 m., widely distributed in the Philippines. Southern Asia to Malaya, New Guinea, and Polynesia. T., *Oliba, Uliba.*

CONIFERÆ.

TAXACEÆ.

1. PODOCARPUS Pers.

1. **P. blumei** Endl.; Pilger in Engler's Pflanzenreich, 18 (1903) 60.

(147, 194 *Barnes*) January; (*Copeland*) January; (1353 *Whitford*) September. In forests at 800 m., Java to Ternate, Celebes and New Guinea.

2. **P. neriifolium** Don; Pilger l. c. 80.

(*Whitford*) March; (2743 *Borden*). In forests at about 500 m. Central Asia to China, Malaya, and New Guinea.

PINACEÆ.

1. AGATHIS Salisb.

1. **A. philippinensis** Warb. Monsunia 1 (1900) 185. *t. 8. f. E.*

(240, 297 *Whitford*) May; (736, 805 *Borden*); (3759 *Merrill*) January, also No. 163 *Merrill*, Decades Philippine Forest Flora, coll. *Borden.* In forests 800 to 1,000 m. Endemic. Sp.-Fil., *Almaciga.*

GNETALES.

GNETACEÆ.

1. GNETUM Linn.

1. **G. gnemon** Linn.; Hook. f. Fl. Brit. Ind. 5 (1887) 641.

(178 *Barnes*) January; (614, 637, 2490 *Borden*) April, January; (2516 *Merrill*) June; (2501 *Meyer*) January; (1036, 1078, 1253 *Whitford*) December, May. In forests 100 to 200 m., widely distributed in the Philippines. Southern Asia to Malaya and New Guinea. T., *Bago.*

2. **G. latifolium** Blume; Beccari, Malesia, 1 (1877) 121.

(1236 *Whitford*) May; (161 *Barnes*) January; (3158 *Merrill*) October; (1805 *Borden*) September. In forests along the river 100 to 300 m., widely distributed in the Philippines. Malaya and New Guinea. T., *Culiat*.

ANGIOSPERMÆ.

MONOCOTYLEDONÆ.

PANDANALES.

PANDANACEÆ.

1. FREYCENETIA Gaudich.

1. **F. ensifolia** Merr. Govt. Lab. Publ. 17 (1904) 5.

(3242 *Merrill*) October; (2624 *Meyer*) February; (1347 *Borden*) July; (329 *Whitford*) May; (6840 *Elmer*) November. On exposed ridges in the mossy forest 800 to 1,200 m. Endemic.

2. **F. luzonensis** Presl.; Warburg in Engler's Pflanzenreich, 3 (1900) 35.

(252 *Copeland*) January; (1311 *Whitford*) June; (3791 *Merrill*) January; (752, 2466 *Borden*) May, January; (2194, 2827 *Meyer*) December, March. In forests along the river, 100 to 800 m. Endemic. T., *Malapandan*.

3. **F.** sp.

(2826 *Meyer*) March. In forests at 900 m., flowering specimen only.

2. PANDANUS Linn.

1. **P. tectorius** Sol.; Warburg l. c. 46.

(92 *Barnes*) November; (7018 *Elmer*) November. Along the seashore, widely distributed in the Philippines. Tropical shores of Asia and Malaya. T., *Pandan*.

2. **P. arayatensis** Merr. Govt. Lab. Publ. 17 (1904) 7. *pl. 3*.

(3125 *Whitford*) May. In forested ravines and on exposed ridges, 900 to 1,200 m. Endemic. T., *Pandan golo*.

3. **P. whitfordii** Merr. l. c. 8.

(351, 507 *Whitford*) May, July; (2944 *Borden*) March. In forests along streams and on ridges 100 to 1,200 m. Endemic.

This species may not be distinct from *Pandanus gracilis* Blanco, although the habit of the specimens cited above is quite different from that of *Pandanus gracilis* as described by Blanco.

4. **P. luzonensis** Merr. l. c. 6.

(3317 *Merrill*); (91 *Barnes*); (6662 *Elmer*). Common in thickets along streams and in forests 15 to 400 m. Endemic. T., *Pandan*.

GLUMIFLORÆ.

GRAMINEÆ.

1. DIMERIA R. Br.

1. **D. orinthopoda** Trin. var. **tenera** (Trin.) Hack. in DC. Monog. Phan. 6 (1889) 81.

(3283, 3286 *Merrill*) October, January. In dry open grass lands and on bluffs near the seashore. Tropical Asia to Japan and Java.

2. IMPERATA Cyr.

1. **I. cylindrica** (Linn.) Beauv., var **koenigii** (Retz.) Benth. *I. arundinacea* Cyr.; Hack. l. c. 94.

(*Merrill*) In open grass lands common and widely distributed in the Philippines. Southern Asia to Japan, Malaya, and Australia.

2. **I. exaltata** Brongn.: Hack. l. c. 98.

(*Whitford*) Gregarious, frequently completely occupying open lands up to 900 m. Malaya to New Hebrides, varieties in tropical America. T., *Cogon.*

3. MISCANTHUS Anderss.

1. **M. japonicus** Anderss.; Hack. l. c. 107.

(3198 *Merrill*) October; (1341 *Whitford*) September. On exposed ridges at 1,200 m. Japan to southern China, Malaya, and Polynesia.

4. SACCHARUM Linn.

1. **S. spontaneum** Linn., subsp. **indicum** Hack. l. c. 114.

(1935 *Borden*) October. In open lands below 100 m., widely distributed in the Philipppines. Southern Asia to Malaya and New Guinea. T., *Talahib.*

5. POGONATHERUM Beauv.

1. **P. saccharoideum** Beauv., var. **monandrum** (Roxb.) Hack. l. c. 193.

(10 *Whitford*); (621 *Borden*); (6696 *Elmer*). Abundant on mossy ledges along streams, widely distributed in the Philippines. Southern Asia to Japan and Malaya.

6. MANISURIS Sw.

1. **M. granularis** Linn. f.; Hack. l. c. 314. *Hackeloehloa granularis* O. Kuntze.

(3094 *Merrill*) October. In open grass lands below 100 m. Tropical and subtropical regions of the world.

7. ANDROPOGON Linn.

1. **A. brevifolius** Sw.; Hack. l. c. 383.

(3306 *Merrill*) October; (6785 *Elmer*) November. In open grass lands below 100 m. Tropics of the world.

2. **A. aciculatus** Retz. Hack l. c. 562.

(801 *Borden*); (385 *Whitford*). In open grass lands below 100 m. Tropical Asia to Malaya and Polynesia.

8. ZOYSIA Willd.

1. **Z. pungens** Willd.; Hook. f. Fl. Brit. Ind. 7 (1897) 99.

(1303 *Whitford*). Open places near the seashore. Tropical Asia, to Malaya and Australia.

9. THYSANOLAENA Nees.

1. **T. maxima** (Roxb.) O. Kuntze. *T. agrostis* Nees; Hook. f. l. c. 61.

(1126 *Whitford*) October. Open grass lands and thickets. Tropics of the world.

10. PASPALUM Linn.

1. **P. scrobiculatum** Linn.; Hook. f. l. c. 10.

(3268 *Merrill*). In open grass lands, widely distributed in the Philippines. Tropics of the world.

11. ISACHNE R. Br.

1. **I. beneckei** Hack. Oesterr. Bot. Zeitschr. 51 (1901) 459.
(3201 *Merrill*); (464 *Whitford*). On exposed ridges at 1,200 m. Java.
2. **I. monticola** Büse in Miq. Pl. Jungh. (1855) 379.
(3245 *Merrill*); (264 *Whitford*). With the preceding. Formosa to Java.
3. **I. minutula** Kunth. Rev. Gram. 2: *t. 117.*
(*Whitford*) September, wet lands near the seashore. Malaya and Polynesia.

12. PANICUM Linn.

1. **P. caudiglume** Hack. Oesterr. Bot. Zeitschr. 51 (1901) 428.
(3307 *Merrill*). Borders of dry thickets below 100 m. Java.
2. **P. flavidum** Retz.; Hook. f. Fl. Brit. Ind. 7 (1897) 28.
(6145 *Leiberg*). In open grass lands below 100 m., common throughout the Philippines. Tropical Asia, Africa, and Malaya.
3. **P. indicum** Linn.; Hook. f. l. c. 41.
(3109 *Merrill.*) In open grass lands below 100 m., common. Tropical Asia to Malaya and Australia.
4. **P. montanum** Roxb.; Hook. f. l. c. 53.
(6735 *Elmer*) November. Widely distributed in the Philippines. Tropical Asia and Malaya.
5. **P. ouonbiense** Balansa, Journ. de Bot. 4 (1890) 142.
(533 *Whitford*). Open grass lands at 75 m., common and widely distributed in the Philippines. Cochin China.
6. **P. parvulum** Trin. Mem. Acad. Petersb. VI. 3 (1835) 205.
(3268 *Merrill*). In open grass lands below 100 m. Tropical Asia and Malaya. An apparently distinct form or variety of this species is presented by No. 3164 *Merrill,* from the same locality.
7. **P. pilipes** Nees et Arn. ex Büse in Miq. Pl. Jungh. (1855) 376.
(3156 *Merrill*); (1821 *Borden*); (1020 *Whitford*); (6650 *Elmer*). Common along trails in the forests and thickets 50 to 150 m., widely distributed in the Philippines. Tropical Asia to Madagascar, Malaya, Australia, and Polynesia.
8. **P. radicans** Retz. Obs. 4 (1779–91) 18.
(3255 *Merrill*); (6646 *Elmer*). With the preceding. Tropical Asia and Malaya.
9. **P. sarmentosum** Roxb.; Hook. f. l. c. 54,
(1019 *Whitford*). Along trails in open forests. British India to China and Malaya.
10. **P. trypheron** Schult.; Hook. f. l. c. 47.
(3107 *Merrill*); (6024 *Leiberg*). In open lands below 100 m. Tropical Asia and Africa to Malaya.
11. **P. miliare** Lam.; Hook. f. l. c. 46.
(*Whitford*) September. In open damp or wet lands near the sea shore, widely distributed in the Philippines. Tropics generally.
12. **P. myurus** H. B. K.; Hook. f. l. c. 39.
(*Whitford*) September. On open wet lands below 100 m. Tropical Asia, Malaya, Australia, and America.

13. ICHNANTHUS Beauv.

1. **I. pallens** (Sw.) Munro in Benth. Fl. Hongk. (1861) 414. *Panicum pallens* Sw.; *Panicum nitens* Merr. Govt. Lab. Publ. 17 (1904) 8.
(2756, 3221 *Merrill*). On exposed ridges at 1,200 m. Tropics of the world.

14. OPLISMENUS Beauv.

1. **O. burmannii** (R. Br.) Beauv.; Hook. f. l. c. 68.

(6645 *Elmer*); (3290 *Merrill*); (1021 *Whitford*). Along trails in forests and thickets below 200 m., and on bluffs near the seashore, widely distributed in the Philippines. Tropical Asia to China and Malaya.

2. **O. undulatifolius** (Arduin.) Beauv.; Hook. f. l. c. 66.

(2547 *Borden*); (6987 *Elmer*). Forested slopes at about 150 m. Central and southern Europe and the Tropics generally.

3. **O. undulatifolius** var. **imbecillis** (R. Br.) Hack. *Orthopogon imbecillis* R. Br.; *Oplismenus minus* Merr. Govt. Lab. Publ. 17 (1904) 9.

(3203 *Merrill*). On exposed ridges at 1,200 m., mountains of the Philippines to Malaya and Australia.

15. SETARIA Beauv.

1. **S. flava** Kunth, Rev. Gram. 1 (1835) 46.

(1936 *Borden*). Generally distributed in the Philippines and other tropical countries, treated by most authors as a synonym of *Setaria glauca*, but apparently distinct.

16. THUAREA Pers.

1. **T. sarmentosa** Pers.; Hook. f. l. c. 91.

(*Merrill*). Common on the sandy seashore, widely distributed in the Philippines. Tropical Asia to Madagascar, Malaya, Australia, and Polynesia.

17. SPINIFEX Linn.

1. **S. squarrosus** Linn.; Hook. f. l. c. 63.

(*Whitford*). On the sandy seashore, widely distributed in the Philippines. Tropical shores of Asia and Malaya.

18. ORYZA Linn.

1. **O. sativa** Linn.; Hook. f. l. c. 92.

Somewhat cultivated near Lamao, generally cultivated in tropical and subtropical regions. Rice.

19. LEERSIA Sw.

1. **L. hexandra** Sw.; Hook. f. l. c. 94.

(*Whitford*). In low wet lands below 100 m. widely distributed in the Philippines. Tropics generally.

20. GARNOTIA Brongn.

1. **G. stricta** Brongn.; Hook. f. l. c. 243.

(6989 *Elmer*); (1146 *Whitford*). On exposed ridges at 1,200 m. British India to the Sandwich Islands.

21. CYNODON Pers.

1. **C. dactylon** (Linn.) Pers.; Hook. f. l. c. 288.

(*Merrill*). In open grass lands and waste places below 100 m., widely distributed in the Philippines. Tropical and subtropical regions generally.

2. **C. arcuatus** Presl. Rel. Haenk. 1 (1830) 290; Merrill, Govt. Lab. Publ. 17 (1904) 9.

(3171 *Merrill*). In open grass lands. Endemic.

22. ELEUSINE Gaertn.

1. **E. indica** (Linn.) Gaertn. Hook. f. l. c. 323.

(800 *Borden*). In open lands below 100 m., widely distributed in the Philippines. Tropics and subtemperate regions generally.

23. PHRAGMITES Trin.

1. **P. karka** (Retz.) Trin.; Hook. f. l. c. 304.

(3178 *Merrill*); (6851 *Elmer*). In thickets along the river below 50 m. Tropical Asia to Africa, Malaya, and Australia.

24. CENTOTHECA Desv.

1. **C. lappacea** (Linn.) Desv.; Hook. f. l. c. 332.

(3264 *Merrill*); (1018 *Whitford*); (6649 *Elmer*). Along trails in open forests, widely distributed in the Philippines. Tropical Asia to Africa, Malaya, and Polynesia.

25. BAMBUSA Schreb.

1. **B. blumeana** Schult. f.; Hook. f. l. c. 394. *Bambus arundo* Blanco.

The common bamboo cultivated throughout the Philippines and very doubtfully wild in the Archipelago. The base of the culms with numerous stiff spiny branches. Malaya. T., *Cauayan, Cauayan totoo.*

In addition to the above species which is cultivated only, there are no less than four other distinct arborescent species of *Bambuseæ* more or less abundant in the Lamao region, which from lack of flowering or fruiting specimens it is impossible accurately to identify at this time. These species are as follows:

2. **Bambusa monogyna** Blanco, Fl. Filip. ed. 2 (1845) 187.

Similar to *Bambusa blumeana* in size and habit, but the culms naked at the base—that is, not protected with spiny branches. T., *Cauayan quiling.*

3. **Bambusa lima** Blanco, l. c. 189.

A characteristic spineless species, the internodes often reaching a length of 4 feet or slightly more. T., *Anos.*

4. **Bambusa lumampao** Blanco, l. c. 189.

The most abundant species in the region, frequently gregarious and forming almost pure stands under scattered large trees such as *Parkia, Albizzia, Anisoptera* etc., sea level to 300 m., spineless. Sp.-Fil., *Caña boho.*

5. **Bambusa** sp.

Similar to the preceding species but differing in sheath and other characters, not common. T., *Tagisi.*

26. DINOCHLOA Büse.

1. **D. diffusa** (Blanco) Merr. Govt. Lab. Publ. 27 (1905) 93.

(75, 519 *Whitford*); (1261 *Borden*); (6092 *Leiberg*); (2550, 3297 *Merrill*) Scandent, abundant in thickets 25 to 150 m. Endemic. T., *Bical.*

2. **D. tjankorreh** Büse: Hook. f. l. c. 414.

(2102 *Borden*). On exposed ridges in forests 900 to 1,200 m. Malaya. T., *Timac.*

CYPERACEÆ.[5]

1. HYPOLYTRUM Rich.

1. **H. compactum** Nees et Mey. Linnaea 9 (1834) 288.

(6011 *Leiberg*) July; (782, 2920 *Borden*) May, March; (2496 *Merrill*) June; (51 *Whitford*) April. In forests 150 to 300 m. Endemic.

[5] This list of *Cyperaceæ* is based on identifications made by C. B. Clarke esq., Kew, England.

The specimens collected by Whitford and Borden apparently represent the young form, although indicated by Mr. Clarke as a distinct unpublished species.

2. **H. latifolium** L. C. Rich.; Clarke in Hook. f. Fl. Brit. Ind. 6 (1894) 578.

(2089 *Borden*) November. Exposed ridges in the mossy forest at 1,150 m. Tropical Asia to Malaya, Australia, and Polynesia.

2. CYPERUS Linn.

1. **C. bancanus** Miq. Fl. Ind. Bat. Suppl. 599. (?).

(2581 *Meyer*) February; (291 *Copeland*) January. In forests at about 200 m.

2. **C. diffusus** Vahl.; Clarke l. c. 603.

(463, 465 *Topping*); (6674 *Elmer*) November; (1921 *Borden*) September. Forests 100 to 300 m. Tropics generally.

3. **C. malaccensis** Lam.; Clarke l. c. 608.

(*Whitford*) September. Brackish marshes along the seashore. Tropical Asia to Malaya, Australia, and Polynesia. T., *Balongot*.

4. **C. pilosus** Vahl.; Clarke l. c. 609.

(*Whitford*) September. In open wet lands. Tropical Asia, Africa, Malaya, and Polynesia.

5. **C.** sp.

(*Whitford*) September. In open wet lands.

3. MARISCUS Vahl.

1. **M. albescens** Gaud.; Clarke l. c. 623.

(1305 *Whitford*) June. Brackish swamps near the seashore, widely distributed in the Philippines. Tropical Asia, Africa, Malaya, Australia, and Polynesia.

2. **M. cyperinus** Vahl.; Clarke l. c. 621.

(6675 *Elmer*) November; (456, 464 *Topping*); (485 in part, *Whitford*) June, July. In thickets and open lands below 100 m. Tropical Asia to Malaya and Polynesia.

3. **M. microcephalus** Presl.; Clarke l. c. 624.

(*Whitford*) September. In wet lands below 100 m. Tropical Asia to Mauritius and Malaya.

4. **M. philippensis** Steud. Syn. Pl. Cyp. 66.

(3277 *Merrill*) October. On bluffs along the seashore. Endemic.

5. **M. flabelliformis** H. B. K. Nov. Gen. et. Sp. Pl. 1: 215.

(405 *Whitford*) June. In open lands below 100 m. Tropics generally.

4. KYLLINGIA Rottb.

1. **K. monocephala** Rottb.; Clarke l. c. 588.

(457 *Topping*); (6026 *Leiberg*) July; (*Whitford*) April; (3160 *Merrill*) October. In thickets and open places below 100 m. Tropical and warm regions of the old world.

5. FIMBRISTYLIS Vahl.

1. **F. diphylla** Vahl.; Clarke l. c. 636.

(6135 *Leiberg*) July. In forests at 250 m. Tropics generally.

2. **F. ferruginea** (Linn.) Vahl.; Clarke l. c. 638.

(1304 *Whitford*) June. Tidal meadows. Tropics generally.

3. **F. miliacea** Vahl.; Clarke l. c. 644.

(459 *Topping*). In open wet lands, widely distributed in the Philippines. Tropical and subtropical regions generally.

6. BULBOSTYLIS Kunth.

1. **B. barbata** Kunth; Clarke l. c. 651.

(410 *Whitford*) June. In open, usually damp places below 100 m., widely distributed in the Philippines. All warm regions.

7. SCLERIA Berg.

1. **S. chinensis** Kunth; Clarke l. c. 690.

(3958, 3964 *Merrill*) March. On exposed ridges in the mossy forest, 800 to 1,000 m. China to Singapore, Malaya, and Australia.

2. **S. lithosperma** Sw.; Clarke l. c. 685.

(6144 *Leiberg*) July; (3176 *Merrill*) October. In thickets and forests 50 to 250 m. Tropics generally except Africa.

3. **S. scrobiculata** Nees et Mey. in Wight. Contrib. 117.

(458 *Topping*); (34 *Whitford*) April; (6677 *Elmer*) November; (1929 *Borden*) October. In thickets along the river below 100 m. China and Malaya.

8. CAREX Linn.

1. **C. rhynchachaenium** C. B. Clarke, Govt. Lab. Publ. 35 (1905) 5.

(6983 *Elmer*) November. On exposed ridges in the mossy forest at 1,100 m. Endemic.

2. **C. brunnea** Thunb. Fl. Jap. 38.

(1346 *Whitford*) September; (3196, 3880 *Merrill*) October, August. On exposed ridges in the mossy forest 100 to 1,250 m. Japan to Malaya.

3. **C. continua** C. B. Clarke, l. c. 717.

(189, 1121, 1145 *Whitford*) May, March; (3197 *Merrill*) October; (6985 *Elmer*) November. With the preceding. Asia.

PRINCIPES.

PALMÆ.[6]

1. CALAMUS Linn.

1. **C. mollis** Blanco, var. **major** Becc. Webbia (1905) 345.

(80 *Whitford*) April. In forests above 100 m. Endemic.

2. **C. ornatus** Blume, var. **philippinensis** Becc. l. c. 346.

(212 *Barnes*) January; (343, 502 *Whitford*). In forests above 100 m. Endemic. T., *Limoran.*

3. **C. spinifolius** Becc. l. c. 348.

(1454 *Ahern's collector*) July, 1904, endemic. T., *Yantoc.* The Tagalog name "yantoc" is used in generic sense for all or nearly all species of *Calamus* and *Daemonorops.*

4. **C. siphonspathus** Mart., var. **sublevis** Becc. l. c. 352.

(*Merrill*) January. On exposed ridges above 900 m. Endemic.

2. DAEMONOROPS Blume.

1. **D. gaudichaudii** Mart.; Becc. l. c. 355.

(289 *Whitford*). In forests above 1,000 m. Endemic.

[6](Based on Beccari, Le Palme della Isole Filippine, *Webbia* (1905) 315–359. The list is incomplete in *Calamus*, additional material having recently been sent Dr. Beccari for identification.)

3. ORANIA Zipp.

1. **O. palindan** (Blanco) Merr. Govt. Lab. Publ. 27 (1905) 88. *Orania philippinensis* Scheff.

(1610 *Borden*) August; (2183 *Meyer*) December. In forests 75 to 400 m. Endemic. T., *Palindan, Barangoi.*

4. PINANGA Blume.

1. **P. barnesii** Becc. l. c. 320.

(122 *Barnes*) January; (2762 *Meyer*) February. In forests on exposed ridges above 800 m. Endemic. T., *Bunga macsin.*

2. **P. elmerii** Becc. l. c. 322.

(3846 *Merrill*) August; (1578 *Borden*); (130 *Whitford*). With the preceding species. Endemic.

3. **P. philippinensis** Becc. l. c. 324.

(3316 *Merrill*); (333 *Whitford*). With the preceding species. Endemic.

5. ARECA Linn.

1. **A. catechu** Linn.; Becc. l. c. 358.

(*Merrill*). In deserted clearings below 100 m., generally cultivated throughout the Philippines, tropical Asia, and Malaya. T., *Bunga.* The betelnut palm.

6. NIPA Thunb.

1. **Nipa fruticans** Wurmb.; Beccari & Hook. f. Fl. Brit. Ind. 6 (1892) 424.

(*Merrill*). Brackish tidal swamp about the mouth of the Lamao River, generally distributed along the mouths of tidal streams throughout the Philippines, and in some localities, notably about the head of Manila Bay, extensively cultivated for the sap secured from the flower stalks, which is utilized in the manufacture of alcohol. Tropical Asia and Malaya. Sp.-Fil., *Nipa;* T., *Sasá.*

SPATHIFLORÆ.

ARACEÆ.

1. POTHOS Linn.

1. **P. philippinensis** Engl. Pflanzenreich 21 (1905) 315.

(369 *Barnes*) March, flower; (369, 1046 bis *Whitford*) May, and January, fruit and flower. Scandent on tree trunks, altitude 100 to 700 m. Endemic.

2. POTHOIDIUM Schott.

1. **P. lobbianum** Schott.; Engler, l. c. 46.

(503 *Whitford*) July; (3053 *Borden*) May. Common in forests above an altitude of 100 m. Celebes, Moluccas, Ternate.

3. RHAPHIDOPHORA Hassk.

1. **R. perkinsæ** Engl. Bot. Jahrb. 37 (1905) 115.

(1169 *Whitford*) March. Scandent, at an altitude of 1,100 m. Endemic.

2. **R. merrillii** Engl. l. c.

(2568 *Borden*) February. Sterile specimens. Endemic.

3. **R.** sp.

(*Whitford*) April.

4. AMORPHOPHALLUS Blume.

1. **A. campanulatus** Blume; Engler in DC. Monog. Phan. 1 (1879) 311. *Arum decurrens* Blanco; *Amorphophallus decurrens* Kunth.

(1292, 1337 *Whitford*) May. Common in the bamboo thickets from the seashore to an altitude of about 50 m., widely distributed in the Philippines. Tropical Asia to Madagascar, Malaya to New Guinea and the Fiji Islands. T., *Puñgapuñg.*

2. **A.** sp. (§ *Brachyspatha.*)

(1338 *Whitford*) May. With the preceding, flowers only. The Tagalog name is the same as for the preceding species.

5. SCHIZMATOGLOTTIS Zoll. et Mor.

1. **S. rupestris** Zoll. et Mor.; Engler in DC. Monog. Phan. 1 (1879) 350.

(529, 1296 *Whitford*) July, May. Common along shaded banks of ravines and streams at an altitude of 100 m. Java.

6. AGLAONEMA Schott.

1. **A. marantifolium** Blume; Engler in DC. Monog. Phan. 1 (1879) 441.

(3889 *Merrill*) August; (6759 *Elmer*) November; (2586 *Meyer*) February; (6111 *Leiberg*) July; (*Copeland*) January. Common in forests and thickets 75 to 200 m. Malayan Archipelago.

7. ALOCASIA Schott.

1. **A. macrorrhiza** Schott; Engler; in DC. Monog. Phan. 1 (1879) 503.

(1278 *Whitford*) May. Common in wet open places near the seashore. British India and Malaya. T., *Biga.*

2. **A. warburgii** Engl. Jahrb. 25 (1898) 25.

(516 *Whitford*) July. Common on forested slopes at an altitude of about 75 m. Endemic.

8. ARISAEMA Martius.

1. **A. polyphylla** (Blanco) Merr. Govt. Lab. Publ. 27 (1905) 90. *Arisaema cumingii* Schott.

(1350 *Whitford*) September. On exposed ridges in the mossy forest, terrestrial and on very mossy trunks at 1,000 m. Endemic.

FARINOSÆ.

FLAGELLARIACEÆ.

1. FLAGELLARIA Linn.

1. **F. indica** Linn.; Hook. f. Fl. Brit. Ind. 6 (1892) 391.

(2500 *Meyer*) January; (2359 *Borden*) January; (1428 *Ahern's collector*) July. Scandent, common in thickets below 100 m. Widely distributed in the Philippines. Tropical Asia, Africa and Malaya. T., *Balinguay.*

BROMELIACEÆ.

1. ANANAS Adans.

1. **A. sativus** Lindl. The pineapple, commonly cultivated. Widely distributed in the Philippines, introduced from Mexico. Sp.-Fil., *Piña.*

COMMELINACEÆ.

1. POLLIA Thumb.

1. **P. sorzogonensis** (Mey.) Endl.; Clarke in DC. Monog. Phan. 3 (1881) 126; Hook. f. Fl. Brit. Ind. 6 (1892) 367.

(385 *Whitford*) May. Common on shaded banks, cañon of the Lamao River, altitude 800 m. Widely distributed in the Philippines. Himalayan region to southern China, Malaya, and New Caledonia.

2. COMMELINA Linn.

1. **C. nudiflora** Linn.; Clarke l. c. 144; Hook. f. l. c. 369.

(408 *Whitford*) June; (2270 *Meyer*) December. Common in grass lands, widely distributed in the Philippines. Tropical and subtropical regions of the world.

3. ANEILEMA R. Br.

1. **A. nudiflorum** (Linn.) R. Br.; Clarke l. c. 210; Hook. f. l. c. 378.

(3088 *Merrill*) October. Common in open grass lands, widely distributed in the Philippines. British India to China and Malaya.

4. CYANOTIS Don.

1. **C. cristata** (Linn.) R. et S.; Clarke l. c. 247; Hook. f. l. c. 385

(3103 *Merrill*) October; (1819 *Borden*) September. Common in open grass lands, widely distributed in the Philippines. Tropical Asia and Africa, Malaya.

2. **C. axillaris** (Linn.) R. et S.; Clarke l. c. 244; Hook. f. l. c. 388.

(3102 *Merrill*) October; (2269 *Meyer*) December. In open grass lands, rather common. Widely distributed in the Philippines. British India to Australia.

3. **C. uniflora** Hassk.; Clarke l. c. 242.

(1903 *Borden*) October. In open thickets at 130 m. Malaya.

5. FLOSCOPA Lour.

1. **F. scandens** Lour.; Clarke l. c. 265; Hook. f. l. c. 390.

(1961 *Borden*) September; (296 *Copeland*) February.

In open damp places near streams. Widely distributed in the Philippines. Tropical Asia to Australia.

PONTEDERIACEÆ.

MONOCHORIA Presl.

1. **M. vaginalis** (Linn.) Presl; Hook. f. Fl. Brit. Ind. 6 (1892) 363; Solms Laub. in DC. Monog. Phan. 4 (1883) 524.

(2271 *Meyer*) December. In shallow stagnant water and muddy places. Widely distributed in the Philippines. Tropical Asia and Africa. T., *Biga-bigan*.

LILIIFLORÆ.

LILIACEÆ.

1. DIANELLA Lam.

1. **D.** sp.

(226 *Whitford*) Pseudoepiphytic at 1,000 m. Material very imperfect but quite distinct from *Dianella ensifolia* Red.

2. DRACAENA Vandelli.

1. **D. angustifolia** (Rump.) Roxb.; Hook. f. Fl. Brit. Ind. 6 (1892) 327.

(2512 *Merrill*) June; (2930, 3041 *Borden*) March, May; (275 *Copeland*) January; (3017 *Meyer*) May. In forests near the river 100 to 300 m. Widely distributed in the Philippines. British India to Australia.

3. OPHIOPOGON Ker.

1. **O. japonicus** (L.) Ker.

(3950 *Merrill*). On exposed ridges at 900 m. Japan to China and Formosa.

4. SMILAX Tourn.

1. **S. bracteata** Presl.; A. DC. Monog. Phan. 1 (1878) 197.

(396, 1283 *Whitford*) June, May; (6024 *Leiberg*) July; (6869 *Elmer*) November; (1607 *Borden*) August; (2548 *Merrill*) June. Abundant in thickets below 100 m. Endemic.

2. **S. vicaria** Kunth, Enum 5 (1850) 262. *S. latifolia* Blanco, Fl. Filip. ed. 2 (1845) 548, non R. Br.

(3771 *Merrill*) January. In forests at 800 m. This imperfectly known species is apparently valid, and not at all closely related to *Smilax macrophylla* Roxb., to which Blanco's species was reduced by Naves. The specimen cited above, though imperfect, certainly represents Blanco's species. No. 1877 *Ahern's collector*, Province of Rizal, Luzon, is a much better specimen, while No. 1713 *Merrill* from the same province represents the species in fruit. T., *Sipit olang*.

AMARYLLIDACEÆ.

1. CRINUM Linn.

1. **C. asiaticum** Linn.; Hook. f. Fl. Brit. Ind. 6 (1892) 280.

(2011 *Borden*) September. In swampy places along the seashore. Tropical Asia. T., *Bacóng*.

TACCACEÆ.

1. TACCA Forst.

1. **T. palmata** Blume; Miq. Fl. Ind. Bat. 3 (1855) 576.

(535 *Whitford*) July; (2560 *Merrill*) June; (6031 *Leiberg*) July. Common in thickets below 100 m. Malaya.

DIOSCOREACEÆ.

1. DIOSCOREA Linn.

1. **D. daemona** Roxb.; Hook. f. Fl. Brit. Ind. 6 (1892) 289.

(6014 *Leiberg*) July. In thickets below 100 m. Widely distributed in the Philippines. British India and Malaya. T., *Name*.

2. **D. pentaphylla** Linn.; Hook. f. l. c.

(69 *Barnes*) November. In thickets at 100 m. British India, Malaya, and tropical Africa.

3. **D. divaricata** Blanco Fl. Filip. ed. 1 (1837) 797; ed. 2 (1845) 550.

(2572 *Borden*) February; (3167 *Merrill*) October; (6737 *Elmer*) November.

An endemic species, previously known only from Blanco's imperfect description. The very deep fleshy roots are used for food by the Negritos of Mount Mariveles. T., *Buloy, Paquit*.

SCITAMINEÆ.

MUSACEÆ.

1. MUSA Linn.

1. **M. paradisiaca** Linn.: Warb. in Engler's Pflanzenreich 1 (1900) 19. The banana. About 9 varieties are commonly cultivated in the river plain region, which can be classified as follows:

Subspecies 1. **normalis** O. Kuntze; Warb. l. c. 20. Pulp edible only when cooked, seedless. *Túndoc*, corresponding to *Musa paradisiaca magna* Blanco; *Matávia* corresponding to *M. paradisiaca maxima* Blanco; *Batúan* corresponding to *M. troglodítarum* Blanco.

Subspecies 2. **sapientium** (Linn.) O. Kuntze; Warb. l. c. Pulp edible without cooking, seedless. *Lacatán*, corresponding to *Musa paradisiaca lacatan* Blanco: *Buñgulan*, corresponding to *M. paradisiaca suavcolens* Blanco; *Morádo*, corresponding to *M. paradisiaca violacea* Blanco; *Glória*, corresponding to *M. paradisiaca ternatensis* Blanco; and *Latúndan* corresponding to *M. paradisiaca cinerea* Blanco.

Subspecies 3. **seminifera** (Lour.) Baker; Warb. l. c. 21. Pulp scarcely edible, with numerous seeds. *Sába*, corresponding to *Musa paradisiaca compressa* Blanco.

2. **M.** sp.

A wild banana is sparingly found in the river cañons in the forests at an altitude of from 800 to 900 m., above the sea, sterile specimens only being observed. It probably corresponds to *Musa troglodítarum errans* Blanco "*Saguing machin*," the "monkey banana," and probably is a wild form of the cultivated banana.

ZINGERBERACEÆ.

1. CURCUMA Linn.

1. **C. zeodaria** (Berg.) Roscoe; K. Sch. in Engler's Pflanzenreich. 20 (1904) 110. *Costus nigricans* Blanco, Fl. Filip. ed. 1 (1837) 3; ed. 2 (1845) 3; ed. 3, 1 (1877) 5. *Roscoea* (?) *nigricans* Hassk.; K. Sch. l. c. 425.

(1267 *Whitford*) May; (6142 *Leiberg*) July. Common in the bamboo thickets below 100 m. British India and Malaya.

Blanco's *Costus nigricans* has not previously been satisfactorily identified, but is certainly referable to the above species. The description given by Blanco applies to our specimens while the habitat, time of flowering, and native name is the same. T., *Barac*.

2. GLOBBA Linn.

1. **G. merrilli** Ridl. Govt. Lab. Publ. 35 (1905) 83.

(3869 *Merrill*) August; (481 *Whitford*) July; (1598 *Borden*) August; (6158 *Leiberg*) July, 1904. Along streams and on ridges, 300 to 1,000 m. Endemic.

2. **G. campsophylla** K. Sch. in Engler's Pflanzenreich 20 (1904) 145.

(1461 *Ahern's collector*) July. Endemic.

3. ZINGIBER Adans.

1. **Z. zerumbet** (Linn.) Smith; K. Sch. l. c. 172.

(6089 *Leiberg*) July; (7028 *Elmer*) November. Common in bamboo thickets below 100 m. British India.

4. AMOMUM Linn.

1. **A. elegans** Ridl. Govt. Lab. Publ. 35 (1905) 84.

(207, 300 *Whitford*) May; (3033 *Borden*) May. In shaded ravines 130 to 600 m. Endemic.

5. ALPINIA Linn.

1. **A. brevilabris** Presl.; K. Sch. in Engler's Pflanzenreich, **20** (1904) 314.
(58, 239 *Whitford*) April, May; (1202, 2931 *Borden*) June, March; (6853, 6859 *Elmer*) November; (2203 *Meyer*) December. In forests, 130 to 1,100 m. Endemic. T., *Malatalbác.*

2. **A. elegans** (Presl.) K. Sch.; l. c. 352.
(73 *Whitford*) April. In ravines below 100 m. Endemic. T., *Talbác.*

3. **A. philippinensis** Ridl. Govt. Lab. Publ. **35** (1905) 86.
(144 *Barnes*) January; (1203, 1777, 2729, 2477 *Borden*) June to January; (2496 *Meyer*) January; (6130 *Leiberg*) July; (1058 *Whitford*) January. Common in open forests below 250 m. Endemic. T., *Talbác babáyac.*

6. COSTUS Linn.

1. **C. speciosus** (Koenig.) Smith, var. **sericea** (Blume) K. Sch. Engler's Pflanzenreich **20** (1904) 399.
(196 *Barnes*) January; (6707 *Elmer*) November; (2171 *Meyer*) December; (2468 *Borden*) January. In forests 100 to 300 m. Widely distributed in the Tropics of the East.

CANNACEÆ.

1. CANNA Linn.

1. **C. indica** Linn.; Hook. f. Fl. Brit. Ind. **6** (1892) 260.
(2012 *Borden*) October. In waste places, deserted clearings, etc. Widely distributed in the Philippines. British India and Malaya. T., *Tiquis-tiquis.*

MARANTACEÆ.

1. DONAX Lour.

1. **D. arundastrum** Lour.; K. Sch. in Engler's Pflanzenreich, **11** (1902) 33. *Maranta dichotoma* Wall.; *Maranta arundinacea* Blanco.
(729 *Borden*) May; (59 *Whitford*) April; (6083 *Leiberg*) July; (6687 *Elmer*) November; (2584 *Meyer*) February; (261 *Copeland*) January. Very common in thickets and open forests below 100 m., widely distributed in the Philippines. British India to Southern China. T., *Bamban.*

MICROSPERMÆ.

ORCHIDACEÆ.[7]

1. HABENARIA Willd.

1. **H. muricata** (Schauer) Vidal; Ames. Orchidaceæ **1** (1905) 64.
(*Merrill*) October. In forests. Endemic.

2. CORYSANTHES R. Br.

1. **C. merrilli** Ames l. c. 65, with figure.
(3871 *Merrill*) August. On mossy shaded cliffs, exposed ridges, above 1,100 m. Endemic.

[7] This list of *Orchidaceæ* is very incomplete, and has been compiled from Ames, *Orchidaceæ* **1** (1905) 63–107. Many other species of the more recent collections from the Lamao region are now in the hands of Mr. Ames for identification.

3. COELOGYNE Lindl.

1. **C. sparsa** Reichb. f.; Ames l. c. 71.
(140 *Whitford*) May; (254, 273 *Copeland*) January, May. In forests above 100 m. Endemic.

4. PHOLIDOTA Lindl.

1. **P. imbricata** Hook.; Ames l. c. 71.
(*Copeland*) January. Abundant on ridges in the mossy forest above 900 m. Tropical Asia and the Andaman Islands.

5. ACORIDIUM Nees et Mey.

1. **A. tenellum** Nees et Mey.; Ames l. c. 3. *pl. l. f. 1–19.*
(3209 *Merrill*) October; (742 *Borden*) May; (233 *Whitford*) May. Abundant on trees in the mossy forest, exposed ridges, above 900 m. Endemic.
2. **A. whitfordii** Rolfe in Ames l. c. 73.
(139 *Whitford*) May. Exposed ridges in the mossy forest. Endemic.

6. PLATYCLINIS Benth.

1. **P. glumacea** (Lindl.) Hemsl.; Ames l. c. 74.
(3211 *Merrill*) October; (1901 *Borden*) September. On exposed ridges in the mossy forest above 900 m. Endemic.
2. **P. latifolia** (Lindl.) Hemsl.; Ames l. c. 74.
(242 *Whitford*) May. With the preceding. Endemic.

7. CESTICHIS Thours.

1. **C. philippinensis** Ames. l. c. 7. *pl. 2.*
(799, 1597 *Borden*) May, August; (3856 *Merrill*) August. On exposed ridges in the mossy forest above 900 m. Endemic.
2. **C. merrilli** Ames, l. c. 11. *pl. 3. f. 13–18.*
(3736 *Merrill*) January; (317 *Whitford*) May. With the preceding. Endemic.
3. **C. compressa** (Blume) Ames l. c. 76, with figure.
(1816 *Borden*) September. With the preceding. Malaya.

8. OBERONIA Lindl.

1. **O. iridifolia** (Roxb.) Lindl.; Ames l. c. 77.
(130 *Barnes*) January. Epiphytic on bamboo. Tropical Asia.

9. CERATOSTYLIS Blume.

1. **C. philippinensis** Rolfe; Ames l. c. 79, with figure.
(3247 *Merrill*) October. On exposed ridges in the mossy forest above 900 m. Endemic.

10. CALANTHE R. Br.

1. **C. furcata** Batem.; Ames l. c. 81.
(3251, 3851 *Merrill*) October, August. In forests. Endemic.

11. DENDROBIUM Sw.

1. **D. acuminatum** Rolfe; Ames l. c. 86.
(738 *Borden*) May. Endemic.
2. **D. macraei** Lindl.; Ames l. c. 89.
(225 *Whitford*) May. Tropical Asia and Malaya.

3. **D. uniflorum** Griff.; Ames l. c. 91.
(302 *Whitford*) May. Burma to Malaya.

12. ERIA Lindl.

1. **E. graciliscaposa** Rolfe; Ames l. c. 93.
(307 *Whitford*) May. Endemic.
2. **E. polyura** Lindl.; Ames l. c. 95.
(3733 *Merrill*) January. Endemic.

13. PHREATIA Lindl.

1. **P. luzoniensis** Rolfe; Ames l. c. 96.
(210 *Whitford*) May. Endemic.

14. BULBOPHYLLUM Thouars.

1. **B. bataanensis** Ames l. c. 96.
(121, 163 *Whitford*) May; (796 *Borden*) May. On exposed ridges in the mossy forest. Endemic.
2. **B. cuneatum** Rolfe; Ames l. c. 98.
(3730 *Merrill*). On exposed ridges in the mossy forest. Endemic.
3. **B. dasypetalum** Rolfe; Ames l. c. 98, with figure.
(3720 *Merrill*). On exposed ridges in the mossy forest. Endemic.
4. **B. lasioglossum** Rolfe; Ames l. c. 100.
(138 *Whitford*) May. Endemic.
5. **B. whitfordii** Rolfe; Ames l. c. 100.
(61 *Whitford*) May. Endemic.

15. CYMBIDIUM Sw.

1. **C. aloifolium** (Linn.) Sw.; Ames l. c. 101.
(87 *Whitford*, in part) April. Malaya.

16. PHALAENOPSIS Blume.

1. **P. amabalis** (Linn.) Blume; Ames l. c. 101.
(680 *Borden*) May. Malaya.
2. **P. rosea** Lindl.; Ames l. c. 102.
(*Merrill*) August. In thickets and open forests below 200 m. Endemic.

17. CLEISOSTOMA Blume.

1. **C. ionosmum** Lindl.; Ames l. c. 103.
(737 *Borden*) May. Endemic.

18. AERIDES Lour.

1. **A. quinquevulnera** Lindl.; Ames l. c. 104.
(3888 *Merrill*). In forests at about 100 m. Endemic.

19. RHYNCHOSTYLIS Blume.

1. **R. violacea** (Lindl.) Reichb. f.; Ames l. c. 105.
(46 *Whitford*) April. Endemic.

20. TRICHOGLOTTIS Blume.

1. **T. bataanensis** Ames l. c. 105, with figure.
(679 *Borden*) May. Endemic.

DICOTYLEDONEÆ.

ARCHICHLAMYDEAE (*Choripetalæ and Apetalæ*).

PIPERALES.

PIPERACEÆ.

1. PIPER Linn.

1. **P. corylistachyon** (Miq.) C. DC. Prodr. 16 (1869) 1: 346.

(2526, 3781 *Merrill*) June, January; (6862 *Elmer*) November; (1280 *Whitford*) May. In forests at about 100 m. Endemic.

2. **P. marivelesanum** C. DC. in Perk. Frag. Fl. Philip. (1905) 155.

(3727, 3786 *Merrill*) January; (165 *Barnes*) January; (2507 *Meyer*) January; (1756 *Borden*) August; (1060 *Whitford*) January. In forests 60 to 600 m. Endemic.

3. **P. miniatum** Blume; C. DC. l. c. 354.

(6683 *Elmer*) November; (504, 1040 *Whitford*) July, January; (6077 *Leiberg*) July. In forests and thickets at about 100 m. Malaya.

4. **P. blancoi** Merrill, nom. nov. *P. philippinense* C. DC. l. c. 353, non *P. philippinum* Miq., 1844.

(188 *Whitford*) May. River cañon at 550 m. Endemic.

5. **P.** sp.

(6805 *Elmer*) November; (258 *Copeland*) January; (2097, 2394 *Borden*) November, January; (2411 *Meyer*) January; (209 *Barnes*) January; 3248, 3768 *Merrill*) October, January; (129 *Whitford*) May. On exposed ridges in the mossy forest above 1,000 m.

6. **P.** sp.

(1382 *Merrill*) October; (6855 *Elmer*) November. On exposed ridges at 1,100 m. No. 6890 *Elmer* may be the same.

7. **P.** sp.

(1911 *Borden*) September; (3165 *Merrill*) October; (57 *Barnes*) October. In thickets below 50 m.

2. PEPEROMIA Ruiz. et. Pav.

1. **P.** sp.

(114, 313 *Whitford*) May; (6820 *Elmer*) November; (3205, 3721 *Merrill*) October, January. On bowlders and trees, exposed ridges in the mossy forest above 1,000 m.

CHLORANTHACEÆ.

1. CHLORANTHUS Swartz.

1. **C. brachystachys** Blume; Hook. f. Fl. Brit. Ind. 5. (1886) 100.

(6050 *Leiberg*) July; (6640 *Elmer*) November; (103 *Whitford*) April; (2514. 3254 *Merrill*) June, October; (1214 *Borden*) June; (2215 *Meyer*) December. Common in forests, 350 to 500 m. Widely distributed in the Philippines, fruit red. British India to Southern China and Malaya. T., *Cahlin.*

2. **C. officinalis** Blume, Hook. f. l. c.

(6885 *Elmer*) November; (6129, 6136 *Leiberg*) July; (1769 *Borden*) August. In forests above 250 m., with the preceding, but the fruit white. Distribution the same as for the preceding species.

MYRICALES.

MYRICACEÆ.

1. MYRICA Linn.

1. **M. rubra** (Lour.) Sieb. et Zucc.; Forbes & Hemsl. Journ. Linn. Soc. Bot. 26 (1899) 496.

(2595 *Meyer*) February; (1140, 1174, 1177 *Whitford*) March. In forests and on exposed ridges 650 to 1,200 m. Southern China and Japan to Formosa, British India and Malaya.

This variable species is here first reported from the Philippines, being the third of the genus to be discovered in the Archipelago, the other two being *Myrica vidaliana* Rolfe, from Mayon Volcano, Province of Albay, Luzon, and *Myrica javanica* Blume, which has been found on Mount Apo, Mindanao (1107 *Copeland*) April, 1904.

JUGLANDALES.

JUGLANDACEÆ.

1. ENGLEHARDTIA Leschen.

1. **E. spicata** Blume; Hook. f. Fl. Brit. Ind. 5 (1888) 595.

(2478 *Borden*) January; (2311 *Meyer*) December. In forests at about 100 m. British India to Cochin China and Java.

2. **E. subsimplicifolia** Merrill, Govt. Lab. Publ. 35 (1906) 6.

(3942, 3951 *Merrill*) March; (1176 *Whitford*) March; (2759, 2770 *Meyer*) February. In the upper forests, 600 to 950 m. Endemic.

FAGALES.

FAGACEÆ.

1. QUERCUS Linn.

1. **Q. bennettii** Miq.; King, Ann. Bot. Gard. Calcutta 2 (1889) 64. *pl.* 58.

(295, 365 *Whitford*) May, June; (632 *Borden*) April; (167 *Merrill*) Decades Philippine Forest Flora, coll. *Borden*, April. In forests 170 to 700 m. Malacca, Borneo, Bangka. T., *Catibang*.

Both of Whitford's specimens were so identified by O. von Seeman while the remaining numbers cited are from the same tree as No. 365 *Whitford*. Identified by the author as *Quercus concentrica* Blanco, which I believe it is.

2. **Q. clementiana** King. l. c. 69. *pl. 63A*.

(1178, 1180 *Whitford*) March. On exposed ridges in the mossy forest at about 1,200 m. Penang.

The above specimens agree well with Philippine material from other localities so identified by von Seeman.

3. **Q. sundaica** Blume; King, l. c. 51. *pl. 47–48*.

(1353 *Borden*) July (det. von Seeman); (1186 *Whitford*) March; possibly also No. 2856 *Meyer*, March. Exposed ridges in the mossy forest above 650 m. Malaya.

4. **Q. wenzigiana** King, l. c. 65. *pl. 58 B*.

(53 *Barnes*) October; (759, 781 *Borden*) May. In forests below 200 m., Malayan Peninsula and Borneo. T., *Catabang*. The above specimens were identified by von Seeman.

5. **Q.** sp. *Q. ovalis* von Seeman in lit., non Blanco.

(806 *Borden*) May; (276 *Whitford*) May; (6897 *Elmer*) November. Forests and ridges at about 650 m.

A species entirely distinct from *Quercus ovalis* Blanco which is represented by No. 3235 *Russell*, Angat, Province of Bulacan, Luzon, June, 1905, from the type locality of Blanco's species, with the same native name and agreeing perfectly with his description.

6. **Q.** spp.

(2997 *Meyer*) May; (6888 Elmer) November; (685 *Borden*); (6052 *Leiberg*) July. On account of incomplete material I have been unable satisfactorily to identify the above specimens, one or two species apparently distinct from those enumerated above being represented.

URTICALES.

ULMACEÆ.

1. CELTIS Linn.

1. **C. philippinensis** Blanco, Fl. Filip. ed. 1 (1837) 197.

(*Whitford*). In thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Malaiemo*.

2. **C.** sp.

(541 *Barnes*) November; (569, 1560, 1631, 1665 *Borden*) August. In forests 100 to 200 m., apparently an undescribed species, but the material very imperfect. T., *Payapa*.

2. TREMA Lour.

1. **T. amboinensis** Blume; Hook. f. Fl. Brit. Ind. 5 (1888) 484.

(1241 *Whitford*) May; (776, 1295 *Borden*) May, July; (2855 *Meyer*) March. Common in thickets below 100 m., widely distributed in the Philippines. British India and Malaya. T., *Daluuot*.

3. APHANANTHE Planch.

1. **A. philippinensis** Planch. Ann. Sc. Nat. III. 10 (1848) 337.

(1286, 1303, 1383, 1397, 1402, 1627, 1628, 1681 *Borden*) July; (417, 1298 *Whitford*) June, May; (6117 *Leiberg*) July; (6691 *Elmer*) November; (2490 Merrill) June. Common in thickets below 100 m. Endemic. T., *Alasiis*.

4. GIRONNIERA Gaud.

1. **G. glabra** Merrill, sp. nov.

A tree about 15 m. high, glabrous or nearly so throughout. Branches slender, glabrous, striate, dark brown, the tips somewhat puberulent. Leaves elliptical lanceolate to oblong lanceolate, alternate, glabrous, subcoriaceous, long acuminate, the base equilateral, acute, entire, 4 to 8 cm. long, 1 to 2.5 cm. wide, shining; nerves about 12 on each side of the midrib, spreading, anastomosing and forming an arched marginal nerve, the secondary veins and reticulations distinct; petioles glabrous or slightly puberulent, slender, 1 to 1.5 cm. long; stipules lanceolate, nearly glabrous, caducous, 5 cm. long or less. Cymes axillary, slightly puberulent, 1 to 2 cm. long, few branched. Pistillate flowers sessile, red. Sepals 4, free, imbricate, ovate to elliptical ovate, acute or obtuse about 2 mm. long, 1.5 mm. wide, the margins slightly ciliate. Ovary ovoid, glabrous, 1-celled with a solitary pendulous ovule; style arms short, 1 to 2 mm. long.

(1205 *Whitford*) March. In forests at about 360 m.

MORACEÆ.

1. ALLAEANTHUS Thwaites.

1. **A. luzonicus** (Blanco) F.-Vill. Nov. App. (1883) 198.

(389, 1290 *Whitford*) June, May; (767, 774, 1281 *Borden*) May, July. In thickets below 100 m. Endemic. T., *Himbabao, Babayan.*

2. MALAISIA Blanco.

1. **M. scandens** (Lour.) K. Sch.; Fl. Deutsch. Schutz. Südsee (1901) 266. *Malaisia tortuosa* Blanco.

(2523 *Merrill*) June. In thickets below 100 m. Southern Asia to Australia.

3. STREBLUS Lour.

1. **S. asper** Lour.; Hook. f. Fl. Brit. Ind. 5 (1888) 489.

(2505 *Meyer*) January; (78 *Whitford*) April; (355 *Barnes*) March; (2491, 2557 *Borden*) January. Abundant in thickets below 100 m. Widely distributed in the Philippines. British India to Southern China and Malaya. T., *Calios.*

4. ARTOCARPUS Forst.

1. **A. communis** Forst. Char. Gen. (1776) 102. *A. incisa* Linn. f. Suppl. (1781) 411.

(1297, 1380, 1531, 1544, 1624, 1682 *Borden*) July, August; (527 *Barnes*) November. Common in the forests and thickets below 200 m. Widely distributed in the Philippines. Malaya and Polynesia. The bread fruit, but all the specimens growing at Lamao the seeded form. T., *Antipolo.*

2. **A. integrifolia** Linn. f.; Hook. f. Fl. Brit. Ind. 5 (1888) 541.

(183 *Barnes*) January. In thickets below 100 m. Widely distributed in the Philippines and cultivated. British India and Malaya. The Jack fruit. T., *Nangca, Lanca.*

3. **A. lanceolata** Trécul; Miq. Fl. Ind. Bat. 1 (1859) 2: 288.

(2946 *Borden*) March. In forests at about 140 m. Endemic.

4. **A. rubrovenia** Warb. in Perk. Frag. Fl. Philip. (1905) 166.

(2562, 2915, 2948 *Borden*) February and March. In forests 120 to 250 m. Endemic. T., *Anubiong.* This name is usually applied to *Artocarpus cumingiana* Trécul.

5. **A. xanthocarpa** Merr. Govt. Lab. Publ. 17 (1904) 10.

(367 *Whitford*) June; (682 *Borden*) May; (183 *Merrill*) Decades Philippine Forest Flora. In forests at 200 m. Endemic. T., *Sulipa.*

6. **A. cumingiana** Trécul. l. c.

(*Whitford*). In forests and thickets, widely distributed in the Philippines. Endemic. T., *Anubiong.*

5. FICUS Linn.

§ *Corellia.*

1. **F. barnesii** Merr. Govt. Lab. Publ. 17 (1904) 12.

(325 *Barnes*) February; (6730 *Elmer*) November. In forests at about 200 m. Endemic. T., *Tibig.*

2. **F. minahassæ** Miq.; King. Ann. Bot. Gard. Calcutta 1 (1888) 108. *pl. 140, 141.*

(2845 *Meyer*) March; 2534 *Merrill*) June; (6670 *Elmer*) November; (30 *Whitford*) April; (66 *Barnes*) November; (231 *Merrill*) Decades Philip. Forest Fl., coll. *Barnes*, November. In forests along the river, 20 to 950 m. Celebes. T., *Ayumit.*

3. **F. nota** (Blanco) Merr. Govt. Lab. Publ. 17 (1905) 10.

(2492 *Merrill*) June; (723 *Borden*) May; (324 *Barnes*) February; (173 *Merrill*) Decades Philip. Forest Fl. coll. *Borden*, May; (6689 *Elmer*) November; (2408 *Meyer*) January; (65, 400 *Whitford*) April, June. In forests and thickets usually near the river, 50 to 500 m. Endemic. T., *Tibig*.

4. **F. pseudopalma** Blanco; Merr. l. c. 6 (1904) 9.

(*Whitford*). In thickets below 100 m. rather common and widely distributed in the Philippines. Endemic. T., *Niogniogan*.

5. **F. ribes** Reinw.; King l. c. 110. *pl. 144*.

(2633, 2838 *Meyer*) February, March; (348 *Barnes*) February; (3881 *Elmer*) November. In forests 600 to 900 m. Malaya to New Guinea.

6. **Ficus rubrovenia** Merrill, sp. nov.

A tree 8 to 14 m. high. Branches light brown, striate, glabrous. Leaves oblong to broadly oblong-lanceolate or oblanceolate, coarsely irregularly repand to entire, chartaceous, glabrous, 11 to 20 cm. long, 4 to 7 cm. wide, the apex somewhat abruptly short acuminate, the base acute; nerves prominent beneath, irregular, reddish brown when dry, the primary ones 7 to 8 on each side of the midrib, distant, curved-ascending, anastomosing, the reticulations lax, distinct; petioles 1 to 3 cm. long, glabrous; stipules glabrous, ovate-lanceolate, caducous. Receptacles fasciculate on small branchlets or tubercles from the trunk of the tree, 3 to 10 or more receptacles in a fascicle, the tubercle or branchlet rugose, stout, 2 cm. long or less. Receptacles subglobose to obovoid, glabrous, red when mature, about 1 cm. in diameter, the peduncles slender, glabrous, 1 to 2 cm. long, with 2 or 3 small bracteoles near the apex. Male flowers few, only near the ostiole, their pedicels 1.5 mm. long, monandrous, the anther 0.8 mm. long, the perianth surrounding the anther. Fertile female flowers sessile or pedicelled. Perianth entire, diagonally truncate, about 1 mm. long, slightly enclosing the base of the ovary; ovary ovoid, 1.5 long, the style sublateral, 0.5 mm. long. Gall flowers similar to the fertile female flowers.

(2769, 3003 *Meyer*) February, May; (1183 *Borden*) June; (3138 *Merrill*) October; (6638 *Elmer*) November; (467, 1076 *Whitford*) July, January. In forests 100 to 700 m. A species well characterized by its oblong, irregularly repand to subentire leaves. T., *Tibig*.

§ *Eusyce*.

7. **F. odorata** (Blanco) Merr. l. c. 17 (1904) 15.

(620, 1256 *Borden*) April, June; (168 *Merrill*) Decades Philippine Forest Fl., coll. *Borden*, June; (37 *Whitford*) April; (6652 *Elmer*) November. In thickets and forests below 100 m. Endemic. T., *Pacquiling*.

8. **F. ruficaulis** Merr. l. c. 13.

(512 *Barnes*) February, November; (185 *Merrill*) Decades Philip. Forest Fl., coll. *Borden*, April; (6878 *Elmer*) November; (1233 *Whitford*) April. In forests 100 to 300 m. Endemic.

9. **F. villosa** Blume; King l. c. 137. *pl. 172*.

(2833 *Meyer*) March. In forests at 850 m., not previously reported from the Philippines. Malayan Peninsula and Archipelago.

§ *Neomorphe*.

10. **Ficus paucinervia** Merrill, sp. nov.

A tree reaching a height of about 13 m. Branches brown, striate, minutely pubescent. Leaves alternate, elliptical ovate to oblong ovate, subcoriaceous, 9 to 14 cm. long, 5.5 to 8 cm. wide, narrowed somewhat to the equilateral, rounded, rarely somewhat acute base, the apex abruptly acuminate, the acumen blunt,

about 1 cm. long, both surfaces somewhat shining, the upper glabrous, the lower paler, slightly pubescent on the nerves and midrib; nerves about 4 on each side of the midrib, prominent beneath, ascending, anastomosing, the primary reticulations distinct; petioles, pubescent, 1.5 to 2.5 cm. long; stipules caducous, ovate lanceolate, acuminate, densely pubescent. Receptacles in fascicles on the larger branches, 3 to 6 or more fruits in each fascicle, depressed globose or obovoid, about 1.4 cm. in diameter, glabrous, rugose when dry, yellowish when fresh, the pedicels slender, glabrous, about 1.5 cm. long, with three small bracteoles at the apex. Male flowers not seen. Fertile female flowers numerous. Perianth 4-lobed, lanceolate, 1 to 1.5 mm. long. Ovary obovoid, about 1.5 mm. long, the style lateral, stout, about 1 mm. long.

(2849 *Meyer*) March. In forests river cañon at about 900 m. Apparently related to *Ficus sycomoroides* Miq., from Amboina.

11. **F. variegata** Blume; King, l. c. 169. *pl. 212;* Merr. Govt. Lab. Publ. 17 (1904) 14.

(354, 601 *Barnes*) March; (171 *Merrill*). Decades Philippine Forest Fl., coll. *Borden*, April; (779, 1177, 1551, 1625 *Borden*) May, August. In forests 100 to 200 m. Malaya. T., *Tangisang bayauac.*

§ *Sycidium.*

12. **F. ampelas** Burm.; King. l. c. 90. *pl. 114.*

(587 *Barnes*) March; (681 *Borden*) May; (275 *Merrill*) Decades Philippine Forest Fl., coll. *Borden*, August. In forests 150 to 200 m., not previously reported from the Philippines. Malaya.

13. **F. hauili** Blanco, Fl. Filip. ed. 1 (1837) 684; ed. 2 (1845) 475.

(1677, 2014, *Borden*) August, October; (1475 *Ahern's collector*) July; (6771 *Elmer*) November. In thickets and open forests below 150 m., abundant and widely distributed in the Philippines, apparently endemic. T., *Hauili.*

No. 2839 *Meyer*, from forests at 1,100 m., is similar to the above specimens except that it has small apparently immature fruits.

14. **F. rostrata** Lam.; King. l. c. 86. *pl. 110.*

(6159 *Leiberg*) July; (2851, 3116 *Meyer*) March, May; (1210 *Borden*) June. In forests 800 to 1,100 m., scandent. British India and Malaya. T., *Balete.*

15. **F. sinuosa** Miq.; Hook. Lond. Journ. Bot. 7 (1848) 232.

(6023 *Leiberg*) July; (2522 *Meyer*) February; (777, 2559 *Borden*) May, February. Abundant in thickets below 100 m., widely distributed in the Philippines. Endemic (?). T., *Isis.*

One of the most common species of the genus in the Philippines, and exceedingly variable, reduced by King to *Ficus heterophylla* Linn., but *Ficus sinuosa* is always an erect shrub, never scandent.

16. **Ficus validicaudata** Merrill, sp. nov.

A small tree 7 to 8 m. high with small, lanceolate to ovate lanceolate very long-caudate-acuminate leaves, and small axillary solitary long peduncled receptacles. Branches slender, brown, glabrous or slightly scabrous pubescent. Leaves 3 to 6 cm. long, 0.8 to 1.5 cm. wide, sometimes 10 cm. long and nearly 3 cm. wide, subcoriaceous, scabrous, shining, not at all pubescent, entire, the base acute, 3-nerved, the apex long narrowly caudate acuminate, the acumen one third to nearly one half as long as the blade; nerves 4 to 5 on each side of the midrib, distant, rather distinct beneath, anastomosing, the reticulations distinct, lax; petioles 3 to 4 mm. long; stipules glabrous, lanceolate, caducous, about 4 mm. long. Receptacles subglobose, glabrous, red when mature, 4 to 5 mm. in diameter, the peduncles slender, 1 to 1.5 cm. long, with three small bracts at the apex. Fertile female flowers sessile or pedicelled; perianth lobes 5, free, 1.5 to

2 mm. long, lanceolate, oblanceolate or spatulate, surrounding and enclosing the ovary. Ovary ovoid, slightly compressed, 1 mm. long; style sublateral, stout, 0.5 to 1 mm. long. Male flowers and gall flowers not seen.

(1201 *Whitford*) March, 1905. Exposed ridges in the mossy forest at about 1,200 m., also No. 967 *Whitford*, Mount Banahao, Province of Tayabas, Luzon, in forests at about 800 m. A species apparently most closely related to the Malayan *Ficus cuspidata* Reinw., but with long pedunculed receptacles.

§ *Synoecia.*

17. **F. bordenii** Merr. Govt. Lab. Publ. **29** (1905) 11.

(1211 *Borden*) June, 1904. In forests at 650 m. Endemic.

18. **F. megacarpa** Merr. l. c. **17** (1904) 14.

(322 *Barnes*) February; (6757 *Elmer*) November; (222 *Merrill*) Decades Philippine Forest Flora, coll. *Borden*, October. In forests 120 to 200 m. Endemic.

§ *Urostigma.*

19. **Ficus bataanensis** Merrill, sp. nov.

Scandent (?). Branches light gray, glabrous 2 to 3 mm. thick. Leaves alternate, coriaceous, elliptical oblong to narrowly obovate oblong, pale when dry, the apex rounded, somewhat acute or very broadly acuminate, the base acute, 4 to 7 cm. long, 1.5 to 3 cm. wide, entire, glabrous, smooth, somewhat shining above, the margins recurved; primary nerves about 12 on each side of the midrib, spreading, somewhat prominent on both surfaces, anastomosing, the secondary nerves and reticulations numerous, rather dense, distinct; petioles stout, rugose, about 5 mm. long; stipules caducous, lanceolate, glabrous, about 14 mm. long. Receptacles subglobose, axillary, solitary, glabrous, red when mature, 12 to 14 mm. in diameter, the peduncle nearly 1 cm. long, slightly pubescent, with two or three scattered small bracts on the upper portion, the ostiole tubular, prominent. Male flowers few only near the ostiole, monandrous, the anther 0.8 mm. long, the perianth lobes exceeding and enclosing the anther, reddish brown. Gall flowers numerous, the perianth lobes 4, reddish brown, lanceolate, 1 to 2.2 mm. long, surrounding and enclosing the ovary. Ovary ovoid, 1.3 mm. long, acute, the style lateral, slender, 1 mm. long. Fertile female flowers similar to the gall flowers but somewhat smaller.

(1175 *Whitford*) March. On exposed ridges in the mossy forest at about 1,200 m.

20. **F. benjamina** Linn. (?). King, l. c. 43., *pl. 52.*

(48 *Whitford*) April; (2427 *Meyer*) January; (2479, 2566 *Borden*) January, February. In forests and thickets below 100 m. British India and Malaya. T., *Balete.*

21. **F. caulocarpa** Miq. *F. infectoria* Roxb. var. *caulocarpa* (Miq.) King, l. c. 63. *pl. 75.*

(3776 *Merrill*) January; (197, 201 *Barnes*) January; (2251 *Meyer*) February; (2551 *Borden*) February; (6706 *Elmer*) November; (67 *Merrill*). Decades Philip. Forest Fl., coll. *Barnes*, January. In forests along the river below 300 m., common and widely distributed in the Philippines. Borneo. T., *Balete.* No. 2493 *Borden*, January, apparently also represents a form of this species.

22. **F. chrysolepis** Miq.; King, l. c. 24. *pl. 20.*

(2387 *Borden*) January. In forests at 650 m. Celebes. T., *Balete.*

23 **F. forstenii** Miq.; King l. c. 29 *pl. 29.*

(1477 *Ahern's collector*) July; (2374 *Borden*) January. In forests below 100 m., Celebes, Timor, Borneo. T., *Payapa, Balete.*

A species differing in some minor characters from *Ficus forstenii* Miq., as figured and described by King, but agreeing so well with that species in essential characters that the material is referred there. *Ficus vidaliana* Warb., differs from our material in the absence of the bracts of the receptacle. If on comparison with authentic material of *Ficus forstenii*, the specimens cited above prove to be sufficiently distinct, I am of the opinion that Blanco's name, *Ficus payapa*, should be adopted for the form here discussed, as his description although short and imperfect applies with sufficient closeness to warrant the adoption of his specific name in such case.

24. **F. indica** Linn.; King l. c. 39. *pl. 45.*

(2063, 2373, 2707 *Borden*) October, February. In forests at about 100 m. Assam and Burma to Malaya. T., *Balete.*

25. **F. retusa** Linn. (?). King, l. c. 50. *pl. 61.*

(2376 *Borden*) January; (1425 *Ahern's collector*) July; (3285 *Merrill*) October. On exposed rocky bluffs on the seashore. Tropical Asia to Malaya and New Caledonia. T., *Balcting bato.*

26. **F. saxophila** Blume; King. l. c. 17. *pl. 12.*

(2588 *Meyer*) February. In thickets at about 25 m. Java. Timor, and Boeroe. T., *Balete.*

27. **Ficus similis** Merrill, sp. nov.

A tree about 12 m. high, apparently starting as an epiphyte. Branches brown, glabrous, striate, the younger parts slightly pubescent. Leaves alternate, oblong-obovate, chartaceous, glabrous, the very young leaves somewhat pubescent on the nerves beneath, shining, rather pale when dry, 9 to 14 cm. long, 3.5 to 5 cm. wide, the apex abruptly short, blunt acuminate, narrowed below to the acute base, the margins entire; nerves 7 to 8 on each side of the midrib, spreading, distant, anastomosing, rather distinct beneath, the reticulations lax, rather obscure; petioles rugose, slightly pubescent or glabrous, 5 to 8 mm. long; stipules caducous, lanceolate, acuminate about 1 cm. long, densely appressed pubescent outside. Receptacles axillary, solitary, subglobose to obovoid, about 1 cm. in diameter, glabrous, or very slightly pubescent, rugose when dry, the peduncles ebracteolate, appressed pubescent, about 5 mm. long. Fertile female flowers numerous, the perianth lobes free, lanceolate, acuminate, 2.5 to 3 mm. long, much exceeding the ovary. Ovary ovoid, rounded, 1 mm. long, the style slender, lateral, 2 to 3 mm. long.

(3031 *Meyer*) May. In forests at 120 m., T., *Balete.* Also No. 1065 *Merrill*, Baler, Province of Principe, Luzon, August, 1902. A species apparently most closely related to *Ficus pubinervis* Blume, differing from that species in its longer peduncled receptacles and glabrous leaves.

28. **F.** sp. (*F. indica* group).

(2031, 2384 *Borden*) October, January. In forests 50 to 900 m., T., *Balete.*

29. **F.** sp. (*F. indica* group).

(2192 *Meyer*) December; (2722 *Borden*) February. In forests at 130 M. T., *Balete.*

30. **F.** sp.

(2316 *Meyer*) December; (2369, 2483 *Borden*) December, January. In forests 100 to 200 m., T., *Balete.*

31. **F.** sp.

(1966 *Borden*) October. In forests at 200 m. T., *Balete.*

6. CONOCEPHALUS Blume.

1. **C. violaceus** (Blanco) Merr. Govt. Lab. Publ. 27 (1905) 80.

(1186 *Borden*) June; (2291 *Meyer*) December; (13, 184 *Whitford*) April, May. River cañon thickets, 100 to 600 m. Endemic. T., *Bagauac.*

URTICACEÆ.

1. LAPORTEA Gaudich.

1. **L. luzonensis** (Wedd.) Warb. in Perk. Frag. Fl. Philip. (1905) 168. *Laportea crenulata* Gaud. var. *luzonensis* Wedd.

(2631 *Meyer*) February; (*Whitford*). In forests at 500 m. Endemic.

2. **L. crenulata** (Roxb.) Gaud.; Wedd. in DC. Prodr. 16 (1869) 1: 85.

(2850 *Meyer*) March. In forests at 900 m. British India and Malaya.

2. PILEA Lindl.

1. **P. luzonensis** sp. nov.

Glabrous erect, 1 m. high or less, the stems slender. Leaves opposite, lanceolate, long petioled, in unequal pairs, the leaves of each pair similar in shape, but one about one-half the size of the other, serrate throughout, the inflorescence not exceeding the petioles. Leaves glabrous, membranous, strongly 3-nerved, the apex long acuminate, narrowed below to the acute, slightly obtuse or even obscurely narrowly cordate base, the larger ones 11 to 14 cm. long, 3 to 4 cm. wide, the smaller ones of each pair about one half as large; petioles slender, 3 to 4 cm. long; stipules very short; cross nervules many, curved, rather prominent beneath. Dioecious. Female inflorescence congested, axillary, less than 1 cm. long, sepals 3, very unequal, one about 1 mm. long, the other two very much smaller, scarcely embracing the achene. Achene ovate, slightly inequilateral, flattened, 1 mm. long. Male inflorescence short peduncled, the branches slender, 3 to 4 cm. long, the flowers in scattered fascicles 3 to 4 mm. in diameter, each fascicle 10 to 20 flowered. Sepals 4, oblong-oblanceolate, about 1.5 mm. long. Stamens 4; filaments slender; anthers about 0.5 mm. long.

(279, 1129 *Whitford*) May, March. Common in the cañon of the Lamao River on damp shaded banks, 800 to 1,000 m.

3. ELATOSTEMA Forst.

1. **E. longifolium** Wedd.; DC. Prodr. 16 (1869) 1: 184.

(*Whitford*) May. Common on wet shaded banks along streams, 500 to 600 m. Endemic.

2. **E. sessile** Forst. var. **brongniartianum** Wedd. l. c. 173.

(174 *Whitford*) May; (288 *Copeland*) February. Common on wet shaded banks along the river, 250 to 600 m. The species widely distributed in tropical Asia and Malaya, the variety endemic.

3. **E. whitfordii** Merrill, n. sp.

A succulent, erect, herbaceous or somewhat suffrutescent plant 1 to 2 m. high, with large alternate glabrous leaves, and very short pedumeled or sessile fleshy hemispherical receptacles 1 to 2 cm. in diameter. Branches glabrous, succulent, striate when dry, slightly zigzag. Leaves oblong 18 to 22 cm. long, 7 to 9 cm. wide, pale green, inequilateral, slightly falcate, the lamina on one side of the midrib about three-fifths as wide as the portion on the other side, the apex sharply acuminate, the base acute, inequilateral, glabrous, membranous, the upper surface with numerous small irregularly disposed cistoliths, the lower surface with cistoliths only on the reticulations and veins, margins rather strongly serrate-dentate throughout, except near the base which is subentire; lateral nerves 11 to 14 on each side of the midrib, prominent beneath, ascending, branched above but scarcely anastomosing; petioles glabrous, about 1 cm. long; stipules membranous, glabrous, deciduous, narrowly lanceolate, long acuminate, 3 cm. long.

Male flowers numerous, subsessile or the peduncle 4 mm. long, fleshy, succulent, the heads 1 to 2 cm. in diameter, the bracts confluent into a fleshy disk, the tips scarcely free, flowers surrounded by a mulicaginous, transparent substance. Anthers 1 mm. long or less.

(254 *Whitford*) May; (1234 *Borden*) June. Growing on wet shaded banks subject to constant drip of water in cañon of the Lamao River 550 to 800 m. A species apparently related to the Malayan *Elatostema macrophyllum* Brongn.

4. PROCRIS Juss.

1. **P. lævigata** Blume; Hook. f. Fl. Brit. Ind. 5 (1888) 575.

(3884 *Merrill*). On cliffs at 1,000 m. Tropical Asia, Africa, and Malaya. Not previously reported from the Philippines.

5. BŒHMERIA Jacq.

1. **B. blumei** Wedd. in DC. Prodr. 16 (1869) 1: 204.

(6078 *Leiberg*) July; (6656 *Elmer*) November. Along streams below 100 m. Endemic.

6. PIPTURUS Wedd.

1. **P. asper** Wedd: in DC. Prodr. 16 (1869) 1: 235.[17]

(72 *Whitford*) April; (2222 *Meyer*) December. In thickets near streams below 100 m. Common and widely distributed in the Philippines. Endemic. T., *Dalunot*.

6. VILLEBRUNEA Gaudichaud.

1. **V. trinervis** Wedd.; DC. Prodr. 16 (1869) 1: 235.[22]

(2645, 3001 *Meyer*) February, May; (6978 *Elmer*) November; (195 *Barnes*) January. In cañon of the Lamao River, 200 to 700 m. Endemic.

7. LEUCOSYKE Zoll. et Mor.

1. **L. capitellata** (Poir.) Wedd. l. c. 235.[27]

(283 *Whitford*) May; (2543, 2544 *Merrill*) June; (6665 *Elmer*) November. Along streams from near sea level to 900 m. Widely distributed in the Philippines. Malaya.

2. **L. capitellata** var. **celtidifolia** (Gaud.) Wedd. l. c. 235.[28]

(1149 *Whitford*) March; (6976 *Elmer*) November. On exposed ridges 900 to 1,100 m. Certainly only an ecological variety of *Leucosyke capitellata*. Endemic.

PROTEALES.

PROTEACEÆ.

1. HELICIA Lour.

1. **H. cumingiana** Presl; Meissn. in DC. Prodr. 14 (1857) 440.

171, 118, 456, 460 *Whitford*) May, July; (1354 *Borden*) July; (3767 *Merrill*) January; (2599 *Meyer*) February. On exposed ridges above 1,000 m. Endemic.

2. **H. philippinensis** Meissn. l. c. 441.

(836, 1235, 2076, 3060 *Borden*) May, June; (1510 *Ahern's collector*) July; (2602 *Meyer*) February; (342 *Whitford*) May. In forests above 600 m. Endemic.

SANTALALES.

LORANTHACEÆ.

1. LORANTHUS Linn.

1. **L. pentapetalus** Roxb.; Hook. f. Fl. Brit. Ind. 5 (1886) 206.

(80 *Barnes*) November; (2242 *Meyer*) December; (6891 *Elmer*) November; (1219 *Whitford*) April. Parasitic on various trees 50 to 1,000 m. Tropical Asia to Malaya. T., *Galamino.*

2. **L.** sp.

(816, 1814, 2938 *Borden*) March to September. Parasitic on various trees 200 to 650 m.

3. **L.** sp.

(134, 1081 *Whitford*) May, February; (1813 *Borden*) September. Parasitic on *Eugenia* and other trees in forests at 600 m.

4. **L.** sp.

(1171 *Whitford*) March. Parasitic on an undetermined tree in forests at 1,100 m.

2. ELYTRANTHE Blume.

1. **E. ampullacea** (Roxb.) Engl. *Loranthus ampullaceus* Roxb.; Hook. f. Fl. Brit. Ind. 5 (1886) 220.

(86 *Whitford*) April. Parasitic on *Anisoptera vidaliana* Brandis. British India to Malaya.

SANTALACEÆ.

1. HENSLOWIA Blume.

1. **H. lobbiana** A. DC.; Hook. f. Fl. Brit. Ind. 5 (1886) 233.

(1200 *Borden*) June. A parasitic scandent vine on trees in the upper forests. The first species of the genus to be definitely known from the Philippines, *H. philippinensis* A. DC., being from Malacca and not from the Philippines, while the species figured by Vidal, Synopsis, Atlas, *t. 18. f. F.*, as *H. heterantha* Hook. f., is *Exocarpus latifolia* R. Br.

OPILIACEÆ.

1. CHAMPEREIA Griff.

1. **C. cumingiana** (Baill.). *Opilia cumingiana* Baill. Adansonia 3 (1862) 124.

(3810 *Merrill*) April; (32, 1063, 1065 *Whitford*) April, January; (2410, 2519, 2771, 2813 *Meyer*) January, March; (617, 2375, 2733 *Borden*) April, January, March. Common in the lower thickets and extending to an altitude of 700 m.

This species has been identified by Vidal as *Champereia griffithiana* Planch., which is probably correct, but Baillon's name is the earlier. It is possible that *Opilia manillana* Baill., is not distinct. T., *Malaluchan.*

2. OPILIA Roxb.

1. **O. amentacea** Roxb.; Laws. in Hook. f. Fl. Brit. Ind. 1 (1875) 583.

(1317 *Whitford*) June; (2356 Borden) January; (2315 *Meyer*) December. Scandent in thickets near the seashore. British India to Malaya and New Guinea.

OLACACEÆ.

1. STROMBOSIA Blume.

1. **S. philippinensis** (Baill.) Rolfe Journ. Bot. 23 (1885) 211 (July); Vidal, Phan. Cuming. Philip. (1885) 23, 102 (November). *Strombosia dubia* Vidal, Sinopsis, Atlas (1883) 20. *t. 30. f. D.*

(639, 660, 661, 1181, 1367, 1737, 1761, 1776, 2742 *Borden*) April to March; (514, 522, 532, 533, 549, 558, 578, 591, 607 *Barnes*) November to January; (2515 *Merrill*) June; (1046 *Whitford*) January. Abundant in the forests 100 to 600 m. Endemic. T., *Camayauan.*

2. OLAX Linn.

1. **O. imbricata** Roxb.; Mast. in Hook. f. Fl. Brit. Ind. 1 (1872) 575.

(2327, 2358, 2705, 2923 *Borden*) December to March; (2281 *Meyer*) December. Scandent in thickets and open forests up to 200 m. Widely distributed in the Philippines. British India and Java.

BALANOPHORACEÆ.

1. BALANOPHORA Forst.

1. **B. decurrens** Fawc. Trans. Linn. Soc. II. 2 (1886) 234. (?).

(3947 *Merrill*) March; (1113 *Whitford*) February. Parasitic on roots of trees on ridges in the mossy forest at 1,000 m. Endemic.

ARISTOLOCHIALES.

ARISTOLOCHIACEÆ.

1. ARISTOLOCHIA Linn.

1. **A. tagala** Cham. Linnaea 7 (1832) 207.

(2342 *Borden*) December. In thickets below 100 m. British India to Malaya.

CENTROSPERMÆ.

AMARANTACEÆ.

1. DEERINGIA R. Br.

1. **D. baccata** (Retz.) Moq. in DC. Prodr. 13 (1849) 2: 236. *D. celesioides* R. Br.

(2265 *Meyer*) December; (6721 *Elmer*) November. In thickets below 100 m. Widely distributed in the Philippines. Southern China to Australia.

2. **D. indica** Zoll. & Mor. Syst. Verz. (1854–55) 72.

(1594, 3064 *Borden*) April, May; (6671 *Elmer*) November; (6082 *Leiberg*) July; (484 *Whitford*) July. Common in thickets below 100 m., widely distributed in the Philippines. Malaya to New Guinea, etc. T., *Hagorilis.*

2. CYATHULA Lour.

1. **C. prostrata** (Linn.) Blume; Hook. f. Fl. Brit. Ind. 4 (1885) 723.

(2362 *Borden*) January; (1024 *Whitford*) December; (2318 *Meyer*) December. A weed in waste places in openings below 100 m. Tropics of the world.

3. AERUA Forsk.

1. **A. lanata** (Linn.) Juss.; Hook. f. Fl. Brit. Ind. 4 (1885) 728.
(*Whitford*) April; (6022 *Leiberg*) July; (6848 *Elmer*) November; (1492 *Ahern's collector*) July. In open places near the seashore. Widely distributed in the Philippines. Asia, Africa and Malaya.

4. GOMPHRENA Linn.

1. **G. globosa** Linn.; Hook. f. l. c. 732.
(2033 *Borden*) October. In waste places about dwellings, probably introduced from Mexico. Cultivated in all countries.

AIZOACEÆ.

1. MOLLUGO Linn.

1. **M. stricta** Linn.; Clarke in Hook. f. Fl. Brit. Ind. 2 (1879) 663.
(6103 *Leiberg*) July; (3305 *Merrill*) October. A weed along trails below 100 m. Tropical Asia to Malaya and the Fiji Islands.

RANALES.

MENISPERMACEÆ.

1. CISSAMPELOS Linn.

1. **C. pareira** Linn.; Hook. f. Fl. Brit. Ind. 1 (1872) 103.
(1604 2015 *Boden*) August, October; (6016 *Leiberg*) July. Common in thickets below 100 m. Widely distributed in the Tropics of the world.

2. CYCLEA Arnott.

1. **C.** sp.
(2527 *Merrill*) June; (1215 *Whitford*) April. In thickets 150 to 700 m. Male flowers only.

3. TINOSPORA Miers.

1. **T. reticulata** Miers. Ann. & Mag. Nat. Hist. II. 13 (1864) 321.
(2541 *Merrill*) June. In thickets at 150 m. Endemic.

4. ANAMIRTA Colebr.

1. **A. cocculus** (Linn.) W. et A.; Hook. f. Fl. Brit. Ind. 1 (1872) 98.
(6652 *Elmer*) November; (3292 *Merrill*) October. In thickets below 100 m. Widely distributed in the Philippines. British India and Malaya.
2. **A.** sp.
(70 *Whitford*) April. In thickets below 100 m. Male flowers only.

5. LIMACIA Lour.

1. **L. cuspidata** Hook. f. et Th.; Hook. f. Fl. Brit. Ind. 1 (1872) 100.
(3112 *Meyer*) May. In forests at 800 m. British India and Malaya.

MAGNOLIACEÆ.

1. TALAUMA Juss.

1. **T. villariana** Rolfe, Journ. Linn. Soc. Bot. 21 (1884) 307.
(668, 1746 *Borden*) April, August; (551 *Barnes*) March; (2506 *Meyer*) January; (1160 *Whitford*) March. In forests 100 to 1,000 m. Endemic. T., *Patanguis*.

2. MICHELIA Linn.

1. **M. parviflora** Merr. Govt. Lab. Publ. 35 (1906) 70.

(*Borden*) April. Sterile specimen. Endemic.

3. DRIMYS Forst.

1. **D. piperita** Hook. f. Icon. Pl. *t. 896.*

(260 *Copeland*) January; (149, 1103 *Whitford*) May, February; (6817 *Elmer*) November. Exposed ridges at 1,100 m. On most of the higher mountains of the Philippines. Borneo and New Guinea.

ANONACEÆ.

1. UVARIA Linn.

1. **U. alba** Merr. Govt. Lab. Publ. 17 (1904) 17.

(50 *Barnes*) August; (3024 *Meyer*) May; (6003 *Leiberg*) July; (6637 *Elmer*) November; (1924 *Borden*) September; (3274, 3859 *Merrill*) October, August. In forests 100 to 400 m. Endemic.

2. **U. ovalifolia** Blume, Fl. Jav. Anon. 27.

(3275, 3897 *Merrill*) October, August; (6140 *Leiberg*) July; (1423 *Ahern's collector*) July. Forests, seashore to 300 m. Malaya.

3. **U. rufa** Blume l. c. 19.

(397, 1319 *Whitford*) June. Common in thickets below 100 m. Widely distributed in the Philippines. Malaya. T., *Susong calabao.*

4. **U.** sp.

(2051 *Borden*) October; (3301 *Merrill*) October; (87 *Barnes*) November. In forests below 200 m. Fruits only.

2. ANAXAGOREA St. Hil.

1. **A. luzonensis** A. Gray, Bot. Wilke's U. S. Explor. Exped. (1854) 27.

(2214 *Meyer*) December; (2500, 3136 *Merrill*) June, October; (471, 505 *Whitford*) July; (1215, 1229, 1327, 1770 *Borden*) June, August. Abundant in forests above 100 m. Widely distributed in the Philippines. British India and Malaya.

3. UNONA Linn. f.

1. **U. clusiflora** Merr. Govt. Lab. Publ. 35 (1906) 13.

(2521, 3769 *Merrill*) June, 1903, January; (1214, 1289 *Whitford*) April, May; (6882 *Elmer*) November. In forests 50 to 600 m. Endemic.

4. CANANGIUM Baill.

1. **C. odoratum** (Lam.) Baill. in Koord. & Val. Bijd. Boomsoort. Java 9 (1903) 279. *Cananga odorata* Hook. f. et Th.

(764, 1400 *Borden*) May, July; (2509 *Meyer*) January; (368 *Whitford*) June. In forests up to 200 m., indigenous. Widely distributed in the Tropics by cultivation. T., *Ilang-ilang.*

5. POLYALTHIA Blume.

1. **P. flava** Merr. Govt. Lab. Publ. 35 (1906) 12.

(1068 *Whitford*) January; (2052, 2544 *Borden*) October, February; (2514 *Meyer*) January. Forests at about 200 m. Endemic.

2. **P. barnesii** Merr. l. c. 17 (1904) 15.

(596 *Barnes*) March; (760, 802, 3032 *Borden*) May. In forests 100 to 200 m. Endemic.

3. **P. suberosa** Hook. f. et Th.; Hook. f. Fl. Brit. Ind. 1 (1872) 65.
(3096 *Merrill*) October. In thickets below 100 m. British India and Java.
4. **P.** sp.
(2823 *Meyer*) March. Fruit only. A tree in forests at 800 m.

6. GONIOTHALAMUS Blume.

1. **G. elmeri** Merr. Govt. Lab. Publ. 29 (1905) 13.
(2498 *Meyer*) January; (7025 *Elmer*) November; (277, 324 *Whitford*) July. In forests 100 to 900 m. Endemic.
2. **G.** sp.
(1213 *Whitford*) April. A tree in forests at 600 m. Flowers immature, from the trunk of the tree.

7. PHÆANTHUS Hook. f. et Th.

1. **P. cumingii** Miq. Fl. Ind. Bat. 1 (1859) 2: 51.
(64, 1030 *Whitford*) April, December; (2501 *Merrill*) June; (6679 *Elmer*) November; (2179, 3022 *Meyer*) December, May; (159 *Barnes*) January; (1204, 1659, 1690, 1750 *Borden*) June, August; (1418, 1481, 1491 *Ahern's collector*) August. In forests 70 to 300 m. Endemic. T., *Banitan.*

8. MITREPHORA Blume.

1. **M. ferruginea** Merr. Govt. Lab. Publ. 17 (1904) 16, non Boerl.
(2829 *Meyer*) March; (61, 367, 513 *Barnes*) October, March; (3728 *Merrill*) January; (635, 2045 *Borden*) April, October; (6734, 7000 *Elmer*) November. In forests 100 to 500 m. Endemic. T., *Dalinas.*
This name is invalidated by *Mitrephora ferruginea* Boerl., a Celebes species, but as two species were confused in the original description, no new name is here proposed for the Philippine plant, as flowering specimens have not been seen.
2. **M. lanotan** (Blanco) Merr. l. c. 35 (1906) 71.
(6087 *Leiberg*) July; (1447 *Ahern's collector*) July; (2230, 3016 *Meyer*) December, May; (610, 763, 2364, 2924, *Borden*) April to March; (1250, 1033 *Whitford*) December, May, 1905. In forests 100 to 300 m. Endemic. T., *Dalinas.*

9. OROPHEA Blume.

1. **O. cumingiana** Vidal, Phan. Cuming. Philip. (1885) 17.
(1238, 1315 *Whitford*) May, June. In forests in river cañon, 200 to 300 m. Endemic.
2. **O. maculata** Merr. Govt. Lab. Publ. 35 (1906) 11.
(2389 *Borden*) January; (2418 *Meyer*) January. In forests, 200 to 500 m. Endemic.

10. XYLOPIA Linn.

1. **X. dehiscens** (Blanco) Merr. Forestry Bureau Bull. 1 (1903) 20.
(683 *Borden*) May. In forests at 150 m. Endemic.

11. ARTABOTRYS R. Br.

1. **A. cumingianus** Vidal, Phan. Cuming. Philip. (1885) 169.
(4 *Whitford*) April; (2950 *Borden*) March. In forests at 100 m. Endemic.
2. **A. rolfei** Vidal, Rev. Pl. Vasc. Filip. (1886) 39.
(2925 *Borden*) March; (2828 *Meyer*) March; (3300 *Merrill*) October. In thickets and forests 75 to 200 m. Endemic.

12. CYATHOCALYX Champ.

1. **C. globosus** Merr. Govt. Lab. Publ. 17 (1904) 17.

(489, 510, 523, 560 *Barnes*) November, March; (359, 501, 1029 *Whitford*) June, December; (622, 646, 657, 667, 1529, 1536, 1735 *Borden*) April, August. In forests 100 to 200 m. Endemic. T., *Latauan*.

MYRISTICACEÆ.

1. HORSFIELDIA Willd.

1. **H. ardisiifolia** (A. DC.) Warb. Monog. Myrist. (1897) 274.

(2487 *Borden*) January. In forests at 200 m. Endemic.

2. GYMNACRANTHERA Warb.

1. **G. paniculata** (DC.) Warb. l. c. 370.

(669, 2940 *Borden*) April, March; (174 *Barnes*) January. In forests 100 to 250 m. Endemic. T., *Tairúean*.

2. **G. lanceolata** Merrill, n. sp.

A medium sized tree. Branches glabrous, gray or dark brown, striate, the ultimate branchlets with very few short ferruginous hairs. Leaves lanceolate, coriaceous, glabrous, dark above, slightly shining, reddish or reddish white beneath, 11 to 14 cm. long, 1.5 to 3 cm. wide, nearly equally and rather abruptly narrowed at both ends, the base acute, the apex acute or merely blunt; primary lateral nerves about 15 on each side of the midrib, reddish brown beneath and somewhat prominent, rather obscure above, the midrib stout, prominent, very slightly pubescent on the lower portion beneath, the reticulations lax, irregular; petioles slightly ferruginous pubescent or nearly glabrous, 1 to 1.5 cm. long. Inflorescence axillary or on the young branchlets below the leaves, 1 cm. long or less, very few flowered, densely ferruginous pubescent throughout, the peduncles 5 mm. long or less. Female flowers (scarcely mature) 2 mm. long, densely ferruginous pubescent with short hairs. Ovary densely ferruginous pubescent. Male flowers and fruits not seen.

(3236 *Meyer*) June. A tree in forests at 800 m.

3. MYRISTICA Linn.

1. **M. philippinensis** Lam.; Warb. l. c. 286.

(628, 761, 1791 *Borden*) April, September; (1438 *Ahern's collector*) July; (361 *Whitford*) June; (52 *Barnes*) October. In forests 100 to 200 m. Endemic.

Warburg, to whom specimens were sent, identified Nos. 628 and 761 *Borden*, and 52 *Barnes* as *Myristica guatteriifolia* A. DC., but all the specimens cited above agree more closely with Nos. 829 and 1481 *Cuming* (*M. philippinensis*), than with 1582 *Cuming*, cotype of M. *Guatteriifolia* A. DC. Specimens of Cuming's plants exist in our herbarium. T., *Duguan, Tumbalao*.

2. **M. simiarum** A. DC.; Warb. l. c. 397.

(2630 *Meyer*) February; (346, 470 *Whitford*) May, July; (1244 *Borden*) June. In forests at 550 m. Endemic. T., *Paria*.

4. KNEMA Lour.

1. **K. heterophylla** (F.-Vill.) Warb. l. c. 573.

(625, 1180, 1372, 1663, 1655, 2556, 2723 *Borden*) April to March; (366, 520 *Whitford*) June, July; (6152 *Leiberg*) July; (2815 *Meyer*) March; (2533 *Merrill*) June; (500 Barnes) November. A tree in forests 50 to 500 m. Common and widely distributed in the Philippines, endemic. Local native names the same as for *Myristica philippinensis*. *Sterculia glomerata* Blanco is certainly identical, but Blanco's description is very imperfect.

MONIMIACEÆ.

1. KIBARA Endl.

1. K. ellipsoidea Merrill, n. sp.

A shrub or small tree about 6 m. high. Branches pale, glabrous. Leaves glabrous throughout, elliptical oblong, subcoriaceous, opposite, rather pale when dry, somewhat shining beneath, entire below, distantly toothed in the upper half, 14 to 17 cm. long, 5 to 7 cm. wide, the apex abruptly short acuminate, the base acute, the teeth irregular, small, 1 to 2 cm. distant; primary lateral nerves prominent beneath, spreading, 7 to 8 on each side of the midrib, anastomosing at 1 cm. from the margin, the reticulations distinct, very lax; petioles 2 to 2.5 cm. long. Female flowers (immature) axillary glabrous, the carpels very numerous, the peduncles elongated in infrutescence, stout, about 2 cm. long, the disk-like receptacle about 1 cm. in diameter in fruit, bearing few mature carpels. Carpels stipitate, ellipsoidal 2 to 2.5 cm. long, about 1.5 cm. thick, glabrous, shining, purple when mature, the stipes about 1 cm. long.

(2843 *Meyer*) March, 1905. In dense forests in cañons at 1,000 m. According to the collector the aboriginal Negritos who inhabit this region use the fruits for food.

LAURACEÆ.

1. CINNAMOMUM Blume.

1. C. mercadoi Vidal, Rev. Pl. Vasc. Filip. (1886) 224.

(2482, 2945 *Borden*) January, March; (2626 *Meyer*) February; (1247 *Whitford*) May. In forests 100 to 700 m. Enemic. T., *Samilin*, *Similin*, *Calingag*.

2. MACHILUS Nees.

1. M. philippinensis Merrill, n. sp.

A small tree 8 to 15 m. high. Branches slender, brown or nearly black, glabrous, striate, the younger branchlets rather densely ferruginous pubescent. Leaves obovate or oblong-obovate, subcoriaceous, glabrous or the under surface with few hairs when young or when very young pubescent on both surfaces, often somewhat glaucous beneath, shining above, rather sharply acuminate, narrowed below to the acute base, 5 to 7 cm. long, 1.5 to 3.5 cm. wide, alternate; nerves 6 to 7 on each side of the midrib, ascending, evident beneath but rather obscure above, the reticulations dense; petioles about 1.5 cm. long, glabrous, or when young slightly pubescent. Panicles slender, axillary, few flowered, 6 to 10 cm. long, branched only above the middle, the peduncle, branches, pedicels and calyx lobes uniformly pubescent with short reddish brown hairs, the branches short, spreading, 2 cm. long or less the pedicels 3 mm. long. Flowers hermaphrodite, greenish, fragrant, about 3.5 mm. long. Sepals 6, oblong to oblong-ovate, 2.5 mm. long, the outer three slightly smaller than the inner ones. Outer stamens nearly equaling the sepals their anthers 4-celled, introrse, the anthers of the inner row of stamens extrorse. Ovary glabrous. Fruit subglobose, glabrous, about 8 mm. in diameter, the calyx lobes not persistent.

(1139, 1220 *Whitford*) March, April; (2793 *Meyer*) March. A tree on exposed forested ridges 900 to 1,000 m.

3. NEOLITSEA (Benth.)

(*Litsea* § *Neolitsea* Benth.; *Tetradenia* Nees, 1831, non Benth. 1830.)

1. N. vidalii nom. nov. *Litsea verticillata* Vidal, Rev. Pl. Vasc. Filip. (1886) 226, non Hance.

(634, 757, 829, 1904, 3029 *Borden*) May, April. In forests 150 to 400 m. Endemic. T., *Pusopuso.*

2. **N. zeylanica** (Nees). *Litsea zeylanica* C. & Fr. Nees in Amœn. Bot. Bonn. Fasc. 1 (1823) 58; Hook. f. Fl. Brit. Ind. 5 (1886) 178.

(1337, 1586, *Borden*) July, August; (3204 *Merrill*) October; (1503, *Ahern's collector*) July; (6806 *Elmer*) November; (119, 458 *Whitford*) May, July; (2617 *Meyer*) February. On exposed ridges above 1,000 m. Not previously reported from the Philippines. British India and Malaya.

3. **N. microphylla** Merrill, n. sp.

A shrub or small tree. Branches slender, glabrous, striate, brown, the young shoots ferruginous pubescent. Leaves alternate, mostly near the tips of the branchlets, elliptical oblong to ovate lanceolate, with few appressed ferruginous hairs on both surfaces when young, becoming glabrous, 3.5 to 5.5 cm. long, 1 to 2 cm. wide, dark and dull above, glaucous beneath; lateral nerves not prominent, the two subbasal ones sharply ascending, about 4 others on each side of the midrib from about the middle upwards; petioles slender, 1 cm. long, glabrous, shining. Umbels sessile, mostly axillary, subglobose and about 5 mm. in diameter before anthesis, 5-flowered, the four surrounding bracts membranous, elliptical-ovate, about 4.5 mm. long, slightly pubescent. Flowers slightly pubescent, the perianth 4-cleft, the lobes acute narrowly ovate. Ovary glabrous. Stamens in the female flowers usually 2 to 3, sterile. Male flowers not seen. Fruit obovoid, glabrous, 1.5 cm. long, black when dry, the persistent calyx tube funnel shaped, about 5 mm. in diameter at the top.

(6905 *Elmer*) November, 1904. On exposed ridges with the preceding species, differing especially in its much smaller leaves and larger fruits.

4. LITSEA Lam.

1. **L. tersa** (Linn.) *Glabraria tersa* Linn. Mant. (1771) 276. *Litsea chinensis* Lam. Encycl. 3 (1789) 574. *L. sebifera* Pers. Syn. Pl. 2 (1807) 4. *Sebifera glutinosa* Lour. Fl. Cochinch. (1790) 638.

(365 *Barnes*) March; (1285 *Borden*) July; (1255 *Whitford*) May. In forests and thickets below 100 m., common and widely distributed in the Philippines. British India to Southern China, Malaya, and Australia. T., *Pusopuso.*

2. **L. luzonica** (Blume) F.-Vill. Nov. App. (1883) 181.

(134, 344 *Barnes*) January, February; (627, 1356, 1371, 1810 *Borden*) April, September; (2321, 2809, 3002 *Meyer*) December, May; (268 *Copeland*) February; (3183, 3891 *Merrill*) October, August; (271, 345, 469 *Whitford*) May, July, (1453 *Ahern's collector*) July; (6075; 6131 *Leiberg*) July; (6633, 6808 *Elmer*) November, 1904. Common in forests 100 to 1,000 m. Widely distributed in the Philippines, possibly endemic. Variable and apparently closely related to the Malaya *Litsea fulva*, and perhaps not distinct from that species, many of the specimens cited above closely resembling authentic specimens of the latter species.

3. **L. perrottetii** (Blume) F.-Vill. l. c.

(128, 330 *Barnes*) January, February; (2347 *Borden*) January; (1025 *Whitford*) December. In open forests below 100 m., widely distributed in the Philippines. Endemic. T., *Maguilie.*

4. **L.** sp.

(1363, 1794 *Borden*) July, September. Apparently undescribed, fruit only.

5. BEILSCHMIEDIA Nees.

1. **B. glomerata** Merr. Govt. Lab. Publ. 29 (1905) 15.

(335 *Barnes*) February. In forests at 100 m. Endemic. T., *Terukan.*

6. CRYPTOCARYA R. Br.

1. **C. luzoniensis** Vidal, Rev. Pl. Vasc. Filip. (1886) 222.

(1043, 1050 *Whitford*) December, January. In thickets along the river at 100 m. Endemic.

2. **C.** sp.

(3046 *Borden*) May, 1905. In forests at 130 m. Fruit only.

7. ENDIANDRA R. Br.

1. **E. coriacea** Merr. Govt. Lab. Publ. 35 (1906) 14.

(3780 *Merrill*) January; (3066 *Borden*) May; (126, 190 *Barnes*) January. In forests 100 to 200 m. Endemic.

8. PLATEA Blume.

1. **P. latifolia** Blume; Miq. Fl. Ind. Bat. 1 (1855) 1: 793.

(1202 *Whitford*) March; (2098 *Borden*) November; (6835 *Elmer*) November. In forests 900 to 1,200 m. Java and Sumatra.

The above specimens are with immature fruits and old pistillate flowers, but agree well with the description of the species, and with sterile specimens in our herbarium from Java. No species of the genus has previously been reported from the Philippines.

RHODEALES.

HERNANDIACEÆ.

1. ILLIGERA Blume.

1. **L. luzonensis** (Presl) Merr. Govt. Lab. Publ. 17 (1904) 18.

(2557, 3289 *Merrill*) June, October. In thickets below 50 m. Endemic.

CAPPARIDACEÆ.

1. GYNANDROPSIS DC.

1. **G. pentaphylla** (Linn.) DC.; Hook. f. Fl. Brit. Ind. 1 (1872) 171.

(*Whitford*) April. Waste places near the seashore. Widely distributed in the Philippines, and generally distributed in the Tropics of the world.

2. CAPPARIS Linn.

1. **C. horrida** Linn. f.; Hook. f. l. c. 178.

(2553 *Borden*) February; (2574 *Meyer*) February. In thickets below 75 m., widely distributed in the Philippines, British India and Malaya. T., *Daug.*

2. **C. micracantha** DC.; Hook. f. l. c. 179.

(93 *Whitford*) April; (2223 *Meyer*) December; (2552 *Borden*) February. Common in thickets below 100 m., widely distributed in the Philippines, British India and Malaya. T., *Tinicán.*

3. **C. oblongata** Merr. Govt. Lab. Publ. 35 (1906) 15.

(2632 *Meyer*) February. In forests at 500 m. Endemic.

4. **C.** sp.

(3858 *Merrill*) August; (518 *Whitford*) July. Fruit only. In thickets below 100 m.

3. STIXIS Lour.

1. **S. philippinensis** (Turcz.) Merr. Govt. Lab. Publ. 35 (1906) 72.

(2263 *Meyer*); (2326 *Borden*) December. In forests at 100 m. Endemic. T., *Lanitnit.*

MORINGACEÆ.

1. MORINGA Juss.

1. **M. oleifera** Lam. *M. pterygosperma* Gaertn.; Hook. f. Fl. Brit. Ind. 2 (1876) 54.

(2518 *Meyer*) January. In deserted clearings near the seashore. Commonly cultivated in the Tropics. T., *Malungay*.

SARRACENALES.

NEPENTHACEÆ.

1. NEPENTHES Linn.

1. **N. alata** Blanco, Fl. Filip. ed. 1 (1837) 805.

(3229 *Merrill*) October; (419 *Whitford*) June. On exposed ridges only near the summit of the mountain above 1,200 m. Endemic.

ROSALES.

CRASSULACEÆ.

1. KALANCHŒ Adans.

1. **K. spathulata** DC.; Clarke in Hook. f. Fl. Brit. Ind. 2 (1878) 414.

(284, 1131 *Whitford*) May, March. On rocks in river cañon 800 to 900 m. British India to Southern China and Java.

SAXIFRAGACEÆ.

1. HYDRANGEA Linn.

1. **H. lobbii** Maxim. Mem. Acad. Petersb. VII. 10 (1867) 16: 15.

(466 *Topping*) May; (2622 *Meyer*) February; (156 *Whitford*) May; (6998 *Elmer*) November. On exposed ridges above 1,000 m. Endemic.

2. ITEA Linn.

1. **I. macrophylla** Wall.; Hook. f. Fl. Brit. Ind. 2 (1878) 408.

(2383 *Borden*) January; (2404, 2615 *Meyer*) January, February. In forests at 900 m. British India and Java.

3. POLYOSMA Blume.

1. **P. philippinensis** Merr. Govt. Lab. Publ. 29 (1905) 16.

(828, 1811, 2079, 2099 *Borden*) June to December; (6795, 6838 *Elmer*) November; (2999 *Meyer*) May; (1206 *Whitford*) March; (1509 *Ahern's collector*) August; (3877 *Merrill*) August. In forests above 600 m. Endemic.

PITTOSPORACEÆ.

1. PITTOSPORUM Banks.

1. **P. pentandrum** (Blanco) Merr.; Govt. Lab. Publ. 27 (1905) 19; l. c. 35 (1906) 16.

(1937 *Borden*) October; (2228 *Meyer*) December; (3177 *Merrill*) October; (6752, 7035 *Elmer*) November; (*Whitford*) June. Common in thickets below 100 m. Widely distributed in the Philippines. Endemic. T., *Mamalis*.

2. **P. odoratum** Merr. Govt. Lab. Publ. **35** (1906) 16.

(1152, 1153 *Whitford*) March; (6902 *Elmer*) November; (2616, 2795 *Meyer*) February, March. On exposed ridges above 1,000 m. Endemic.

3. **P. resiniferum** Hemsl. Kew Bull. (1894) 344; Merr. l. c. 17.

(3729 *Merrill*) January; (2380 *Borden*) January; (2403, 2794 *Meyer*) January, March; (6903 *Elmer*) November; (1141 *Whitford*) March. On exposed ridges above 900 m. Celebes. (?)

CUNONIACEÆ.

1. WEINMANNIA Linn.

1. **W. luzoniensis** Vidal, Rev. Pl. Vasc. Filip. (1886) 125.

(420 *Whitford*) June; (2756, 3123 *Meyer*) February, May; (789, 1227 *Borden*) May, June. On exposed ridges above 700 m. Endemic.

ROSACEÆ.

1. ERIOBOTRYA Lindl.

1. **E. ambigua** Merr. Govt. Lab. Publ. **35** (1906) 19.

(2796 *Meyer*) March; (1155, 1168, 1367 *Whitford*) March, June. On exposed ridges above 900 m. Endemic.

2. PHOTINIA Lindl.

1. **P. luzonensis** Merr. Govt. Lab. Publ. **17** (1904) 18.

(6996 *Elmer*) November; (2120 *Borden*) November; (1161, 1189 *Whitford*) March; (3223, 3714 *Merrill*) October, January. On exposed ridges above 1,000 m. Endemic.

3. RUBUS Linn.

1. **R. moluccanus** Linn.; Hook. f. Fl. Brit. Ind. **2** (1878) 330.

(124 *Whitford*) May; (2842 *Meyer*) March; (3754 *Merrill*) January. On exposed ridges above 1,000 m. British India and Malaya.

2. **R. rosæfolius** Smith. f. l. c. 341.

(6790 *Elmer*) November; (101 *Whitford*) April. On exposed ridges above 800 m. British India and Malaya.

3. **R. tagallus** Cham. et Schlecht. Linnaea **2** (1827) 9.

(203 *Barnes*) January; (*Copeland*) January; (267 *Whitford*) May; (2114 *Borden*) November; (3187, 3766, 3953 *Merrill*) October to March, 1905. On exposed ridges above 1,000 m. Formosa.

4. **R. fraxinifolius** Poir.; Perk. Frag. Fl. Philip. (1904) 118.

(3957 *Merrill*) March. On exposed ridges above 1,000 m. Malaya.

4. PYGEUM Gaertn.

1. **P. latifolium** Miq. Fl. Ind. Bat. **1** (1855) **1**: 361.

(49 *Barnes*) August; (1396, 1575, 1806, 2064, 2366, 3044 *Borden*) July to May; (2629 *Meyer*) February; (6697 *Elmer*) November; (8, 84, 1203 *Whitford*) April, March. Common in thickets and forests 60 to 1,200 m., widely distributed in the Philippines. Malaya. T., *Lago*.

5. PARINARIUM Aubl.

1. **P. griffithianum** Benth.; Hook. f. Fl. Brit. Ind. **2** (1878) 310.

(688, 2724 *Borden*) May, February; (571 *Barnes*) March, 1904. In forests 100 to 200 m., widely distributed in the Philippines. British India and Malaya. T., *Linsin*.

CONNARACEÆ.

1. CONNARUS Linn.

1. **C. neurocalyx** Planch. Linnaea 23 (1850) 248.

(2030 *Borden*) October. In thickets at 60 m. Endemic.

2. AGELAEA Sol.

1. **A. wallichii** Hook. f. Fl. Brit. Ind. 2 (1876) 47.

(6004 *Leiberg*) July; (3025 *Meyer*) May; (29 *Whitford*) April; (3043 *Borden*) May. In forests 100 to 700 m. Malayan Peninsula. T., *Tayabac, Palo Santo.*

3. ROUREA Aubl.

1. **R. multiflora** Planch. Linnaea 23 (1850) 418.

(6017 *Leiberg*) July; (323 *Whitford*) May; (2520 *Merrill*) June. In thickets below 100 m., and on ridges at 800 m. Endemic.

2. **R. volubilis** (Blanco) Merr. Govt. Lab. Publ. 27 (1905) 36. *R. heterophylla* Planch. l. c. 419.

(1967 *Borden*) October. In forests at 200 m. Endemic.

4. CNESTIS Juss.

1. **C. ramiflora** Griff.; Hook. f. Fl. Brit. Ind. 2 (1876) 54.

(2592 *Meyer*) February; (2567 *Borden*) February; (529 *Topping*) May. Common in thickets below 100 m., widely distributed in the Philippines. British India and Malaya

5. ELLIPANTHUS Hook. f.

1. **E. luzoniensis** Vidal, Rev. Pl. Vasc. Filip. (1886) 104.

(1051 *Whitford*) January; (812, 1742, 1909, 2074, 2107, 2926 *Borden*) June to March; (1426, 1505 *Ahern's collector*) August; (6692, 6883, 6889 *Elmer*) November. In forests, 100 to 600 m. Endemic. T., *Banato.*

LEGUMINOSÆ.

1. PITHECOLOBIUM Mart.

1. **P. acle** (Blanco) Vidal, Rev. Pl. Vasc. Filip. (1886) 121.

(35 *Whitford*) April; (6688 *Elmer*) November; (366, 507 *Barnes*) March, November; (687, 689, 720 *Borden*) May. In forests mostly along the river below 200 m., widely distributed in the Philippines. Endemic. T., *Acle.*

2. **P. dulce** (Willd.) Benth.; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 303.

(2274 *Meyer*) December; (*Whitford*) April; (63 *Barnes*) October; (1268, 1265 *Borden*) July. In deserted clearings and thickets below 100 m., introduced from Mexico and now spontaneous and widely distributed in the Philippines. T., *Camanchili.*

3. **P. montanum** Benth.; Baker in Hook. f. l. c. 306.

(2746 *Borden*) March. In forests at 500 m. British India and Malaya.

4. **P. prainianum** new name. *P. parvifolium* Merr. Govt. Lab. Publ. 29 (1905) 19, non Benth.

(1179 *Whitford*) March; (3876 *Merrill*) August; (2790 *Meyer*) March. On exposed ridges above 1,000 m. Endemic.

The specific name previously proposed for this species being invalid, the above new name is proposed, in honor of the Director of the Royal Botanic Garden, Calcutta, who has kindly aided me in the identification of various species in this family.

5. **P. lobatum** (Grah.) Benth.; Baker in Hook. f. l. c. 305.

(1257 *Whitford*) May; (1441 *Ahern's collector*) July; (726, 1687, 1933 *Borden*) May, October. In forests, 100 to 300 m., widely distributed in the Philippines. British India and Malaya. T., *Anagap.*

2. ALBIZZIA Durazz.

1. **A. lebbekoides** Benth in Hook. Lond. Journ. Bot. 3 (1844) 89.

(*Whitford*). In thickets below 100 m.

2. **A. procera** (Willd.) Benth.; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 299.

(1270, 1292, 1293, 1300, 1310, 1382, 1555, 1567, 1620, 1823 *Borden*) July to September; (6892 *Elmer*) November; (158 *Barnes*) January; (41 *Whitford*) April. Abundant in open forests and thickets below 100 m., widely distributed in the Philippines. British India and Malaya. T., *Alalangad.*

3. **A. saponaria** Blume; Miq. Fl. Ind. Bat. 1 (1855) 1: 19.

(1563, 1932 *Borden*) August, October; (1498 *Ahern's collector*) August. In forests below 300 m., widely distributed in the Philippines. Malaya. T., *Gogong toco.*

3. ACACIA Willd.

1. **A. farnesiana** (Linn.) Willd.; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 292.

(7003 *Elmer*) November. In thickets near the seashore, widely distributed in the Philippines, but only in the settled portions. Tropics of the world. T., *Aroma.*

2. **A. intsia** (Linn.) Willd.; Baker l. c. 297.

(3796 *Merrill*) January. In thickets and forests along streams at about 100 m. British India and Malaya.

4. PROSOPIS Linn.

1. **P. juliflora** DC. Prodr. 2 (1825) 447.

(*Whitford*) April; (1264 *Borden*) July; (56 *Barnes*) October. Abundant along the seashore forming dense thickets immediately back of the beach, introduced from Mexico. T., *Aroma.*

5. ADENANTHERA Linn.

1. **A. pavonina** Linn.; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 287.

(1256, 1286 *Whitford*) May; (1496 *Ahern's collector*) August; (3863 *Merrill*) August; (1599, 2345 *Borden*) August, January. Common in open forests below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya.

6. ENTADA Adans.

1. **E. scandens** (Linn.) Benth.; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 287.

(2542 *Borden*) February. In thickets, widely distributed in the Philippines. Cosmopolitan in the Tropics. T., *Gogo.*

7. PARKIA R. Br.

1. **P. roxburghii** G. Don.; Baker l. c. 289.

(89, 323 *Barnes*) November, February; (6888 *Elmer*) November; (1290, 1320, 1518, 1549, 1519, 1614, 1626, 2132 *Borden*) July to September. Abundant in open forests and thickets below 100 m., widely distributed in the Philippines. Malaya. T., *Cupang.*

8. CYNOMETRA Linn.

1. **C. simplicifolia** Harms. Notizblatt. Kgl. Bot. Gart. Berlin 3 (1902) 186.
(*Borden, Whitford*). In forests at 500 m., sterile specimens. Endemic.
2. **C. inæquifolia** A. Gray; Baker l. c. 267.
(*Whitford*) September. In forests. Malayan Peninsula. T., *Diladila.*

9. TAMARINDUS Linn.

2. **T. indica** Linn.; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 273.
(*Whitford*). Cultivated at Lamao and generally distributed throughout the Philippines. Tropics generally, probably indigenous in Africa. T., *Sampaloc.* The tamarind.

10. INTSIA Thou.

1. **I. bijuga** (Colebr.) O. Kuntze. *Afzelia bijuga* A. Gray; Baker l. c. 275.
(1318 *Whitford*) June. Along the seashore, common, widely distributed in the Philippines. Malaya to Polynesia. T., *Ipil.*

11. PAHUDIA Miq.

1. **P. rhomboidea** (Blanco) Prain, Sci. Mem. Med. Off. Ind. 12 (1901) 46. *Epura rhomboidea* Blanco. *Afzelia rhomboidea* Vidal. *Intsia rhomboidea* O. Kuntze.
(2046, 2570 *Borden*) October, February; (2591 *Meyer*) February; (*Whitford*) June. In forests below 200 m., widely distributed in the Philippines. Endemic. T., *Tindalo.*

12. BAUHINIA Linn.

1. **B. cumingiana** (Benth.) F.-Vill. Nov. App. (1880) 73.
(187 *Barnes*) January; (1442 *Ahern's collector*) July; (2721 *Borden*) February. In open forests below 150 m., widely distributed in the Philippines. Endemic. T., *Banot.*

13. CASSIA Linn.

1. **C. alata** Linn.; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 264.
(7015 *Elmer*) November; (2198, 2583 *Meyer*) December, January. In open lands below 100 m., widely distributed in the Philippines. Cosmopolitan in the Tropics. T., *Pacayomcom.*
2. **C. occidentalis** Linn.; Baker l. c. 262.
(1943 *Borden*) October. In dry thickets near the seashore, widely distributed in the Philippines. Cosmopolitan in the Tropics.
3. **C. timorensis** Decne.; Baker l. c. 265.
(2339 *Borden*) December; (361 *Barnes*) March; (2238 *Meyer*) December. In thickets below 50 m., widely distributed in the Philippines. Burma to Malaya and Australia. T., *Balacbac.*
4. **C. tora** Linn.; Baker l. c. 263.
(1944 *Borden*) October; (3170 *Merrill*) October. A weed in waste places, widely distributed in the Philippines. Cosmopolitan in the Tropics.

14. GLEDITSCHIA Linn.

1. **G. rolfei** Vidal, Rev. Pl. Vasc. Filip. (1886) 115.
(326 *Barnes*) February. In forests at 100 m., apparently rare. Celebes.
The above identification has been verified by Prain and Rolfe, by comparison with the type of the species at Kew. *G. celebica* Koorders is apparently identical.

15. CÆSALPINIA Linn.

1. **C. bonducella** (Linn.) Flem.; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 254.

(7002 *Elmer*) November; (3284 *Merrill*) October. Common in thickets near the seashore, widely distributed in the Philippines. Cosmopolitan in the Tropics. T., *Calumbibit*.

2. **C. nuga** Ait.; Baker l. c. 255.

(1952, 2492 *Borden*) October, January; (2272 *Meyer*) December; (7009 *Elmer*) November; (1264 *Whitford*) May. Abundant in thickets on the seashore, widely distributed in the Philippines. British Indian to Malaya, Polynesia, and Australia. T., *Sapinit*.

16. MEZONEURUM Desf.

1. **M. glabrum** Desf. Mem. Mus. Paris 4 (1818) 245, *t. 18*.

(*Whitford*). In thickets near the seashore. Malaya.

17. ORMOSIA Jacks.

1. **O. calavensis** Blanco Fl. Filip. ed. 2 (1845) 230.

(223 *Merrill*) Deeades Philippine Forest Flora, coll. *Borden*, October. In forests 300 to 500 m. Endemic. T., *Babay*.

2. **O. paniculata** Merr. Govt. Lab. Publ. 35 (1906) 21.

(2028 *Borden*) October. In forests at 60 m. Endemic.

18 CROTALARIA Linn.

1. **C. quinquefolia** Linn.; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 84.

(*Whitford*) September. A weed in open wet places, widely distributed in the Philippines. British India and Malaya.

2. **C. retusa** Linn.; Baker l. c. 75.

(2021 *Borden*) October. In sandy soil near the seashore, widely distributed in the Philippines. Tropical Asia, Malaya, and Australia.

3. **C. verrucosa** Linn.; Baker l. c. 77.

(2181 *Meyer*) December; (6741 *Elmer*) November; 3308 *Merrill*) October. In waste places from sea level to 200 m., widely distributed in the Philippines. Tropics generally.

19. DALEA Linn.

1. **D. glandulosa** (Blanco) Merr. Govt. Lab. Publ. 27 (1905) 37. *D. nigra* Mart. et Gal.

(*Whitford*). In open lands and thickets below 100 m., introduced from tropical America and now widely distributed in the Philippines, ascending to an altitude of 1,400 m., in the highlands of Benguet Province, Luzon.

20. MILLETTIA W. et A.

1. **M. merrillii** Perk. Frag. Fl. Philip. (1904) 81.

(*Whitford*). In forests. Endemic.

21. GLIRICIDIA H. B. K.

1. **G. sepium** (Jacq.) Steud.; Perk. Frag. Fl. Philip. (1904) 17. *G. maculata* H. B. K.

(2593 *Meyer*) February. In deserted clearings below 75 m. Very common about towns throughout the Philippines, introduced from tropical America. Sp.-Fil., *Cacauate, Madre cacao*.

22. ZORNIA Gmel.

1. **Z. diphylla** Pers.; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 147.

(3787 *Merrill*) January. In open grass lands at 75 m. Cosmopolitan in the Tropics.

23. DESMODIUM Desv.

1. **D. capitatum** (Burm.) DC.; Baker, l. c. 170.

(*Whitford*) September. In open wet lands, widely distributed in the Philippines. British India and Malaya.

2. **D. gangeticum** (Linn.) DC.; Baker l. c. 168.

(406 *Whitford*) June; (6852 *Elmer*) November; (3104 *Merrill*) October. In open thickets below 75 m. Widely distributed in the Philippines. Tropical Asia, Africa, and Malaya.

3. **D. latifolium** DC.; Baker, l. c. (?)

(2231 *Meyer*) December. In open lands and borders of thickets below 75 m., distribution of the preceding.

4. **D. laxiflorum** DC.; Baker l. c. 164.

(2218 *Meyer*) December. With the preceding. Tropical Asia and Malaya.

5. **D. polycarpum** DC., var. **ovalifolia** (Wall.) Prain in King Mat. Fl. Malay. Penin. 2 (1897) 141.

(227 *Whitford*) May; (3115 *Meyer*) May. On exposed ridges above 1,000 m. Malayan Peninsula and Sumatra.

6. **D. pulchellum** (Linn.) Benth.; Baker l. c. 162.

(3310 *Merrill*) October; (292 *Copeland*) January; (2185 *Meyer*) December. Abundant in open places below 75 m., common and widely distributed in the Philippines. Tropical Asia and Malaya.

7. **D. scorpiurus** Desf. Journ. Bot. 1 (1813) 122. (?)

(3101 *Merrill*) October. In waste places below 50 m.

The above specimen agrees with No. 385 *Merrill*, so identified by Perkins, but there appears to be some doubt as to the correctness of the identification. *Desmodium scorpiurus* Desf., is a native of the West Indies.

8. **D. triflorum** (Linn.) DC.; Baker, l. c. 173.

(*Whitford*) June. In open grass lands below 75 m., widely distributed in the Philippines. Cosmopolitan in the Tropics.

9. **D. umbellatum** (Linn.) DC.; Baker, l. c. 161.

(2026 *Borden*) October. A shrub on the seashore, widely distributed in the Philippines. Tropical Asia, Malaya, and Polynesia.

24. ALYSCICARPUS Neck.

1. **A. vaginalis** (Linn.) DC.; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 158.

(407 *Whitford*) June; (6778 *Elmer*) November; (3091 *Merrill*) October. Common in open grass lands below 75 m., widely distributed in the Philippines. Tropical Asia, Africa and Malaya, introduced in America.

35. PHYLACIUM Benn.

1. **P. bracteosum** Benn. Pl. Jav. Rar. (1840) 159. *t. 33.*

(2734 *Borden*) March; (6701 *Elmer*) November; (295 *Copeland*) January; (3777 *Merrill*) January. Abundant in thickets along the river below 150 m., widely distributed in the Philippines. Malaya.

26. DALBERGIA Linn. f.

1. **D. ferruginea** Roxb.; Prain, Ann. Bot. Gard. Calcutta 10 (1904) 101, *pl. 86.*

(90 *Whitford*) April; (2493 *Merrill*) June; (6028 *Leiberg*) July. Abundant in thickets below 100 m., widely distributed in the Philippines. Malaya.

2. **D. torta** Grah.; Prain l. c. 64. *pl. 42.*

(*Whitford*). In thickets near the seashore. Tropical Asia to Malaya, Australia, and Polynesia.

27. PONGAMIA Lam.

1. **P. glabra** Vent.; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 240.

(1279, 1288, 2044 *Borden*) July, October; (1424 *Ahern's collector*) July. Mostly along the seashore, extending inland a short distance along the river, widely distributed in the Philippines. Tropical Asia, Malaya, and Australia. T., *Bani, Banit.*

28. DERRIS Lour.

1. **D. elliptica** (Wall.) Benth.; Baker l. c. 243. *Millettia piscatoria* Merr. Govt. Lab. Publ 27 (1905) 37, l. c. 29 (1905) 18. *Cylista piscatoria* Blanco; *Galactia* (?) *terminaliflora* Blanco; *Millettia splendens* F.-Vill. non W. et A.

(60 *Whitford*) April. In forests along the river above 100 m. Martaban to the Malayan Peninsula and Archipelago and Celebes.

This species is represented in our herbarium from several different localities, but all of our material is with flowers only. It so far has been found in the Philippines only in thickets and forests bordering rivers. Dr. Prain who has examined specimens states that they closely match the Malayan *Derris elliptica*, but that mature fruits are necessary to definitely determine whether the Philippine plant is a *Derris* or a *Millettia.*

2. **D. multiflora** Benth. in Miq. Pl. Jungh. (1851–55) 253.

(535 *Topping*) May. Endemic.

3. **D. sinuata** (Wall.) Benth.; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 246.

(1261 *Whitford*) May; (2561 *Merrill*) June. In thickets below 75 m., widely distributed in the Philippines. British India and Malaya.

4. **D. uliginosa** (Willd.) Benth.; Baker l. c. 241.

(*Whitford*) June. In tidal thickets along the seashore, widely distributed in the Philippines. Tropical Asia, Africa, Malaya, and Australia.

29. ABRUS Linn.

1. **A. precatorius** Linn.; Baker in Hook. f. l. c. 174.

(*Whitford*) April. In thickets below 100 m., widely distributed in the Philippines. Cosmopolitan in the Tropics.

2. **A. pulchellus** Wall.; Baker l. c.

(2068 *Borden*) October; (3265 *Merrill*) October; (293 *Copeland*) January; (1034 *Whitford*) December; (6717, 6736 *Elmer*) November. Abundant in thickets below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, and Malaya.

30. ERYTHRINA Linn.

1. **E. indica** Lam.; Baker l. c. 188.

(2235 *Meyer*) December; (1266, 1274 *Borden*) July. In thickets mostly near the seashore, widely distributed in the Philippines. British India to Malaya and Polynesia. T., *Dapdap.*

31. STRONGYLODON Vog.

1. **S. macrobotrys** A. Gray, Bot. Wilke's U. S. Explor. Exped. (1854) 448. *t. 49.*

(57, 160 *Whitford*) April, May; (2808 *Meyer*) March; (262 *Copeland*) January. In forests 650 to 1,000 m. Endemic. T., *Tayabac.*

32. MUCUNA Adans.

1. **M. imbricata** DC.; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 185.

(1028 *Whitford*) December; (3783 *Merrill*) January. Abundant in thickets and open forests below 100 m. British India. T., *Duglo*.

2. **M. pruriens** (Linn.) DC.; Baker l. c. 187.

(1817 *Borden*) September, 1904. In cultivated lands at 75 m. Cosmopolitan in the Tropics.

33. DIOCLEA H. B. K.

1. **D.** sp. (?)

(3050 *Borden*) May. In forests at 100 m. Flowers only.

34. PUERARIA DC.

1. **P. phaseoloides** (Roxb.) Benth.; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 199.

(6719 *Elmer*) November; (2340 *Borden*) December; (2340 *Merrill*) January. Common in thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya.

35. CANAVALIA Adans.

1. **C. ensiformis** (Linn.) DC.; Baker, l. c. 195.

(3811 *Merrill*) April; (6870 *Elmer*) November; (79 *Barnes*) November. Common in thickets below 50 m., widely distributed in the Philippines. Cosmopolitan in the Tropics.

2. **C. obtusifolia** (Lam.) DC.; Prain in King, Journ. As. Soc. Beng. **66** (1897) **2**: 62.

(3172 *Merrill*) October. In thickets near the seashore, widely distributed in the Philippines. Tropical Asia and Malaya.

36. CAJANUS DC.

1. **C. indicus** Spreng.; Baker, l. c. 217.

(2266 *Meyer*); (2337 *Borden*) December. In thickets and open places below 100 m., widely distributed in the Philippines. Tropics of the world. T., *Caguois, Gablos*.

37. VIGNA Savi.

1. **V. lutea** (Sw.) A. Gray; Baker l. c. 205.

(2295 *Meyer*) December. Sandy seashore, widely distributed in the Philippines. Tropics generally.

38. PACHYRRHIZUS Rich.

1. **P. bulbosus** (Linn.) Britton. *P. angulatus* Rich., Baker l. c. 207.

(1955 *Borden*) October; (54 *Barnes*) October; (3098 *Merrill*) October. Abundant in thickets below 75 m. Widely distributed in the Philippines. Everywhere in the Tropics. T., *Sineamas*.

GERANIALES.

OXALIDACEÆ.

1. BIOPHYTUM DC.

1. **B. sensitivum** DC.; Hook. f. Fl. Brit. Ind. 1 (1874) 436.

(3111 *Merrill*) October; (*Whitford*) September. In waste places and open lands, widely distributed in the Philippines. Tropics of the world.

2. AVERRHOA Linn.

1. **A. bilimbi** Linn.: Hook. f. l. c. 439.

(2737 *Borden*) March. In thickets and open forests below 100 m., probably introduced from tropical America, widely distributed in the Philippines and the Tropics generally. T., *Camias*.

RUTACEÆ.

1. FAGARA Linn.

1. **F. integrifoliola** Merrill, n. sp. § *Macqueria*.

A tree 13 to 20 m. high, the trunks spineless, except in young plants, the branches with scattered spines, the ultimate branches much thickened, 1.5 to 2 cm. in diameter, with few or no short spines, pale, glabrous. Leaves 45 to 60 cm. long, glabrous, 8 to 9 jugate, alternate, crowded toward the ends of the branches, the common petiole with very few short straight spines on the upper surface in the lower part, the internodes 5 to 7 cm. long; leaflets glabrous, shining, subcoriaceous, oblong to elliptical oblong, 10 to 15 cm. long, 4 to 6 cm. wide, entire, strongly inequilateral at the acute base, the apex usually abruptly acuminate, the acumen blunt or sharp; petiolules 6 to 10 mm. long; nerves 10 to 12 on each side of the midrib, not prominent, the secondary nerves nearly as prominent as the primary ones, the reticulations lax, the midrib spineless. Panicles in the upper axils, 15 to 25 cm. long, glabrous or slightly puberulent, rarely with very few small spines, the lower branches often 10 or 15 cm. long. Flowers white, very fragrant, 4 mm. long, subsessile or their pedicels 1 to 2 mm. long, subtended by 2 or 3 small bracteoles. Sepals 4, glabrous, suborbicular, rounded, about 1 mm. in diameter. Petals 4, glabrous, elliptical or oblong, obtuse, 4 mm. long, 2 mm. wide. Stamens 4, the anthers about 1.2 mm. long. Ovary glabrous. Fruit somewhat ovoid about 8 mm. long, brown or black when dry, glabrous, the pericarp pitted. Seed ovoid, compressed, black and shining, about 6 mm. long.

(88, 336 *Barnes*) November, February, fruit and flower (type); (2351, 2484, 2740 *Borden*) January, March; (2307 *Meyer*) December; (1044, 1295 *Whitford*) January, May.

A species apparently related to *Fagara rhetsa* Roxb. In forests 100 to 200 m. T., *Buso*.

2. **F.** sp. (?).

(1565, 3051 *Borden*) August, May; (1455 *Ahern's collector*) August. In forests 100 to 130 m., staminate flowers and apparently deceased fruits only. T., *Cayetana*.

2. EVODIA Forst.

1. **E. glabra** Blume: Hook. f. Fl. Brit. Ind. 1 (1875) 489.

(2947, 3045 *Borden*) March, May. In forests 120 to 150 m. Malaya.

2. **E. triphylla** (Lam.) DC.; Hook. f. l. c. 488.

(2055 *Borden*) October; (6133 *Leiberg*) July; (1474 *Ahern's collector*) August. In forests and thickets below 200 m., widely distributed in the Philippines, Malaya and Burma.

3. **E. retusa** Merrill, n. sp.

A small tree 6 to 8 m. high, nearly glabrous. Branches light gray or the ultimate branchlets brown, glabrous, the terminal buds slightly pubescent. Leaves opposite, trifoliate, glabrous, the petioles 3 to 4 cm. long; leaflets oblong obovate, subcoriaceous, 6 to 10 cm. long, 3 to 5 cm. wide, the lateral ones somewhat inequilateral, narrowed below to the acute base, the apex rounded or obscurely broadly acuminate, retuse, often prominently so, entirely glabrous, paler beneath; nerves

7 to 10 on each side of the midrib, not prominent, irregular; petiolules 2 to 5 mm. long. Inflorescence short, axillary, 2 to 3.5 cm. long, glabrous or slightly pubescent when young, the branches spreading, 1 cm. long or less. Pedicels 1 mm. long, each with 2 small basal bracteoles. Flowers white, small, mostly crowded at the ends of the branchets. Sepals ovate, 1 mm. long, obtuse or acute, slightly pubescent. Petals 4, oblong-obovate, acute, 2 mm. long, 1.2 to 1.4 mm. wide, glabrous. Stamens 4, the filaments 1 mm. long. Ovary pubescent. Fruit brown, glabrous, rugose when dry, about 4 mm. long. Seed somewhat wrinkled, brown, shining, about 2 mm. thick.

(2620 *Meyer*) February, 1905; (1329 *Borden*) July, 1904; (1181 *Whitford*) March, 1905. On exposed ridges in the mossy forest above 1,000 m.

3. MELICOPE Forst.

1. **M. luzonensis** Engl. in Perk. Frag. Fl. Philip. (1905) 161.

(3056 *Borden*) May. In forests at 150 m., widely distributed in the Philippines. Endemic.

4. LUNASIA Blanco.

1. **L. amara** Blanco, Fl. Filip. ed. 1 (1837) 783.

(745 *Borden*) May; (180 *Barnes*) January; (3161 *Merrill*) October. Common in thickets and forests below 200 m., widely distributed in the Philippines. Celebes. T., *Lunas*.

5. ACRONYCHIA Forst.

1. **A. laurifolia** Blume; Hook. f. Fl. Brit. Ind. 1 (1875) 498.

(6045 *Leiberg*) July; (3185, 3870 *Merrill*) October, August; (1333 *Borden*) July; (1147 *Whitford*) March; (6724 *Elmer*) November. On exposed ridges above 1,000 m. Tropical Asia and Malaya.

6. MICROMELUM Blume.

1. **M. pubescens** Blume; Hook. f. Fl. Brit. Ind. 1 (1875) 501.

(1434 *Ahern's collector*) August; (2246, 3021 *Meyer*) December, May; (6710, 6872 *Elmer*) November; (381 *Whitford*) June; (75, 359 *Barnes*) November, March; (2513, 3175 *Merrill*) June, October. Abundant in thickets below 100 m., widely distributed in the Philippines. British India to Malaya and Polynesia.

7. MURRAYA Linn.

1. **M. exotica** Linn.; Hook. f. l. c. 502.

(1165, 1323 *Whitford*) March, May; (2804 *Meyer*) March. On ridges above 900 m., widely distributed in the Philippines, often cultivated. Tropical Asia, Malaya, Australia, and Polynesia. T., *Camuning*.

8. CLAUSENA Burm.

1. **C. anisum-olens** (Blanco) Merr. Govt. Lab. Publ. 17 (1904) 21. *C. warburgii* Perk. Frag. Fl. Philip. (1905) 162.

(1231, 1422, 1796, 3065 *Borden*) June, May; (2509 *Merrill*) June; (1339 *Whitford*) May. Common in open forests and thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Calomata, Mala-anis, Cayomanis*.

9. ATALANTIA Correa.

1. **A. disticha** (Blanco) Merr. Govt. Lab. Publ. 27 (1905) 28.

(3118 *Meyer*) May; (3052 *Borden*) May; (1069, 1300 *Whitford*) January, June; (3789 *Merrill*) January. In thickets along the river 100 to 800 m., widely distributed in the Philippines. Endemic. T., *Maladayap, Malacabuyao*.

10. CITRUS Linn.

1. **C. hystrix** DC.; Hook. f. Fl. Brit. Ind. 1 (1875) 515.

(2312, 2766 *Meyer*) December, February; (6828 *Elmer*) November; (1361, 1545, 2736 *Borden*) July, March; (517 *Whitford*) July. In forests 100 to 1,000 m., widely distributed in the Philippines. British India, Malaya. T., *Cabuyao.*

SIMARUBACEÆ.

1. BRUCEA J. S. Muell.

1. **B. luzoniensis** Vidal, Sinopsis, Atlas (1883) 19. *t. 26. f. B.*

(181, 480 *Whitford*) May, July; (6786 *Elmer*) November; (6165 *Leiberg*) July; (1766, 2750 *Borden*) August, March; (2608 *Meyer*) February. In forests 100 to 800 m. Endemic.

2. **B. membranacea** Merrill, n. sp.

A shrub or small tree 5 to 6 m. high, with 3 to 4 jugate, odd pinnate leaves about 20 cm. long, the leaflets nearly glabrous, membranous, subentire or rather distantly toothed above, the inflorescence axillary, 10 cm. long or less. Branches light gray, lenticellate, ferruginous pubescent, the younger ones densely so. Leaves alternate, the rhachis more or less ferruginous pubescent; leaflets ovate to oblong-ovate, base slightly inequilateral, rounded or acute, the apex shortly blunt acuminate, 4 to 6 cm. long, 2 to 3 cm. wide, the midrib above and the midrib and nerves beneath ferruginous pubescent, otherwise glabrous; nerves about 7 pairs; petiolules densely pubescent, 3 to 4 mm. long. Inflorescence densely ferruginous pubescent, axillary, the flowers green, disposed in very small, few flowered cymes along the rhachis, these cymes 1 cm. long or less, rarely more than three flowered. Sepals slightly pubescent. Petals ovate to elliptical ovate, not reflexed, 1.5 mm. long, glabrous. Ovary glabrous. Staminate flowers similar to the pistillate, the stamens very short, not exserted, scarcely exceeding the disk.

(2799, 2800 *Meyer*) March, 1905. On exposed ridges at 1,000 m.

This species agrees in some respects with Vidal's description of *Brucea luzoniensis*, differing from that species as described by Vidal in its broader, not reflexed petals, very short stamens, and smaller leaves and leaflets, agreeing with his description in its short inflorescence. The specimens above referred to *Brucea luzoniensis* all have very much elongated panicles.

2. AILANTHUS Desf.

1. **A. philippinensis** Merr. Govt. Lab. Publ. 35 (1905) 25.

(2719 *Borden*) February. In forests at 150 m. Endemic.

BURSERACEÆ.

1. CANARIUM Linn.

1. **C. ahernianum** Merrill, n. sp.

A tree 20 to 25 m. high. Branches thickened, densely ferruginous pubescent with short hairs, the ultimate branchlets often 1 cm. or more in diameter, the leaf scars large and prominent. Leaves crowded toward the ends of the branchlets, 30 to 40 cm. long, 5 to 6 jugate, the rhachis rather densely ferruginous pubescent, becoming somewhat glabrous in age; leaflets oblong, entire, acuminate, the base rounded, often inequilateral, 10 to 14 cm. long, 4 to 6.5 cm. wide, firm, usually shining on both surfaces, often pale when dry, densely ferruginous pubescent on the midrib above and often somewhat pubescent on the nerves and reticulations, becoming subglabrous, beneath prominently pubescent on the midrib

nerves and reticulations, both surfaces strongly, densely reticulate; nerves very prominent beneath, spreading-ascending, anastomosing near the margin, 15 to 20 on each side of the midrib; petiolules 5 to 10 mm. long, densely ferruginous pubescent. Flowers unknown. Panicles in infrutescence short, stout, axillary, about 7 cm. long, very densely ferruginous pubescent. Drupe broadly ovoid, strongly 3-angled, about 3 cm. long, 2 cm. thick, strongly and densely wrinkled reticulate when dry, pale brown, often somewhat glaucous, with few scattered ferruginous hairs, densely ferruginous pubescent at the base, the apex blunt. Persistent calyx 3-lobed, densely ferruginous pubescent on both sides, thick, the lobes 5 to 6 mm. long, the pedicels stout, short.

(123 *Barnes*) January; (1254 *Whitford*) May. Province of Rizal, Luzon (422 *Ahern's collector*) February. In forests 60 to 200 m. According to *Barnes* the tree yields a considerable amount of pitch, and according to *Ahern's collector* the seeds are edible.

A species apparently related to *Canarium bersamifolium* Perk., with which it was at first identified, but distinguished from that species by its ferruginous pubescent leaves, somewhat larger fruits, and other characters.

2. **C. lucidum** Perk. Frag. Fl. Philip. (1904) 94.

(1154 *Whitford*) March. On exposed ridges at 900 m. Endemic. It is possible that No. 296 *Whitford* should also be referred here, but in some respects it seems closer to *Canarium villosum*.

3. **C. luzonicum** (Miq.) A. Gray; Merrill, Govt. Lab. Publ. **29** (1905) 53. *C. carapifolium* Perk. l. c. 91.

(1753 *Borden*) August. In forests at 200 m., widely distributed in the Philippines. Endemic. T., *Pili*.

4. **C. radlkoferi** Perk. l. c. 96.

(329 *Barnes*) February; (2558 *Borden*) February. In forests 15 to 100 m., apparently not abundant. Endemic.

5. **C. villosum** (Blume) F.-Vill.; Merrill, Govt. Lab. Publ. **35** (1906) 27.

(74, 376 *Whitford*) April, June; (2556 *Merrill*) June; (125 *Barnes*) January; (697, 1284, 1311, 1312, 1314, 1319, 1554, 1558, 1564, 1676 *Borden*) May, July. Abundant in thickets and open forests below 100 m., widely distributed in the Philippines. Endemic. T., *Palsahinguin, Pagsahinguin*.

2. SANTIRIA Blume.

1. **S. nitida** Merr. Govt. Lab. Publ. **35** (1906) 29.

(517, 597 *Barnes*) March, November; (638, 808, 2912 *Borden*) May, March; (2786 *Meyer*) February. In forests 100 to 700 m. Endemic. T., *Alupag macsin*.

MELIACEÆ.

1. XYLOCARPUS Kœnig.

1. **X. granatum** Kœnig. *Carapa moluccensis* Lam.; Hiern in Hook. f. Fl. Brit. Ind. **1** (1875) 567.

(*Whitford*) June, 1904. In the strand forest only, widely distributed along the seashore in the Philippines. Tropical Asia, Africa, Malaya, Australia, and Polynesia. T., *Tabiqui*.

2. SANDORICUM Cav.

1. **S. indicum** Cav.; C. DC. l. c. 461.

(1379, 1392, 1640, 1650, 1651 *Borden*) July, August; (357 *Barnes*) March; (77, 377 *Whitford*) April, June. Abundant in forests and thickets below 150 m., widely distributed in the Philippines and frequently cultivated for its edible fruits. Malaya. T., *Santol*.

3. DYSOXYLUM Blume.

1. **D. altissimum** Merr. Govt. Lab. Publ. 17 (1904) 25.

(624 *Borden*) April. In forests at 100 m. Endemic. T., *Guso.*

2. **D. cumingianum** C. DC. l. c. 498.

(1332 *Whitford*) May; (2638 *Meyer*) February. In forests in cañons, 400 to 600 m. Endemic.

3. **D. rubrum** Merr. Govt. Lab. Publ. 35 (1906) 32.

(1293 *Whitford*) May; (2013 *Borden*) October. In forests 80 to 180 m. Endemic.

4. **D. turczaninowii** C. DC. l. c. 501. *Amoora macrocarpa* Merr. Govt. Lab. Publ. 17 (1904) 24.

(3731 *Merrill*) January; (6908 *Elmer*) November; (2634 *Meyer*) February; (1365 *Borden*) July; (474, 1199, 1217 *Whitford*) July, March, April. In forests, 500 to 800 m. Endemic. T., *Tañglin.*

4. CHISOCHETON Blume.

1. **C. cumingianus** (C. DC.) Harms, in Engler und Prantl. Pflanzenfam. 3 (1896) 4: 294.

(2644 *Meyer*) February; (193, 1314 *Whitford*) May, June. In forests in cañons 225 to 600 m. Endemic. T., *Cato.*

2. **C. philippinus** (Turcz.) Harms, l. c. 296.

(651, 718, 1656, 1689, 1800, 2049 *Borden*) April to October; (78, 518 *Barnes*) November; (2250 *Meyer*) December; (1470 *Ahern's collector*) August; (6127 *Leiberg*) July. Common in forests 100 to 200 m., widely distributed in the Philippines. Endemic. T., *Cato-macsin.*

This species was erroneously referred by the author[1] to *Chisochiton pentandrus* (*Trichilia pentandra* Blanco). Blanco's species is quite distinct however.

3. **C. tetrapetalus** Turcz.; C. DC. Monog. Phan. 1 (1878) 530.

(675, 1653, 1743 *Borden*) May, August; (1482 *Ahern's collector*) August; (1039 *Whitford*) December. In forests 75 to 200 m., widely distributed in the Philippines. Endemic. T., *Agogoy*, also *Cato* and *Cato-macsin.*

6. REINWARDTIODENDRON Koord.

1. **R. merrillii** Perk. Frag. Fl. Philip. (1904) 74.

(59, 594, *Barnes*) October, March; (6766 *Elmer*) November; (3149 *Merrill*) October; (1368, 1762, 2060 *Borden*) July, October. In forests 100 to 500 m. Known only from Luzon, a second species of the genus being known from Celebes. T., *Malacamanga.*

7. AMOORA Roxb.

1. **A. aherniana** Merr. Govt. Lab. Publ. 17 (1904) 24.

(823 *Borden*) June. In forests at 600 m. Endemic. T., *Cato.*

2. **A. cumingiana** C. DC. l. c. 580.

(522, 1041 *Whitford*) July, January; (2530 *Merrill*) June; (2563 *Borden*) February. In forests below 200 m. Endemic.

8. AGLAIA Lour.

1. **A. bordenii** Merr. Govt. Lab. Publ. 17 (1904) 22.

(631, 714, 1749 *Borden*) April, August; (3159 *Merrill*) October; (1231 *Whitford*) April; (1500 *Ahern's collector*) August. In forests 100 to 400 m. Endemic. T., *Potian.*

[1] Govt. Lab. Publ. 27 (1905) 31.

2. **A. denticulata** Turcz.; C. DC. l. c. 642.

(3008 *Meyer*) May; (1023, 2953 *Borden*) September, March; (6729 *Elmer*) November; (1234 *Whitford*) April; (1450 *Ahern's collector*) July; (2510, 3134 *Merrill*) June, October. In forests 100 to 350., widely distributed in the Philippines. Endemic. T., *Bayanti.*

3. **A. harmsiana** Perk. Frag. Fl. Philip. (1904) 32.

(66 *Whitford*) April; (2255 *Meyer*) December; (62, 503, 616 *Barnes*) October, November, April; (1754 *Borden*) August. In forests 100 to 200 m. Endemic. T., *Malatumbaga.*

I have some doubt regarding the identification of the above specimens, as the leaves are 4 to 6 jugate instead of 2 to 3 jugate as described by Perkins, while our specimens of No. 422 *Ahern* have 5 jugate leaves, this number being cited by Perkins in her description of the species.

4. **A. micrantha** Merr. Govt. Lab. Publ. 29 (1905) 22.

(3120 *Meyer*) May; (104, 215, 477, 1230 *Whitford*) April; (1195 *Borden*) June; (3724 *Merrill*) January. In forests 300 to 700 m., the fruit edible. Endemic. T., *Lansones bundoc, Mansanas.*

5. **A. pauciflora** Merr. l. c.

(6699 *Elmer*) November. Endemic.

6. **A. multiflora** Merr. sp. nov. § *Euaglaia.*

A tree with alternate 4 to 5 jugate leaves, and large axillary many flowered panicles nearly equaling the leaves, the flowers 3 mm. long, the staminal tube free from the petals. Branches finely and densely brownish gray lepidote. Leaves about 35 cm. long, the rhachis about 23 cm. long, more or less lepidote; leaflets alternate, oblong or oblong ovate, 10 to 14 cm. long, 4.5 to 6 cm. wide, chartaceous, dull, glabrous above, only slightly lepidote on and near the veins beneath, short blunt acuminate, the base usually rounded, often strongly inequilateral; lateral nerves prominent beneath, 9 to 12 pairs; petiolules about 5 mm. long. Panicles 20 to 25 cm. long, many branched, the primary branches often 15 cm. long, many flowered, the flowers racemosely disposed, the rhachis, branches, branchlets, short pedicels and calyces more or less brown lepidote, the pedicels about 1 mm. long. Flowers 3 mm. long. Calyx shortly 5 lobed, the lobes acute. Petals 5, glabrous, obong elliptical obtuse, 3 mm. long, 1.5 wide. Staminal tube free from the petals, ovoid or obovoid, much contracted and nearly closed at the apex, glabrous, 3 mm. long. Stamens 5, inserted below the middle of the tube, included, the anthers 1.5 mm. long.

(1420 *Ahern's collector*) July, 1904. In forests. T., *Malatumbaga.*

A species in some respects resembling *Aglaia macrobotrys* Turcz., differing from that species especially in its flowers which are about twice as large. Somewhat resembling *Aglaia turczaninowii* C. DC., but the staminal tube not at all united with the corolla.

7. **A. turczaninowii** C. DC. l. c. 623. *Amoora lepidota* Merr. Govt. Lab. Publ. 17 (1904) 23.

(3173 *Merrill*) October; (1492 *Ahern's collector*) July; (373 *Whitford*) July; (694, 1764, 1964 *Borden*) May to October. In forests 100 to 200 m. Endemic.

A variable species, to which *Amoora lepidota* Merr., must certainly be reduced. The stamens vary from 6 to 10, and frequently the staminal tube is only slightly united with the corolla.

MALPIGHIACEÆ.

1. TRISTELLATEIA Thours.

1. **T. australasica** Rich.; Hook. f. Fl. Brit. Ind. 1 (1874) 418.

(1444 *Ahern's collector*) July. A scandent shrub in thickets along the seashore, widely distributed in the Philippines. Malaya to tropical Australia.

2. HIPTAGE Gaertn.

1. H. luzonica Merr. Govt. Lab. Publ. 35 (1906) 33.

(1148 *Whitford*) March. A scandent shrub on exposed ridges at 900 m. Endemic.

POLYGALACEÆ.

1. POLYGALA Linn.

1. P. chinensis Linn.; Benn. in Hook. f. Fl. Brit. Ind. 1 (1872) 204.

(3092 *Merrill*) October; (6109 *Leiberg*) July; (*Whitford*) June. In open dry grass lands below 100 m. Tropical Asia, Malaya, and Australia.

2. XANTHOPHYLLUM Roxb.

1. X. sp.

(525 *Barnes*) November. A tree in hill forests at 100 m., the specimens sterile. T., *Carra*.

DICHAPETALACEÆ.

1. DICHAPETALUM Dup. Th.

1. D. triçapsulare (Blanco) Merr. Govt. Lab. Publ. 35 (1906) 35.

(2824 *Meyer*) March; (3191 *Merrill*) October; (145 *Barnes*) January; (2077 *Borden*) November; (6642 Elmer) November. In forests above 700 m. Endemic.

EUPHORBIACEÆ.

1. ANDRACHNE Linn.

1. A. sp. (?)

(1934 *Borden*) October. Scandent, in forests at 300 m., material imperfect.

2. FLUGGEA Willd.

1. F. obovata (Linn.) Wall.; *F. microcarpa* Blume; Hook. f. Fl. Brit. Ind. 5 (1887) 328.

(6025 *Leiberg*) July; (390, 534 *Whitford*) June, July; (775 *Borden*) May. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, Malaya, and Australia. T., *Bayisit*.

3. PHYLLANTHUS Linn.

1. P. blancoanus Muell. Arg.; DC. Prodr. 15 (1862) 2: 420.

(237 *Whitford*) May; (3179, 3751 *Merrill*) October, January. In forests and on exposed ridges above 700 m., also represented by No. 98 *Bolster* and No. 3830 *Merrill*, from Mount Arayat, Province of Pampanga, Luzon, and No. 2698 *Ahern's collector*, Bosoboso, Province of Rizal, Luzon. Endemic.

Phyllanthus blancoanus Muell. Arg., was based on *P. niruri* Blanco, non Linn. =*P. tetrander* Blanco, non Roxb., and being known only from Blanco's description, has previously been a doubtful species. The above specimens although not agreeing perfectly with Blanco's description, are the only ones I have seen that closely approach the species as described by him, and accordingly are so referred.

2. P. buxifolius (Blume) Muell. Arg. l. c. 426.

(3010 *Meyer*) May; (2532 *Merrill*) June; (2932 *Borden*) March; (1501 *Ahern's collector*) July. In forests 100 to 250 m. Java.

3. P. niruri Linn.; Muell. Arg. l. c. 406.

(3157 *Merrill*) October. In open places along streams and in thickets below 100 m., widely distributed in the Philippines. Tropics generally.

4. **P. reticulatus** Poir.; Muell. Arg. l. c. 344.

(6702 *Elmer*) November; (2715 *Borden*) February. In thickets below 100 m. Tropical Asia and Malaya.

5. **P. stipularis** Merrill sp. nov.

A small shrub or undershrub 1 to 2 m. high. Branches brown, more or less furfuraceous ferruginous pubescent. Leaves alternate, oblong ovate, 4 to 9 cm. long, 1 to 2.5 cm. wide, narrowed above to the sharply acute or slightly acuminate apex, the base inequilateral, rather abruptly acute, glabrous and dark above when dry, white or pale beneath and very slightly furfuraceous pubescent, membranous; nerves 5 to 6 on each side of the midrib, distant, indistinct, the reticulations obsolete or nearly so; petioles 2 to 3 mm. long, somewhat furfuraceous; stipules linear, persistent, slightly furfuraceous, 5 to 8 mm. long. Male flowers fascicled, red, 5 to 6 or more in each axil, the pedicels slender, 5 mm. long or less. Calyx glabrous the sepals 4, free, ovate-lanceolate, acute or blunt, 2.5 to 3 mm. long, about 1.5 mm. wide, the margins slightly irregularly crenate. Disk scales free, thick, fleshy, truncate, often nearly 1 mm. long. Stamens 4, the filaments united, very short or the anthers sessile, the anther cells 4, horizontal, their tips contiguous but not confluent. Rudimentary ovary 0. Female flowers solitary in the upper axils, long pedicelled. Sepals 6, imbricate, in 2 series, ovate lanceolate, acute, 2 to 2.3 mm. long, 1 to 1.3 mm. wide. Disk scales similar to the males. Ovary subglobose, about 1 mm. in diameter, 6 ridged, 3 celled, each cell 2 ovuled; styles 6, stout, about 0.3 mm. long, bifid or cleft at the apex. Fruit red, glabrous, subglobose, dehiscent, about 1.5 cm. in diameter, dry, the sepals persistent, somewhat accrescent.

(282, 1102 *Whitford*) May, February; (2841 *Meyer*) March; (2087 *Borden*) November; (*Copeland*) January; (6804 *Elmer*) November. On exposed ridges in the mossy forest above 1,100 m.

4. GLOCHIDION Forst.

1. **G. album** (Blanco) Boerl. *Phyllanthus albus* Blanco; Muell. Arg. l. c. 306.

3162, 3797, 3873 *Merrill*) January, October, August; (1765 *Borden*) August; (127 *Barnes*) January; (33 *Whitford*) April; (6663 *Elmer*) November; (2224, 2818 *Meyer*) December, March. In forests 100 to 500 M. Celebes.

2. **G. littorale** Blume. *Phyllanthus littoralis* Muell. Arg. l. c. 280.

(1276 *Whitford*) May. On bluffs at the seashore. Malaya to British India.

3. **G. llanosi** Muell. Arg. *Phyllanthus llanosi* Muell. Arg. l. c. 308.

(2289 *Meyer*) December; (6860 *Elmer*) November; (1774 *Borden*) August; (3131 *Merrill*) October. In open forests 100 to 250 m. Endemic. T., *Banitan, Talicud.*

4. **G.** sp.

(1172, 1327 *Whitford*) March, May. On exposed ridges in the mossy forest above 1,000 m.

5. **G.** sp.

(6106 *Leiberg*) July; (1427 *Ahern's collector*) July. In thickets below 50 m.

6. **G.** sp.

(2716 *Borden*) February. In thickets near the seashore.

5. BREYNIA Forst.

1. **B. cernua** Muell. Arg. l. c. 439.

(391 *Whitford*) June; (1357, 1600 *Borden*) July, August; (534 *Topping*) May. In thickets and forests from near the sea level to 700 m. Malaya. T., *Matang olang.*

2. **B. acuminata** Muell. Arg. l. c. 442.

(6422, 6753 *Elmer*) November; (399 *Whitford*) June; (6107 *Leiberg*) July; (2189, 3009 *Meyer*) December, May; (1495 *Ahern's collector*) July. In thickets and forests 25 to 300 m. Endemic.

6. CYCLOSTEMON Blume.

1. **C. bordenii** Merr. Govt. Lab. Publ. 17 (1904) 26.

(671, 673, 2372, 2395 *Borden*) May, January; (2398, 2415, 2819 *Meyer*) January, March; (1031 *Whitford*) December; (333, 542, 546, 563, 573 *Barnes*) February, March; (182 *Merrill*) Decades Philip. Forest Fl., coll. *Borden*, May. In forests 100 to 500 m. Endemic. T., *Dila dila, Talimorung.*

2. **C. cumingii** Baill.; Muell. Arg. l. c. 485.

(1269, 1275 *Whitford*) May. On bluffs along the seashore. Endemic.

3. **C. monospermus** Merrill, sp. nov. § *Stenogynium.*

A tree 4 to 12 m. high. Branches light gray or brownish, striate, glabrous, lenticellate. Leaves coriaceous, elliptical oblong to broadly oblong lanceolate, 4 to 9 cm. long, 1 to 4 cm. wide, the apex rounded, blunt or very obscurely broadly acuminate, retuse, the base acute, regular or very slightly inequilateral, glabrous, shining above, dull beneath, the primary nerves 8 or 9 on each side of the midrib, obscure, anastomosing, the secondary veins and reticulations nearly as prominent; petioles glabrous, 5 to 8 mm. long. Male flowers fascicled, on short axillary or extra-axillary bracteate peduncles, the buds globose. Sepals 4, broadly elliptical-ovate to suborbicular ovate, rounded, glabrous except the slightly ciliate margins, about 2 mm. long. Stamens 4; filaments 2 mm. long, glabrous; anthers elliptical-ovoid, about 1 mm. long the alternating disk segments thick, fleshy, narrowly ovate, about 1 mm. long. Female flowers with calyx of the male. Ovary ovoid, glabrous, 2-celled, each cell 2-ovuled, the disk annular; style 0; stigmas dilated, fleshy, more or less connate into a somewhat lobed disk. Fruit about 1 cm. long, 8 mm. in diameter, glabrous, fleshy, white, becoming gray or blackish when dry, ovoid or ellipsoid, 1-celled, 1-seeded.

(2802, 3122, 3235 *Meyer*) March, May, June; (1232 *Whitford*) April; (1225 *Borden*) June. In the upper forests and on exposed ridges in the mossy forest 650 to 1,250 m.

4. **C. microphyllus** Merr. l. c. 27.

(2260 *Meyer*) December; (175, 494 *Barnes*) January, November; (252, 340, 1027, 1229 *Whitford*) May, December, April; (640, 672, 836 bis, 1253, 2329 *Borden*) April, June, December. In forests 100 to 800 m. Endemic. T., *Tulumorung, Irani, Pangirani, Tangnaranig.*

7. APOROSA Blume.

1. **Aporosa sphæridophora** Merrill, sp. nov.

A tree 10 to 15 m. high. Branches dark reddish brown, striate, glabrous, the older ones more or less grayish. Leaves alternate, subcoriaceous, ovate to oblong or elliptical ovate, acuminate, the base acute, rarely somewhat rounded, often somewhat inequilateral, 8 to 15 cm. long, 3 to 7 cm. wide, glabrous, dark colored and dull or shining above, paler and shining beneath; nerves rather obscure above, somewhat prominent beneath, ascending, 6 to 7 on each side of the midrib, the reticulations distinct; petioles 1.5 to 2 cm. long, glabrous, somewhat swollen and rugose above. Male flowers yellow, in dense, more or less interrupted, simple, axillary spikes 2 to 5 cm. long, the rhachis and bracts ferruginous pubescent, the bracts subreniform, to broadly ovate, about 1.5 mm. long. Sepals 4, in two series, rounded at the apex, pubescent, 1 to 1.2 mm. long, the two inner ones smaller than the two outer. Stamens 2; filaments glabrous, 2 to 2.5 mm. long;

anthers orbicular ovoid, 0.5 mm. long. Female flowers yellow, in axillary, solitary or fascicled spikes 1 to 3 cm. long, the rhachis, bracts, pedicels and calyces rather densely ferruginous pubescent, the flowers few, scattered, one in each bract, the pedicels about 1 mm. long. Sepals elliptical ovate, rounded or acute. Ovary glabrous, 2-celled, each cell 2-ovuled; styles stout, recurved, 2-cleft, persistent. Fruit globose, indehiscent, brown, glabrous and shining when dry, about 1 cm. in diameter, dry, 2-celled, each cell with a single seed, the pedicels 4 to 5 mm. long.

(133, 146, 198 *Barnes*) January; (732, 818, 834, 1373 *Borden*) May, June, July; (3762 *Merrill*) January; (1451 *Ahern's collector*) July; (6086 *Leiberg*) July. In forests 300 to 900 m. Nos. 6101 and 6225 *Elmer*, Sablan, Province of Benguet, Luzon, April, 1904 are the same.

2. **Aporosa symplocosifolia** Merrill, sp. nov.

A small tree 5 to 8 m. high, the leaves usually pale yellowish green when dry. Branches light gray or brownish, glabrous. Leaves alternate, subcoriaceous, oblong ovate or elliptical ovate to broadly elliptical lanceolate, glabrous, shining on both surfaces 6 to 15 cm. long, 2 to 5 cm. wide, the apex usually rather long acuminate, the base rounded or acute, equilateral, entire; nerves about 7 on each side of the midrib, distant, anastomosing, the primary reticulations lax; petioles 1 to 1.5 cm. long, glabrous, flattened and with two small glands at the apex on the upper side. Male flowers in simple, dense, solitary or fascicled, axillary catkin-like spikes about 1 cm. long 2 mm. in diameter, the bracts very slightly pubescent, reniform, 1.5 mm. long, 2 to 2.5 mm. wide. Sepals ovate, acute, about 1.5 mm. long. Filaments about 1 mm. long, glabrous, the anthers 0.5 mm. long. Female flowers on stout, solitary or fascicled, simple, bracteose, pubescent spikes less than 1 cm. long. Sepals 4, broadly ovate, 1.5 to 2 mm. long, their margins ciliate. Ovary glabrous, 2-celled, each cell 2-ovuled. Stigmas short, stout, more or less spreading and somewhat pectinate. Fruit red when mature, sessile, ovoid to ellipsoid, glabrous, 1 cm. long or less, dry, dehiscing from the base, 2-celled, each cell with 1 or 2 seeds.

(3764, 2497 *Merrill*) June, January; (1187, 2361, 2541, 2745 *Borden*) June, January to March; (53, 99, 303, 1055, 1073 *Whitford*) April, May, January; (202 *Barnes*) January; (2320, 2512, 2820 *Meyer*) December, January, March. In forests 100 to 800 m. Other specimens from Luzon are Nos. 383, 910 *Maule*, Province of Zambales, and Nos. 394, 403, 1099, 2657, 3086, 2894 *Ahern's collector*, Province of Rizal.

8. BACCAUREA Lour.

1. **B. tetrandra** (Baill.) Muell. Arg. l. c. 465.

(662, 1217, 2368, 2486 *Borden*) April, June, January; (2504 *Merrill*) June; (334, 531 *Barnes*) February, November; (55, 1038, 1053, 1054 *Whitford*) April, December, January; (2399, 2400, 2811 *Meyer*) January, March. In forests 90 to 600 m. Endemic. T., *Dilac*.

9. ANTIDESMA Linn.

1. **A. bunius** (Linn.) Spreng.; Muell. Arg. l. c. 262.

(754, 1778 *Borden*) May, August; (415 *Whitford*) June; (2559 *Merrill*) June. In thickets below 75 m., widely distributed in the Philippines. British India and Malaya. T., *Bignay*.

2. **A. edule** Merr. Govt. Lab. Publ. 17 (1904) 26.

(6085, 6091 *Leiberg*) July; (52, 476, 521 *Whitford*) April, July; (3148, 3784 *Merrill*) October, January; (167, 547 *Barnes*) January, March; (2739 *Borden*) March (144 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, July. In forests and thickets 75 to 400 m. Endemic. T., *Tanigi*.

3. **A. ghæsembilla** Gaertn.; Muell. Arg. l. c. 251.

(1783, 2333 *Borden*) August, December; (2245 *Meyer*) December. In thickets below 75 m., widely distributed in the Philippines. Tropical Asia, Africa, and Malaya. T., *Bignay pogo*.

4. **A. leptocladum** Tul.; Muell. Arg. l. c. 253.

(728, 2058, 3034 *Borden*) May, October; (6125 *Leibery*) July; (1316 *Whitford*) June; (2498 *Merrill*) June. In forests and thickets 30 to 250 m. Malaya. T., *Bignay*.

5. **Antidesma lucidum** Merrill, sp. nov.

A small tree 6 to 9 m. high, glabrous throughout. Branches brown or grayish, slender, glabrous. Leaves alternate, elliptical ovate to oblong ovate, subcoriaceous, glabrous, shining on both surfaces, usually dark above and paler beneath when dry, 4 to 9 cm. long, 1.5 to 4 cm. wide, entire, the base acute, the apex broadly blunt acuminate, the acumen blunt, apiculate or retuse; nerves 5 to 6 on each side of the midrib, distant, anastomosing, the reticulations very lax; petioles glabrous, 3 to 5 mm. long; stipules small, deciduous. Inflorescence axillary and terminal, glabrous, slender, spicate, or the spikes in few-branched panicles 6 cm. long or less. Male flowers sessile or nearly so, scattered, each subtended by a small acute bract less than 0.5 mm. long, usually solitary or rarely two or three together. Calyx glabrous, cup shaped, obscurely 4 or 5 toothed or subtruncate. Stamens 4 to 5 in flowers on the same plant; filaments 1.6 mm. long, the anthers cells 0.4 mm. long, the disk fleshy, thickened. Fruit red when mature, wrinkled when dry, somewhat compressed, glabrous, ovoid, 6 to 7 mm. long, the persistent style small, terminal.

(2642, 2775 *Meyer*) February; (1135 *Whitford*) March; (7005 *Elmer*) November. In forests 700 to 900 m. A species in vegetative characters similar to *Antidesma rostratum* Tul., differing from that species, and from *A. leptocladum*, and *A. pleuricum* in being quite glabrous.

10. BISCHOFIA Blume.

1. **B. trifoliata** (Roxb.) Hook. f. *B. javanica* Blume; Muell. Arg. l. c. 478.

(65 *Barnes*) November; (*Whitford*) June; (3 *Merrill*) Decades Philip. Forest Flora, coll. *Barnes*, December. In forests along streams 75 to 200 m., widely distributed in the Philippines. Tropical Asia to Malaya and Polynesia. T., *Tuay*.

11. BRIDELIA Willd.

1. **B. stipularis** (Linn.) Blume; Muell. Arg. l. c. 499.

(2023 *Borden*) October; (3139 *Merrill*) October; (6769 *Elmer*) November; (92 *Whitford*) April. In thickets below 100 m., abundant, widely distributed in the Philippines. Tropical Asia and Africa to Malaya. T., *Lubalub*.

2. **B. tomentosa** Blume, var. **lancæfolia** (Roxb.) Muell. Arg. l. c. 502.

(2262 *Meyer*) December; (6754 *Elmer*) November; (1405, 1916, 2346 *Borden*) July, September, January; (3087 *Merrill*) October. In thickets below 100 m., widely distributed in the Philippines. Timor. T., *Argai*.

12. CROTON Linn.

1. **C. consanguineus** Muell. Arg. l. c. 619.

(2637, 2814 *Meyer*) February, March. In forests 550 to 900 m. Endemic.

2. **C. leiophyllus** Muell. Arg. l. c. 573.

(1433, 1467 *Ahern's collector*) July, August; (2543 *Borden*) February; (2298 *Meyer*) December. In thickets near the seashore. Endemic.

13. CLAOXYLON Juss.

1. **C. rubescens** Miq. var. **oblanceolatum** var. nov.

Similar to the species, but with oblanceolate to oblong oblanceolate leaves, abruptly acute or acuminate, tapering below to the acute base. Fruit subglobose, fleshy, white when fresh.

(1222, 1760 *Borden*) June, August; (2763 *Meyer*) February; (1480 *Ahern's collector*, in part) July; (3112 *Merrill*) October. In forests 100 to 800 m.

2. **Claoxylon rubescens** Miq., **meyenianum** Muell. Arg. l. c. 788.

(2918 *Borden*) March. In forests at 180 m. Endemic.

14. TREWIA Linn.

1. **Trewia ambigua** Merrill, sp. nov.

A tree 8 to 12 m. high with penninerved leaves, axillary and terminal inflorescence and 1-celled fruits. Diœcious. Branches brown, glabrous, the younger branchlets finely brownish puberulent. Leaves opposite, ovate to lanceolate ovate, chartaceous, glabrous throughout or bearded in the vein axils beneath, 10 to 20 cm. long, 4.5 to 9.5 cm. wide, dull or slightly shining, the apex short or rather long acuminate, the base acute, the margins subentire to obscurely coarsely undulate or crenate undulate, often with few scattered glands; nerves 8 to 9 on each side of the midrib, prominent beneath; petioles 1.5 to 6 cm. long, somewhat pubescent. Male inflorescence axillary, racemose, 5 to 8 cm. long, densely brownish puberulent, the flowers solitary or 3 to 6 in the axil of the same bract, the buds globose, sessile or short pedicelled. Sepals 4, ovate to oblong ovate, acute, about 3 mm. long, pubescent outside. Stamens indefinite; filaments glabrous, about 1.3 mm. long; anthers 2-celled, about 0.3 mm. long. Female inflorescence axillary, racemose, 4 to 7 cm. long, long peduncled, pubescent, few flowered, the pedicels about 2 mm. long, one flower in each bract, the bracts ovate, decidous. Ovary oblong ovoid, 1-celled, 1-ovuled, puberulent, the disk wanting. Style single, undivided, stout, in old flowers 5 to 6 mm. long, densely covered with stout forked or branched processes 1.5 to 2 mm. long. Fruit (immature) ovoid, about 1.5 cm. in diameter, brown, crustcaeous, 1-celled, 1-seeded, indehiscent, tipped by the base of the style.

(2798 *Meyer*) March; (623, 1251 *Borden*) April, June. In forests 100 to 800 m. The following specimens are the same: Province of Rizal, Luzon (2977, 3180 *Ahern's collector*) April, July; (2271 *Merrill*) May.

Differing from *Trewia* in its 1-celled, 1-ovuled ovaries and 1-celled, 1-seeded fruits, and in its penninerved leaves, but apparently referable to the genus.

15. MALLOTUS Lour.

1. **M. moluccanus** (Linn.) Muell. Arg. l. c. 958.

(63 *Whitford*) April; (765 *Borden*) May. In thickets below 100 m., common and widely distributed in the Philippines. Tropical Asia and Malaya. T., *Taquip asin.*

2. **M. muricatus** (Wight) Muell. Arg. l. c. 972, in part. (2555 *Merrill*) June; (3011 *Meyer*) May; (26, 378, 386 *Whitford*) April, June. In forests and thickets 75 to 250 m. Malaya.

3. **M. philippinensis** (Lam.) Muell. Arg. l. c. 980.

(1556, 1919, 2726 *Borden*) August, September, March; (1486 *Ahern's collector*) July; (67 *Whitford*) April; (2551 *Merrill*) June. In forests and thickets 50 to 150 m., widely distributed in the Philippines. Tropical Asia to Malaya and Australia. T., *Banato.*

4. **M. playfairii** Hemsl. Journ. Linn. Soc. Bot. 26 (1894) 441?

(2057, 2357 *Borden*) October, January; (2317 *Meyer*) December; (1462 *Ahern's collector*) July. In thickets along the seashore. T., *Binunga*.

This Formosan species was described from staminate specimens only, and I am unable to determine the exact identity of the Philippine form at the present time.

5. **M. repandus** (Rottl.) Muell. Arg. l. c. 981.

(6749 *Elmer*) November. In forests, generally distributed in the Philippines. Tropical Asia to Malaya and New Caledonia.

6. **M. ricinoides** (Pers.) Muell. Arg. l. c. 963.

(2846 *Meyer*) March. In forests at 800 m., widely distributed in the Philippines. Tenasserim to Southern China. T., *Alim*.

7. **M.** sp.

(2612 *Meyer*) February. In forests at 500 m., an apparently undescribed species, in fruit only.

16. ALCHORNEA Sw.

1. **A. javensis** (Blume) Muell. Arg. l. c. 905.

(3795 *Merrill*) January; (3027 *Borden*) May. In forests 75 to 100 m. Burma to Southern China and Malaya.

17. MACARANGA Thouars.

1. **M. bicolor** Muell. Arg. l. c. 1010.

(641, 722, 1294, 1296, 1569, 1570, 2913 *Borden*) April to August; (9, 17 *Whitford*) April; (165 *Merrill*) Decades Philip. Forest Fl., coll. *Borden* April; (3018 *Meyer*) May; (6858 *Elmer*) November. In forests 100 to 250 m. Endemic. T., *Binunga, Bilua*.

2. **M. cumingii** Muell. Arg. l. c. 1005.

(2650 *Meyer*) February. On exposed ridges in the mossy forests at 1,300 m. Endemic.

3. **M. mappa** (Linn.) Muell. Arg. l. c. 1000.

(2059, 2951 *Borden*) October, March; (12, 1052 *Whitford*) April, January; (2309 *Meyer*) December; (6731 *Elmer*) November. In thickets and open forests below 120 m., common and widely distributed in the Philippines. Malaya. T., *Bilua*.

4. **M. tanarius** (Linn.) Muell. Arg. l. c. 997.

(2296 *Meyer*) December; (392 *Whitford*) June; (2473 *Borden*) January. In thickets along the seashore, widely distributed in the Philippines. Malayan Peninsula and Archipelago. T., *Binunga, Bilua*.

5. **M.** sp.

(521 *Barnes*) November. Forests at 100 m. Sterile specimens apparently closely related to *Macaranga hispida* Muell. Arg. T., *Cabal*.

18. ACALYPHA Linn.

1. **Acalypha cardiophylla** Merrill, sp. nov.

A small tree about 7 m. high, dioecious. Branches light gray, glabrous, the younger parts densely cinerous puberulous, also with few scattered long ciliate hairs. Leaves alternate, broadly ovate, membranous, 8 to 15 cm. long, 8 to 12 cm. wide, nearly glabrous above, or pubescent on the veins, glandular punctate, beneath more or less puberulous at least on the midrib and nerves when young, and with few long scattered hairs, the apex short acuminate, the base broad, rounded or cordate, the margins crenate-serrate to subentire; basal nerves 5, the lateral nerves about 7 on each side of the midrib, curved-ascending, distinct, the reticulations subparallel, distinct; petioles 6 to 12 cm. long, puberulent; stipules lanceolate or ovate lanceolate, pubescent, deciduous, 4 to 5 mm. long.

Staminate inflorescence axillary, slender, spicate, many flowered, densely light gray pubescent, often 20 cm. long, the flowers fascicled, sessile, ebracteolate, the buds globose. Sepals 4, oblong-ovate, acute, pubescent, about 1 mm. long. Stamens 8; filaments about 0.5 mm. long, free, the anther cells divergent. Pistillate inflorescence slender, axillary, solitary, spicate, simple, 15 to 25 cm. long, densely light gray pubescent. Flowers rather distant, sessile, ebracteolate, solitary. Calyx 1 mm. in diameter or less, 3-lobed. Ovary globose or ovoid, densely pubescent, 3-celled, about 1.5 mm. in diameter; styles 5 to 6 mm. long, fimbriate.

(2506 *Merrill*) June; (1249 *Ahern's collector*) August. In thickets below 100 m., a species well characterized by its very long, slender, ebracteolate, densely pubescent spikes.

2. **A. stipulacea** Klotz.; Muell. Arg. l. c. 807.

(2640, 2847, 2848 *Meyer*) February, March. In forests 600 to 900 m. Malaya to New Guinea.

19. TRAGIA Linn.

1. **T.** sp.

(2910 *Borden*) March. Scandent, in forests at 200 m., a characteristic species with oblong, cordate leaves, with few stinging hairs. Specimens with immature fruit.

20. HOMONOYA Lour.

1. **H. riparia** Lour.; Muell. Arg. l. c. 1023.

(6 *Whitford*) April; (6777 *Elmer*) November; (2237 *Meyer*) December; (286 *Copeland*) January; (724 *Borden*) May. Along the borders of, and on gravel bars in the bed of the Lamao River below 300 m., abundant. Along most streams throughout the Philippines. Tropical Asia to Java. T., *Bayanti, Lumanaia.*

21. JATROPHA Linn.

1. **J. curcas** Linn.; Muell. Arg. l. c. 1080.

(384 *Whitford*) June; (2582 *Meyer*) February; (7017 *Elmer*) November; (6122 *Leiberg*) July. In old clearings below 100 m., a native of tropical America, now planted throughout the Philippines. T., *Tangantangan.*

22. MANIHOT Adans.

1. **M. utilissima** Pohl.; Muell. Arg. l. c. 1064.

Occasionally cultivated (*Whitford*). A. native of tropical America, now generally cultivated throughout the Philippines. The Tapioca or Cassava. T., *Camoting cahoy.*

23. CODIÆUM Rumph.

1. **Codiæum** (?) **luzonicum** Merrill, sp. nov.

Erect, unbranched, shrubby, 0.8 to 1.6 m. high. Stems gray or brown, glabrous, the younger portions somewhat ferruginous pubescent, the leaf scars large and prominent. Leaves alternate, more or less crowded at the tip of the stem, chartaceous, glabrous, somewhat shining, narrowly oblong obovate to oblong oblanceolate, entire, the apex abruptly acute or rounded, gradually narrowed below to the acute, often rather abruptly cuneate base, 20 to 30 cm. long, 5 to 11 cm. wide; nerves 13 to 15 on each side of the midrib, prominent beneath, spreading, distant, the reticulations very lax; petioles stout, 2 to 4 cm. long. Dioecious. Male inflorescence terminal or axillary, racemose, erect, 20 to 40 cm. long, the rhachis stout, appressed pubescent. Flowers white, the buds globose, the pedicels 5 to 10 mm. long, slender, pubescent, usually fascicled. Sepals, 5, orbicular ovate, rounded, about 5 mm. long, appressed hirsute pubescent outside. Petals none.

Stamens about 100; filaments free, glabrous, about 3 mm. long; anther cells on the margin of the rather broad connective, parallel, the cells somewhat confluent at the apex, the filaments straight in bud, the anthers erect, the disk glands about 1 mm. long. Female inflorescence similar to the male but the pedicels shorter, the flowers solitary, scattered, the bracts minute or wanting. Ovary densely hirsute, 3-lobed, 3-celled; style arms 6, slender, glabrous, about 2.5 mm. long. Fruit dry, 3-celled, dehiscent, about 1 cm. in diameter, glabrous. Seed about 6 mm. long, pale brown, marked with reddish brown dashes.

(2216) *Meyer*) December; (1908 *Borden*) September; (273 *Whitford*) May; (6886 *Elmer*) November; (2517 *Merrill*) June; (*Copeland*) February. In forests 300 to 600 m. Differing from typical *Codiæum* in the absence of the petals and in the numerous stamens.

24. DIMORPHOCALYX Thwaites.

1. **Dimorphocalyx longipes** Merrill, sp. nov.

A tree 10 to 12 m. high. Branches brown, glabrous, the younger parts often slightly pubescent. Leaves alternate, long petiolate, oblong, entire, or slightly, obscurely repand-crenate and with distant minute glandular teeth, the apex short acuminate, the base acute or obtuse, glabrous, shining, submembranous, dark colored when dry, 9 to 20 cm. long, 3 to 6 cm. wide; nerves 11 to 12 on each side of the midrib, distant, distinct beneath, anastomosing, the reticulations very lax; petioles 2 to 10 cm. long, slender, glabrous. Diœcious. Male inflorescence axillary, spicate, 3 to 10 cm. long, glabrous or slightly pubescent, the flowers purplish, sessile in fascicles of from 3 to 6 or more, the bracts small. Sepals 5, slightly united below, oblong ovate to obovate, obtuse, 2 to 2.5 mm. long. Petals 5, imbricate, free, obtuse, glabrous, elliptical ovate, about 2.5 mm. long. Stamens 5, the filaments very short and united or wanting, the anthers more or less united in a globose head 1 mm. in diameter, the cells parallel, not confluent. Pistillate inflorescence a narrow panicle, or a reduced raceme or spike, 5 to 15 cm. long, the bracts oblong, foliaceous, persistent, 5 to 8 mm. long, the flowers solitary or fascicled, sessile or pedicelled. Calyx and corolla of the male. Ovary 3-celled, 1 ovule in each cell, the styles very short, 3, erect, each cleft. Sepals accrescent persistent, about 5 mm. long in young fruit.

(1066 *Whitford*) January; (1801 *Borden*) September. In forests 175 to 250 m. No. 2699 *Merrill*, Bosoboso, Province of Rizal, Luzon, is apparently the same.

25. ENDOSPERMUM Benth.

1. **E. peltatum** Merr. Govt. Lab. Publ. 25 (1905) 35.

(716, 1669, 1672, 1747, 2754 *Borden*) May, August, March. In forests 100 to 200 m. Endemic. T., *Callucoy*.

26. EXCŒCARIA Linn.

1. **E. agallocha** Linn.; Muell. Arg. l. c. 1220.

(1271 *Whitford*) May. In thickets along the seashore, generally distributed throughout the Philippines. Tropical shores of Asia, Malaya, Australia, and Polynesia. T., *Butabuta*.

2. **Excœcaria philippinensis** Merrill sp. nov.

A shrub or small tree 3 to 8 m. high. Branches brown, striate, glabrous. Leaves alternate, oblong lanceolate to oblong oblanceolate, short blunt acuminate, gradually narrowed below to the acute base, entire, subcoriaceous, glabrous, pale when dry and somewhat shining, 7 to 20 cm. long, 1.5 to 4.5 cm. wide; nerves 18 to 20 on each side of the midrib, distant, spreading, indistinct, anastomosing, the reticulations somewhat lax; petioles 1 to 3 cm. long, usually slender, glabrous.

Dioecious. Staminate inflorescence axillary, spicate, 10 cm. long or less, solitary or fascicled, glabrous or nearly so. Bracts subreniform to ovate, glabrous, about 1 mm. long, apiculate, each subtending a solitary flower, the calyx lobes very small, 3, lanceolate, acuminate, less than 1 mm. long. Stamens 3; filaments glabrous, 1.5 mm. long; anthers didynamous, about 1 mm. thick, 0.8 mm. long. Pistillate inflorescence similar to the staminate but shorter, few flowered. Sepals 3, broadly triangular ovate, acute, about 1 mm. long slightly glandular at the apex. Ovary ovoid, glabrous, 3-celled, each cell 1-ovuled; styles 3, stout, recurved, slightly united below, about equaling the ovary. Fruit dry, dehiscent, 3-celled, glabrous, about 1 cm. in diameter, the valves somewhat twisted in dehiscence, the seed globose, smooth, mottled, about 4 mm. in diameter.

(138 *Barnes*) January; (112, 1137 *Whitford*) May, March; (1358, 1359, 2749, 2934 *Borden*) July, March; (2768 *Meyer*) February; (2529, 3189 *Merrill*) June, October; (6001 *Leiberg*) July. In forests 300 to 1,000 m.

27. HOMALANTHUS Juss.

1. **H. populneus** (Geisel.) Pax in Engl. und Prantl. Nat. Pflanzenfam. 3 (1890) **5**: 96.

(478, 1281 *Whitford*) July, May; (1209 *Borden*) June. In open forests 100 to 500 m. Malaya.

28. SAPIUM P. Br.

2. **Sapium lateriflorum** Merrill, sp. nov.

A tree reaching a height of 25 m., monœcious. Branches usually slender, brown or gray, glabrous. Leaves alternate, elliptical ovate to elliptical oblong, coriaceous, glabrous, entire, slightly shining, 7 to 14 cm. long, 3 to 6 cm. wide, the apex short, abruptly acuminate, the base acute, slightly glandular auriculate; primary nerves 6 to 7 each side of the midrib, distant, curved, not prominent, the reticulations lax, rather obscure; petioles 1 to 3 cm. long, glabrous. Inflorescence lateral, axillary or extra-axillary, in simple or paniculate spikes or spicate racemes, glabrous, 3 to 8 cm. long, the staminate flowers above numerous, the pistillate below in the same inflorescence, few, pedicellate, the basal portion of the racemes often with numerous, small imbricated bracts. Staminate flowers yellow, sessile or pedicelled, fasciculate, the subtending bracts rugose, ovate, acuminate, about 1.5 mm. long, 2 to 4 or 5 flowers in each bract. Sepals 2, broadly ovate, acute or obtuse, about 1.5 mm. long. Stamens 2; filaments stout, about 1 mm. long; anthers 2-celled, broadly ovoid or subglobose, about 0.8 mm. long. Disk and petals none. Pistillate flowers few, solitary, pedicelled, at the base of the staminate spike or on branches from the base of the inflorescence. Calyx of the male. Ovary ovoid, glabrous, 2-celled, each cell 1-ovuled. Styles 2, entire, stout, recurved, about 1 mm. long. Fruit subglobose to obovoid, baccate, glabrous, inequilateral, 1-celled, 1-seeded, indehiscent, the peduncles 1.5 to 2 cm. long, the styles persistent.

(2565 *Borden*) February; (338 *Barnes*) February. In forests 100 to 200 m. The following specimens are the same: (1991 *Ahern's collector*) Bosoboso, Province of Rizal, Luzon, November; (1080 *Clarke*) Island of Ticao, May. A species differing from typical *Sapium* in its lateral inflorescence.

29. EUPHORBIA Linn.

1. **E. pilulifera** Linn. Hook. f. Fl. Brit. Ind. 5 (1887) 250.

(6021 *Leiberg*) July; (402 *Whitford*) June. A weed in waste places and open lands below 100 m., widely distributed in the Philippines. Tropical and subtropical regions generally.

SAPINDALES.

BUXACEÆ.

1. BUXUS Linn.

1. **B. rolfei** Vid. Rev. Pl. Vasc. Filip. (1886) 233.

(1254, 3054 *Borden*) June, May. A small tree in forests 100 to 400 m. Endemic.

ANACARDIACEÆ.

1. BUCHANANIA Spreng.

1. **B. florida** Schauer, var. **arborescens** Engl. in DC. Monog. Phan. 4 (1883) 189.

(695, 1306, 1315, 1401, 1617, 2016, 2056, 2126, 2127 *Borden*) May to November; (6746, 6756, 6843 *Elmer*) November; (2225, 2791 *Meyer*) December, March; (79, 375, 1072, 1138 *Whitford*) April to March; (3276 *Merrill*) October; (124 *Barnes*) January. From the seashore to the summit of the mountain, but never in the dense forest, widely distributed in the Philippines. British India and Malaya. T., *Balinhasay.*

2. MANGIFERA Burm.

1. **M. altissima** Blanco; Merr. Govt. Lab. Publ. 17 (1904) 27.

(642, 643, 830 *Borden*) April, June; (2807 *Merrill*) April; (356, 484, 485, 487, 502 *Barnes*) November, March; (355 *Whitford*) June. A tree of the river bottom forests above 75 m., widely distributed in the northern Philippines. Endemic. T., *Pahutan.*

2. **M. indica** Linn.; Engler in DC. Monog. Phan. 4 (1883) 198.

(94 *Whitford*) April; (2248 *Meyer*) December; (1289, 1393 *Borden*) July. Cultivated and frequent in deserted clearings below 100 m., common throughout the Philippines and generally cultivated throughout the Tropics. The mango. T., *Manga.*

3. ANACARDIUM Linn.

1. **A. occidentale** Linn.; Engler l. c. 219.

(172 *Barnes*) January; (2323, 2344 *Borden*) December. Cultivated and also occasional in deserted clearings, introduced from tropical America and widely distributed in the Philippines. The cashew nut. T., *Casuy, Balubad.*

4. SPONDIAS Linn.

1. **S. lutea** Linn.; Engler l. c. 244.

(*Whitford*) March. Cultivated, generally distributed in cultivation throughout the Philippines, introduced from tropical America. Sp.-Fil., *Siruelas.*

2. **S. mangifera** Willd.; Engler l. c. 248.

(160 *Barnes*) January; (353 *Whitford*) June. In forests at about 100 m. British India and Malaya. T., *Libas.*

5. DRACONTOMELUM Blume.

1. **D. cumingianum** Baill.; Engler in DC. Monog. Phan. 4 (1883) 254.

(1, 354 *Whitford*) April, June; (360, 499 *Barnes*) March, November; (747, 1207, 1673 *Borden*) May to August. In forests 50 to 250 m., rather common. Endemic. T., *Lamio.*

2. **D. mangiferum** Blume; Engler l. c. 251.

(1528, 1648, 1670 *Borden*) August. A tree in thin forests and thickets below 100 m., common and widely distributed in the Philippines. Burma to Borneo and Java. T., *Dao.*

6. KOORDERSIODENDRON Engl.

1. **K. pinnatum** (Blanco) Merr. Forest. Bur. Bull. 1 (1903) 33; Govt. Lab. Publ. 35 (1906) 73.

(353, 515, 557, 567, 602, 606 *Barnes*) January, March; (358 *Whitford*) June; (649, 1611, 1618, 1646, 1664, 1678, 1787 *Borden*) April to August; (2575 *Meyer*) February. Common in forests 75 to 150 m., widely distributed in the Philippines. Celebes and New Guinea. T., *Amuguis*.

7. SEMECARPUS Linn. f.

1. **S. albescens** Kurz; Engler in DC. Monog. Phan. 4 (1883) 488.

(337 *Barnes*) February; (674, 708, 1193 *Borden*) May, June; (2777 *Meyer*) February. In forests 100 to 600 m. British India. T., *Ligas*.

The above specimens agree fairly closely with No. 1776 *Cuming* referred by *Engler* to the above species.

2. **S. gigantifolia** F.-Vill. Nov. App. (1883) 350; Vidal, Sinopsis, Atlas, (1883) *t. 36. f. A*.

(2491 *Merrill*) June, 1903. In forests along the river at 100 m., ascending to about 1,000 m. in northern Luzon (Lepanto). Endemic.

3. **S. micrantha** Perk. Frag. Fl. Philip. (1904) 27. (?)

(2388 *Borden*) January; (2422 *Meyer*) January. An endemic species to which the above specimens are doubtfully referred, both numbers being with fruit only.

4. **S. perrottetii** March.; Engler l. c. 480.

(2513 *Meyer*) January; (1302, 1305, 2720 *Borden*) July, February. In open forests and thickets below 100 m., widely distributed in the Philippines. Celebes. T., *Ligas*.

This species and some others of the genus have the same poisonous effect on some persons as *Rhus toxicodendron* Linn.

CELASTRACEÆ.

1. CELASTRUS Linn.

1. **C. paniculata** Willd.; Laws. in Hook. f. Fl. Brit. Ind. 1 (1875) 617.

(81, 414 *Whitford*) April, June; (6747 *Elmer*) November; (3298 *Merrill*) October. Common in thickets below 100 m., widely distributed in the Philippines. British India and Malaya.

HIPPOCRATEACEÆ.

1. SALACIA Linn.

1. **S. integrifolia** sp. nov.

A scandent shrub reaching a height of 12 m. and a diameter of 7 cm., entirely glabrous, with oblong lanceolate to elliptical lanceolate subcoriaceous entire leaves, the flowers fasciculate, axillary, 10 to 20 flowers or more in each axil. Branches light brown, glabrous. Leaves opposite, 7 to 10 cm. long, 2 to 4.5 cm. wide, scarcely drying black, usually pale brown beneath, the base acute, the apex short blunt acuminate; nerves 5 to 6 on each side of the midrib, obscure above, somewhat prominent beneath; petioles 5 to 6 mm. long. Flowers numerous, yellowish brown, the pedicels slender, glabrous, about 1 cm. long. Calyx glabrous. Petals suborbicular to subreniform, obtuse, 2 mm. long. Fruit subglobose, dark yellow when mature, glabrous, fleshy, 2 to 2.5 cm. in diameter, usually with two elliptical, compressed seeds about 1.5 cm. long.

(2550 *Borden*) February; (2517 *Meyer*) January; (1313 *Whitford*) June. The first two numbers are with flowers, the last with fruit. In thickets and forests 100 to 300 m., along the river. T., *Matang olang*.

A species apparently closely related to *Salacia verrucosa* Wight, which has been credited to the Philippines, but the branches of the specimens cited above are scarcely verrucose, while the calyx lobes are entirely glabrous, not fringed with rusty hairs.

2. HIPPOCRATEA Linn.

1. **H. obtusifolia** Roxb. (?); Laws. in Hook. f. Fl. Brit. Ind. 1 (1875) 623.
(2712 *Borden*) February. In thickets below 50 m., the material imperfect, flowers only, but not agreeing very closely with the figure given by Wight.

2. **H. indica** Willd.; Laws. in Hook. f. Fl. Brit. Ind. 1 (1875) 624.
(1469 *Ahern's collector*) July. In thickets below 100 m. Tropical Asia, Africa, and Malaya.

STAPHYLEACEÆ.

1. TURPINIA Vent.

1. **S. pomifera** DC.; Hiern in Hook. f. Fl. Brit. Ind. 1 (1875) 698.
(645, 686, 762, 1189, 1257, 1376 *Borden*) April to July; (2502, 2546 *Merrill*) June; (488 *Whitford*) July; (509, 535, 544, 570, 599 *Barnes*) November, March; (2600, 3012 *Meyer*) February, May. Common in forests 100 to 500 m., widely distributed in the Philippines. British India to Southern China and Malaya. T., *Malabago*.

ICACINACEÆ.

1. GONOCARYUM Miq.

1. **G. tarlacense** Vid. Sinopsis Atlas (1883) XX. *t. 30. f. C.*
(636, 831, 1366, 1803, 2106, 2744 *Borden*) April to November; (2199, 2643 *Meyer*) December, February; (6884, 6887 *Elmer*) November; (475, 1212 *Whitford*) July, April. Forests 100 to 700 m. T., *Malasamat*.
An endemic species apparently very closely related to *Gonocaryum teysmannianum* Scheff., from the Moluccas.

2. URANDRA Thwaites. (?)

1. **U.** sp. (?)
(711, 1926, 2949 *Borden*) May to September; (562, 574 *Barnes*) March. A tree in forests 100 to 250 m. T., *Mabunot*.

ACERACEÆ.

1. ACER Linn.

1. **A. philippinum** Merr. Govt. Lab. Publ. 35 (1906) 36.
(3872 *Merrill*) August. A small tree on exposed ridges above 1,000 m. Endemic.

SAPINDACEÆ.

1. ALLOPHYLUS Linn.

1. **A. dimorphus** Radlk. Act. Congr. Bot. Amst. 1877 (1879) 126.
(6019 *Leiberg*) July; (1262, 1605 *Borden*) July, August. A shrub or small tree in dry thickets below 75 m. Endemic.

2. **A. filiger** Radlk. l. c.
(2547, 3263, 3882 *Merrill*) June to October; (1255, 1745 *Borden*) June, August; (182 *Whitford*) July. Common in dry thickets below 100 m. Endemic.

2. ERIOGLOSSUM Blume.

1. **E. rubiginosum** (Roxb.) Blume; Radlk. in Perk. Frag. Fl. Philip. (1904) 60.

(1272 *Whitford*) May. In thickets near the seashore, widely distributed in the Philippines. British India to Malaya and tropical Australia. T., *Calayo.*

3. OTOPHORA Blume.

1. **O. fruticosa** Blume, Rumphia 3 (1837) 142. *Capura pinnata* Blanco; *C. purpurata* Blanco; *Otolepis nigrescens* Turcz.; *Capura nigrescens* Vidal; *Otophora pinnata* Merr.

(3808 *Merrill*) April; (294 *Copeland*) January; (2335 *Borden*) December. Common in thickets below 100 m., widely distributed in the Philippines. Malaya. T., *Balinaonao.*

4. EUPHORIA Commers.

1. **E. cinerea** (Turcz.) Radlk. Sizb. Phys. Phys.-Math. Acad. Muench. 8 (1878) 299.

(65, 364, 528 *Whitford*) April to July; (331 *Barnes*) February; (2278, 2784 *Meyer*) December, February; (648, 832, 2349 *Borden*) April, January. Common in the hill forests 100 to 600 m., widely distributed in the Philippines. Endemic. T., *Alupag.*

5. LITCHI Sonn.

1. **L.** sp.

(2812 *Meyer*) March; (2919 *Borden*) March; (1322 *Whitford*) June. In forests 200 to 500 m. A new species, teste *Radlkofer* in lit.

6. GUIOA Cav.

1. **G. aptera** Radlk. in Perk. Frag. Fl. Philip. (1904) 62.

(141 *Barnes*) January; (2785 *Meyer*) February. In forests up to 600 m. Endemic.

2. **G. lasiothyrsa** Radlk. l. c. 63.

(3718 *Merrill*) January, 1904. On exposed forested ridges at about 1,000 m. Endemic.

3. **G. perrottetii** (Blume) Radlk. Sitzb. Math.-Phys. Acad. Muench. 8 (1878) 302.

(2244 *Meyer*) December; (85 *Whitford*) April; (182 *Barnes*) January; (2053, 2328 *Borden*) October, December; (2537 *Merrill*) June; (6635, 6867 *Elmer*) November. Abundant in thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Salab, Ngisingisi.*

7. ARYTERA Blume.

1. **A. litoralis** Blume, Rumphia 3 (1837) 170.

(1242 *Whitford*) May; (1466, 1476 *Ahern's collector*) July; (2589 *Meyer*) February; (772 *Borden*) May. In thickets below 75 m., widely distributed in the Philippines. British India and Malaya. T., *Alasan.*

8. MISCHOCARPUS Blume.

1. **M. fuscescens** Blume, Rumphia 3 (1837) 169.

(*Whitford*). In forests. Malaya.

2. **M. triqueter** Radlk. in Perk. Frag. Fl. Philip. (1904) 65.

(*Whitford*). In forests. Endemic.

9. LEPIDOPETALUM Blume.

1. L. perrottetii Blume, Rumphia 3 (1837) 172.
(2710 *Borden*) February. In thickets below 100 m. Endemic.

10. GANOPHYLLUM Blume.

1. G. obliquum (Blanco) Merr. Govt. Lab. Publ. 27 (1905) 30. *G. falcatum* Blume.
(2545 *Borden*) February; (2515 *Meyer*) January; (1074 *Whitford*) January. In forests 140 to 200 m., widely distributed in the Philippines. Java to New Guinea and Australia.

11. HARPULLIA Roxb.

1. H. arborea (Blanco) Radlk. Sitzb. Math.-Phys. Akad. Muench. 20 (1890) 404.
(1302 *Whitford*) June; (1282, 1298, 1299 *Borden*) July; (6845 *Elmer*) November; (3166 *Merrill*) October. In thickets below 100 m., common and widely distributed in the Philippines. British India and Malaya. T., *Uas*, *Poas*.

SABIACEÆ.

1. MELIOSMA Blume.

1. M. sp.
(1352 *Borden*) July. On ridges at 750 m., with very young fruits only.

RHAMNALES.

RHAMNACEÆ.

1. ZIZYPHUS Juss.

1. Z. trinervia (Cav.) Poir.; Vidal, Rev. Pl. Vasc. Filip. (1886) 91.
(6108 *Leiberg*) July; (6750 *Elmer*) November; (2190 *Meyer*) December; (1075 *Whitford*) January; (1308 *Borden*) July; (74 *Barnes*) November; (3100 *Merrill*) October. Common in thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Duclap*.
2. Z. zonulatus Blanco, Fl. Filip. ed. 2 (1845) 120. *Z. arborea* Merr. Govt. Lab. Publ. 6 (1904) 11.
(1394, 1399, 1535, 1548, 1557, 1576, 1960 *Borden*) July to October; (70, 192 *Barnes*) November, January. A tree in thickets and the lower forests, 75 to 200 m., widely distributed in the Philippines. Endemic. T., *Ligaa;* Pamp., *Balacat*.

2. COLUBRINA Brongn.

1. C. asiatica (Linn.) Brongn.; Laws. in Hook. f. Fl. Brit. Ind. 1 (1875) 642.
(1430 *Ahern's collector*) July, 1904. In thickets near the seashore. Tropical Asia, Africa, Malaya, and Australia. T., *Cabatete*.

VITACEÆ.

1. TETRASTIGMA Planch.

1. T. lanceolarium (Roxb.) Planch. in DC. Monog. Phan. 5 (1883-87) 423. *Vitis pedata* Blanco, Fl. Filip. ed. 1 (1837) 71, non Linn.
(16 *Whitford*) April; (2061 *Borden*) October; (3258 *Merrill*) October; (2310

Meyer) December. In thickets below 100 m., widely distributed in the Philippines. British India and Malaya. T., *Ayo*.

2. **T.** sp. (?)

(7004 *Elmer*) November; (71 *Barnes*) November. Specimens with fruit only.

2. CISSUS Linn.

1. **C. adnata** (Roxb.) Planch. l. c. 494.

(512 *Whitford*) July; (2519 *Merrill*) June. In thickets below 100 m. British India to southern China and Malaya.

2. **C. japonica** Willd.; Planch. l. c. 561.

(6672 *Elmer*) November; (2170 *Meyer*) December; (23 *Whitford*) April; (2535 *Merrill*) June. In thickets below 100 m. Japan to China, Java, New Caledonia, and Australia. T., *Calit-calit*.

3. **C. geniculata** Blume, Planch. l. c. 572.

(6700 *Elmer*) November; (1786 *Borden*) August; (2531 *Merrill*) June. In thickets below 100 m. Cochin China and Malaya.

4. **C. rostrata** (Miq.) Korth.; Planch. l. c. 500.

(6669 *Elmer*) November; (1927, 2122 *Borden*) October, November; (3793 *Merrill*) January; (1056 *Whitford*) January; (2193 *Meyer*) December. In thickets below 100 m. Java and New Guinea.

5. **C. repens** (Lam.) Planch. l. c. 504.

(3151 *Merrill*) October; (1785, 1795 *Borden*) August, September; (6708, 6751 *Elmer*) November. In thickets below 100 m., widely distributed in the Philippines. British India, Malaya, and Australia.

6. **C.** sp. (?)

(2495 *Borden*, 2510 *Meyer*) January. In thickets at 600 m., staminate flowers only. T., *Latgitic*.

3. LEEA Linn.

1. **L. manillensis** Walp. Nov. Act. Acad. Nat. Cur. 19 (1843) Suppl. 1: 314.

(14 *Whitford*) April; (2552, 3163 *Merrill*) June, October; (2187 *Meyer*) December; (721 *Borden*) May. Along the river, and in thickets below 200 m., the whole inflorescence bright red, previously identified by the author and distributed as *L. rubra* Blume. Endemic. *Caliantang, Taliantang*.

2. **L. sambucina** Willd.; King, Mat. Fl. Malay. Penin. 700. 1896.

(3883 *Merrill*) August; (6651 *Elmer*) November. In forests at about 1,000 m. British India and Malaya.

3. **L. philippinensis** Merrill, sp. nov.

A shrub or small tree, sometimes 10 m. high, with glabrous pinnate leaves, lanceolate to oblong lanceolate, long acuminate leaflets, the flowers greenish white, yellowish, or sometimes tinged with pink. Branches light brown, lenticellate, not at all pubescent, terete. Leaves 20 to 50 cm. long, simply pinnate, the leaflets 5 to 13; rhachis glabrous, terete, the petiole channeled above; leaflets 8 to 20 cm. long, 2 to 6 cm. wide, glabrous, dull, subcoriaceous, the base acute, the apex long acuminate, the acumen blunt, the margins rather coarsely crenate-dentate; nerves 9 to 11 on each side of the midrib, usually not prominent; petiolules 1 cm. long, that of the terminal leaflet longer. Cymes up to 10 cm. long on stout peduncles 6 cm. long or less, the branches and especially the branchlets ferruginous pubescent or puberulent, often 20 cm. across, but frequently much smaller. Calyx green, glabrous, or when young puberulent, the buds obovoid, the teeth broad, short, acute. Petals oblong-ovate, acute, glabrous, about 4 mm. long, yellowish or greenish white, sometimes slightly pink. Staminal tube notched, about 5 mm. long. Fruits brown, glabrous, depressed globose, about 1.5 cm. thick, 1 cm. long, wrinkled when dry; seeds three, subglobose, about 6 mm. in diameter, glabrous, reticulate.

(28, 496, 1200 *Whitford*) March to July; (1192, 1232, 1326, 1740, 1922 *Borden*) June to September; (6686, 6693 *Elmer*) November; (6149 *Leiberg*) July; (1516 *Ahern's collector*, type) July; (2172, 2779 *Meyer*) December, February; (2507 *Merrill*) June; (149 *Barnes*) January. In thickets 25 to 75 m., extending along the river valley to an altitude of about 500 m. T., *Taliantang, Maguilic.*

A species apparently constantly with simply pinnate leaves, distinguished moreover from *Leea sambucina* by its obovoid buds and long acuminate leaflets, and from *L. javanica* and *L. aquata* by its glabrous leaves. The forms from the higher altitudes are constantly with smaller leaves and much smaller cymes than those from the lower regions.

MALVALES.

ELAEOCARPACEÆ.

1. ELAEOCARPUS Linn.

1. **E. monocera** Cav. Icon. 6 (1801) 1. *t. 501.*

(1574, 1804 *Borden*) August, September, 1904. In forests at about 130 m., apparently rare in the Philippines. King[1] retains as a distinct species, and apparently correctly so, *Elaeocarpus obtusus* Blume, the latter species having been reduced by Masters[2] to *E. monocera* Cav. Cavanilles' species is apparently distinct from Blume's and endemic.

2. **E. oblongus** Gaertn.; Mast. in Hook. f. Fl. Brit. Ind. 1 (1874) 403.

(3852 *Meyer*) March; (2937 *Borden*) March. In forests 200 to 500 m. British India and Malaya.

GONYSTYLACEÆ.

1. GONYSTYLUS T. et B.

1. **G. bancanus** (Miq.) Gilg.; Perk. Frag. Fl. Philip. (1904) 79.

(824 *Borden*) June. In forests at 600 m. Java, Sumatra, and Banca.

This specimen is sterile, but is manifestly identical with No. 1078 *Merrill*, so identified by Dr. Perkins.

TILIACEÆ.

1. CORCHORUS Linn.

1. **C. acutangulus** Lam.; Mast. in Hook. f. Fl. Brit. Ind. 1 (1874) 398.

(1912 *Borden*) September. In open places along the river in the lowlands, widely distributed in the Philippines. Generally distributed in the Tropics.

2. GREWIA Linn.

1. **G. multiflora** Juss.; Mast. l. c. 388.

(1920, 2050 *Borden*) September; (3144 *Merrill*) October; (6877 *Elmer*) November; (1502 *Ahern's collector*) August. In thickets below 100 m., common and widely distributed in the Philippines. Tropical Asia, Africa and Malaya. T., *Danglin.*

2. **G. stylocarpa** Warb. in Perk. Frag. Fl. Philip. (1904) 104.

(20, 105 *Whitford*) April; (2782 *Meyer*) February; (652, 676, 1194, 2564 *Borden*) April to February; (688 *Barnes*) March. In forests 100 to 600 m. Endemic. T., *Susumbiic.*

[1] Journ. As. Soc. Beng. 60 (1891) 2: 134, 135.

[2] Hook. f. Fl. Brit. Ind. 1 (1874) 405.

3. **G. tiliæfolia** Vahl.; Mast. l. c. 386.

(1288 *Whitford*) May; (1489 *Ahern's collector*) August; (3048 *Borden*) May. In thickets below 100 m. British India and tropical Africa.

4. **G. umbellata** Roxb.; Mast. l. c. 385.

(1483 *Ahern's collector*) August. In thickets near the seashore. British India and Malaya.

3. COLUMBIA Pers.

1. **C. serratifolia** (Cav.) DC. Prodr. 1 (1824) 512. *Colona serratifolia* Cav.; Merr. Govt. Lab. Publ. 6 (1904) 16.

(766, 1276, 1385 *Borden*) May, July; (1488 *Ahern's collector*) July; (382 *Whitford*) June. In thickets below 100 m., widely distributed in the Philippines. Celebes. T., *Anilao.*

4. TRIUMFETTA Linn.

1. **T. rhomboidea** Jacq.; Mast. l. c. 395.

(2182 *Meyer*) December; (6733 *Elmer*) November; (3294 *Merrill*) October. In open grass lands and waste places, widely distributed in the Philippines. Tropical Asia, Africa, and Malaya. T., *Calutan.*

MALVACEÆ.

1. ABUTILON Gaertn.

1. **A. indicum** (Linn.) G. Don.; Mast. in Hook. f. Fl. Brit. Ind. 1 (1874) 326.

(2038 *Borden*) October. Open places near the seashore, widely distributed in the Philippines. Tropics generally. Sp.-Fil., *Malbas.*

2. MALVASTRUM A. Gray.

1. **N. coromandelianum** (Willd.) Garcke, Bonplandia, 5 (1857) 297. *M. tricuspidatum* (Ait.) A. Gray; Mast. in Hook. f. Fl. Brit. Ind. 1 (1874) 321.

(1950 *Borden*) October. In open thickets near the seashore. Tropics generally.

3. SIDA Linn.

1. **S. cordifolia** Linn.; Mast. in Hook. f. Fl. Brit. Ind. 1 (1874) 324.

(1939 *Borden*) October. In thickets near the seashore, widely distributed in the Philippines. Tropics generally.

2. **S. carpinifolia** Linn.; Mast. l. c. 323.

(6776 *Elmer*) November. In open thickets and grass lands, widely distributed in the Philippines. Tropics generally.

3. **S. humilis** Willd.; Mast. l. c. 322.

(3304 *Merrill*) October. In open thickets. Tropics generally.

4. **S. mysorensis** W. et A.; Mast. l. c. 322.

(3272 *Merrill*) October; (1946 *Borden*) October. In open thickets and grass lands below 100 m. British India and Malaya.

4. **S. retusa** Linn.; DC. Prodr. 1 (1824) 462. *S. rhombifolia* var. *retusa* Mast., l. c. 324.

(1941 *Borden*) October; (6773 *Elmer*) November. In open dry grass lands, widely distributed in the Philippines. Tropics generally.

5. **S. rhombifolia** Linn.; Mast. l. c. 323.

(1945 *Borden*) October. In dry thickets, common and widely distributed. Tropics generally.

4. MALACHRA Linn.

1. **M. fasciata** Jacq. var. **lineariloba** (Turcz.) Gürke in Engler's Bot. Jahrb. 16 (1893) 355.

(6722 *Elmer*) November; (2067 *Borden*) October; (3169 *Merrill*) October. In waste places and thickets about houses and along trails, common and widely distributed in the Philippines, certainly introduced from tropical America, and possibly not distinct from the species.

5. URENA Linn.

1. **U. lobata** Linn., var. **scabriuscula** Mast.; Hook. f. Fl. Brit. Ind. 1 (1874) 329.

(6774 *Elmer*) November; (3261 *Merrill*) October; (*Whitford*) April. In open grassy places below 100 m. British India.

2. **U. sinuata** Linn.; Mast. l. c.

(3271 *Merrill*) October; (6775 *Elmer*) November. In open grassy places, widely distributed in the Philippines. Tropics generally. T., *Calutcalutan.*

6. HIBISCUS Linn.

1. **H. schizopetalus** Hook. f. Bot. Mag. *t. 6524.*

(226 *Merrill*) Decades Phil. Forest. Fl., coll. *Borden*, October. Generally cultivated throughout the Philippines, not spontaneous. T., *Gomamela.*

2. **H. surattensis** Linn.; Mast. l. c. 334.

(1963 *Borden*) October; (6738 *Elmer*) November. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, Malaya, and Australia. T., *Sagnit.*

3. **H. tiliaceus** Linn.; Mast. l. c. 343.

(134 *Merrill*) Decades Phil. Forest Fl., coll. *Ahern's collector*, July. Seashore, widely distributed in the Philippines. Tropics generally. T., *Malibago, Balibago.*

7. ABELMOSCHUS Medik.

1. **A. moschatus** Medik.; Miq. Fl. Ind. Bat. 1 (151) 2: 1859. *Hibiscus abelmoschus* Linn.; Mast. l. c. 342.

(1820, 1902 *Borden*) September; (6739 *Elmer*) November. In thickets and open places below 100 m., widely distributed in the Philippines. Tropics generally, cultivated or wild. T., *Castuli.*

8. THESPESIA Corr.

1. **T. lampas** (Cav.) Dalz. et Gibs.; Mast. l. c. 345.

(2065, 2332 *Borden*) October, December; (2283 *Meyer*) December. In dry thickets below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, and Malaya. T., *Bulaebulac.*

2. **T. populnea** (Linn.) Corr.; Mast. l. c. 345.

(2039 *Borden*) October; (2297 *Meyer*) January. In thickets along the seashore, widely distributed in the Philippines. Tropical Asia, Africa, Malaya, and Polynesia. T., *Banalo.*

BOMBACACEÆ.

1. BOMBAX Linn.

1. **B. ceiba** Linn. Sp. Pl. (1753) 511. *B. malabaricum* DC.; Mast. in Hook. f. Fl. Brit. Ind. 1 (1874) 349.

(1543, 1546, 1561, 2725 *Borden*) August, March, 1905; (332 *Barnes*) February. In forests and thickets below 130 m. British India and Malaya. T., *Malabulac.*

2. CEIBA Gaertn.

1. **C. pentandra** (Linn.) Gaertn. Fruct. 2 (1791) 244. *t. 133. Eriodendron anfractuosum* DC.; Mast. l. c. 350.

(416 *Whitford*) June. In thickets and old clearings below 100 m., widely distributed in the Philippines. Tropics generally, cultivated or wild. T., *Boboi.*

PAREITALES.

STERCULIACEÆ.

1. MELOCHIA Linn.

1. **M. indica** (Houtt.) A. Gray; Perk. Frag. Fl. Philip. (1904) 112. *M. velutina* Bedd.; Mast. in Hook. f. Fl. Brit. Ind. 1 (1874) 374. *M. arborea* Blanco.

(6874 *Elmer*) November. In thickets below 100 m., widely distributed in the Philippines. British India and Malaya. T., *Anibiong.*

2. **M. corchorifolia** Linn.; Mast. l. c. 374.

(1917 *Borden*) September. In thickets and open places below 100 m., widely distributed in the Philippines. Tropics generally.

2. WALTHERIA Linn.

1. **W. americana** Linn.; DC. Prodr. 1 (1824) 492. *W. indica* Linn.; Mast. l. c. 374.

(3269 *Merrill*) October. In thickets below 100 m., widely distributed in the Philippines. Tropics generally.

3. COMMERSONIA Forst.

1. **C. platyphylla** Andr.; Mast. l. c. 378.

(2227 *Meyer*) December; (6690 *Elmer*) November; (1457 *Ahern's collector*) July; (2471 *Borden*) January. In thickets below 100 m., widely distributed in the Philippines. Malaya. T., *Anabo.*

4. ABROMA Linn. f.

1. **A. augusta** Linn. f.; Mast. l. c. 375.

(2324 *Borden*) December. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya. T., *Anabo, Anabong.*

5. PTEROSPERMUM Schreb.

1. **P. niveum** Vid. Rev. Pl. Vasc. Filip. (1886) 67.

(1042 *Whitford*) December; (2470 *Borden*) January. In forests and thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Bayog.*

2. **P. obliquum** Planco Fl. Filip. ed. 1 (1837) 529.

(2257 *Meyer*) December; (1645, 2370 *Borden*) August, January; (1045 *Whitford*) December; (72 *Barnes*) November. In forests and thickets below 120 m. Endemic. T., *Bayog.*

6. HELICTERES Linn.

1. **H. hirsuta** Lour.; King in Journ. As. Soc. Beng. 60 (1891) 2: 82. *H. spicata* Colebr.; Mast. l. c. 366.

(157 *Barnes*) January; (1602, 2018 *Borden*) August, October; (6648 *Elmer*) November; (95 *Whitford*) April; (3147 *Merrill*) October. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya.

7. KLEINHOFIA Linn.

1. **K. hospita** Linn.: Mast. l. c. 364.

(6726 *Elmer*) November; (2240 *Meyer*) December; (1384, 1623, 1797 *Borden*) July, September. In forests and thickets below 100 m., common and widely distributed in the Philippines. Tropical Asia, Africa, and Malaya. T., *Tanag.*

8. STERCULIA Linn.

1. **S. brevipetiolata** Merr. Govt. Lab. Publ. 35 (1906) 40.

(1907, 3028 *Borden*) September, May; (6829 *Elmer*) November; (1226 *Whitford*) April; (3023 *Meyer*) May; (6088 *Leiberg*) July; (200 *Barnes*) January. Forests 200 to 500 m. Endemic.

2. **S. crassiramea** Merr. l. c. 29 (1905) 28.

(1363 *Whitford*) September; (2258 *Meyer*) December. In forests at about 100 m. Endemic. T., *Malapapaya.*

3. **S. fœtida** Linn.; Mast. l. c. 354.

(2936 *Borden*) March; (2301 *Meyer*) December; (6991 *Elmer*) November. In thickets and open forests below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, Malaya, and Australia. T., *Calumpang.*

4. **S. montana** Merr. l. c. 35 (1906) 40.

(1221 *Whitford*) April; (6761 *Elmer*) November. In forests on exposed ridges above 1,000 m. Endemic.

5. **S. oblongata** R. Br. Pl. Jav. Rar. 238.

(692, 1321 *Borden*) May, July. In forests at 150 m. Endemic.

9. PTEROCYMBIUM R. Br.

1. **P. tinctorium** (Blanco) Merr. Govt. Lab. Publ. 27 (1905) 24. *T. javanicum* R. Br. *Sterculia campanulata* Wall.

(744, 780, 1318, 2009 *Borden*) March to July. In forests and thickets below 200 m., widely distributed in the Philippines. Malayan Peninsula and Archipelago. T., *Taoto.*

10. HERITIERA Ait.

1. **H. litoralis** Dry.; Mast. l. c. 363.

(1268 *Whitford*) May; (2474 *Borden*) January. Along the seashore, widely distributed in the Philippines. Seacoasts of the Tropics of the Old World. T., *Dungon, Dungon late.*

11. TARRIETIA Blume.

1. **T. sylvatica** (Vid.) Merr. Forest. Bureau Bull. 1 (1903) 38. *Heritiera sylvatica* Vidal, Rev. Pl. Vasc. Filip. (1886) 66.

(*Whitford*) June. In forests at 400 m. Endemic. T., *Dungon.*

DILLENIACEÆ.

1. TETRACERA Linn.

1. **T. sarmentosa** (Linn.) Vahl.: *Delima aspera* Linn.; Hook. f. et Th. Fl. Brit. Ind. 1 (1872) 31.

(1910 *Borden*) September; (2558 *Merrill*) June; (383 *Whitford*) June. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya. T., *Malacatmon.*

2. DILLENIA Linn.

1. **D. philippinensis** Rolfe Journ. Linn. Soc. Bot. 21 (1884) 307.

(1259 *Borden*) June. In forests at 200 m., widely distributed in the Philippines. Endemic. T., *Catmon*.

2. **D. luzoniensis** (Vidal). *Wormia luzoniensis* Vidal, Rev. Pl. Vasc. Filip. (1886) 36.

(1320 *Whitford*) June; (3063 *Borden*) May. In forests 140 to 400 m. Endemic.

3. SAURAUIA Willd.

1. **S. subglabra** Merr. Govt. Lab. Publ. 35 (1906) 43.

(268 *Whitford*) May; (2767 *Meyer*) February. In forests in river cañon at 800 m. Endemic.

THEACEÆ.

1. THEA Linn.

1. **T. montana** (Blanco) Merr. Govt. Lab. Publ. 27 (1905) 21; l. c. 35 (1906) 44.

(304, 441 *Whitford*) May, July; (2402, 2831 *Meyer*) January, March; (6787, 6977 *Elmer*) November; (1196, 1362, 1905, 2378 *Borden*) June to January. In forests above 500 m. Endemic.

2. TERNSTRŒMIA Nutt.

1. **T. toquian** (Blanco) F.-Vill. Nov. App. (1880) 18. *Taonabo toquian* Merr. Govt. Lab. Publ. 27 (1905) 21.

(137, 150, 208 *Barnes*) January; (3206 *Merrill*) October; (1506 *Ahern's collector*) July; (787, 835, 1351, 2381, 2935 *Borden*) May to March; (6899 *Elmer*) November; (2207, 2605, 2614, 2760 *Meyer*) December to February; (100, 337 *Whitford*) April, May. Abundant on forested ridges above 700 m. Endemic. T., *Bicag*.

3. ADINANDRA Jack.

1. **A. luzonica** Merr. Govt. Lab. Publ. 29 (1905) 29.

(6906 *Elmer*) November; (6057 *Leiberg*) July; (1360 *Borden*) July; (446, 1184 *Whitford*) July, March. Exposed ridges in the mossy forest at 1,200 m. Endemic.

4. EURYA Thunb.

1. **E. acuminata** DC., var. **euprista** Dyer in Hook. f. Fl. Brit. Ind. 1 (1872) 285.

(2621, 2641 *Meyer*) February; (1192 *Whitford*) March; (2119 *Borden*) November; (3712 *Merrill*) January; (1440 *Ahern's collector*) August; (6813 *Elmer*) November. On forested slopes and ridges in the mossy forest above 1,000 m. British India to Malaya and the Fiji Islands.

5. GORDONIA Ell.

1. **Gordonia fragrans** Merrill, sp. nov.

A tree 6 to 18 m. high. Branches brown or gray, glabrous. Leaves coriaceous, glabrous and shining on both surfaces, oblong lanceolate, 7 to 15 cm. long, 2 to 5 cm. wide, the margins obscurely, finely crenate, the apex obscurely blunt acuminate, the acumen retuse, the base acute; nerves obscure, scarcely more prominent than the lax reticulations; petioles stout, 5 mm. long or less. Flowers solitary, axillary, white, fragrant, about 5 cm. in diameter, subsessile or shortly

pediceled. Bracts and calyx lobes rounded, pubescent. Petals 2 to 2.5 cm. long, about 1.5 cm. wide, rounded at the apex, densely appressed pubescent outside, slightly pubescent inside near the base, slightly united below. Stamens indefinite; filaments 7 to 8 mm. long, slightly united below and adnate to the corolla; anthers broadly ovate, 2 mm. long. Ovary oblong ovoid, glabrous or nearly so, 5-celled. Fruit oblong, woody, about 3 cm. long, appressed pubescent, the back of the lobes sulcate. Seeds, including the wing, 1.5 cm. long, the wing membranous, 5 mm. wide.

(305 *Whitford*) May; (2596 *Meyer*) February) (3732 *Merrill*) January; (809 *Borden*) May. In forests and on exposed ridges 600 to 1,100 m.

GUTTIFERÆ.

1. CRATOXYLON Blume.

1. **C. blancoi** Blume Mus. Bot. Lugd. Bat. 2 (1856) 17.

(1478 *Ahern's collector*) August. In thickets below 100 m. Endemic. T., *Guyong-guyong.*

2. **C. floribundum** (Turcz.) F.-Vill. Nov. App. (1880) 16.

(1601, 2713, 3035 *Borden*) August, February, May; (27 *Whitford*) April; (3152 *Merrill*) October. In thickets below 100 m. Endemic. T., *Guyong-guyong.*

2. CALOPHYLLUM Linn.

1. **C. inophyllum** Linn.; Vesque in DC. Prodr. 8 (1893) 544.

(2472 *Borden*) January; (2303 *Meyer*) December; (139 *Merrill*) Decades Phil. Forest. Fl., coll. *Ahern's collector*, July. Along the seashore, common throughout the Philippines. Tropical shores of the Old World. Sp.-Fil., *Palomaria del playa, Palomaria.* T., *Dancalan.*

2. **Calophyllum whitfordii** Merrill, sp. nov.

A tree about 20 m. high. Branches light gray, often yellowish, glabrous, shining, the ultimate branchlets often slightly angular, slender. Leaves opposite, ovate-oblong to elliptical oblong, glabrous, coriaceous, the base acute, the apex somewhat prominently acuminate, the acumen blunt, 6 to 8 cm. long, 2 to 4 cm. wide; petioles about 1 cm. long, rugose when dry, rather slender, channeled above. Panicles terminal, and in the upper axils, 5 cm. long or less, the peduncles about 2 cm. long, slightly ferruginous pubescent, the branches ascending, few flowered, the pedicels 6 to 10 mm. long, slender, rather densely ferruginous puberulous. Flowers white, fragrant, 1.5 cm. in diameter. Outer two sepals with few short hairs, especially near the margins, becoming glabrous or nearly so, 6 mm. long, 4 mm. wide, acute or obtuse, the inner two sepals petaloid, 9 mm. long, 6 mm. wide, rounded. Petals 4, elliptical or slightly obovate, 8 mm. long, about 5.5 mm. wide. Stamens very numerous, the filaments free, 4.5 to 5 mm. long; anthers about 1 mm. long. Ovary subglobose, glabrous; style slender, 5 mm. long. Fruit ovoid, glabrous, about 13 mm. long, 10 mm. in diameter, minutely apiculate, dark colored when dry.

(2613 *Meyer*) February; 1905 (type); (336 *Whitford*) May, 1904; (785 *Borden*) May, 1904. Forested slopes at about 700 m., recognized by its rather small, acuminate leaves. T., *Dataog.* Sp.-Fil., *Palomaria del monte.*

A very closely related if not identical form, is represented by the following specimens: (257, 1190 *Whitford*) May, 1904, March, 1905; (6907 *Elmer*) November, 1904; (1812 *Borden*) September, 1904; (142 *Merrill*) Decades Phil. Forest Fl. coll. *Ahern's collector*, July, 1904.

The above specimens, distributed as *C. pseudotacamahaca* Pl. et Tr., differ from *Calophyllum whitfordii* in their dark-colored branches and branchlets, smaller,

decidedly narrower leaves and larger fruits, but as no flowers are at present available, the specimens being all with fruit, the material is here enumerated under the species above proposed.

3. **C. wallichianum** Pl. et Tr.; Vesque, l. c. 599.

(350, 495, 528, 554, 575 *Barnes*) November, March; (647, 2488 *Borden*) April, January; (21 *Whitford*) April. In forests 100 to 300 m. Malayan Peninsula. Sp.-Fil., *Palomaria del monte.*

3. KAYEA Wall.

1. **K. paniculata** (Blanco) Merr. Govt. Lab. Publ. 17 (1904) 29.

(2539 *Merrill*) June; (364 *Barnes*) March; (748, 1767, 2933 *Borden*) May, August, March; (6080 *Leiberg*) July; (68, 379 *Whitford*) April, June. In forests along the river 75 to 200 m. Endemic. T., *Carinas.*

4. GARCINIA Linn.

1. **G. binucao** (Blanco) Choisy; Vesque l. c. 454. *G. cumingiana* Pierre, Vesque l. c. 434.

(612, 713, 783 *Borden*) April, May; (170 *Merrill*) Decades Phil. Forest Fl., coll. *Borden*, April. In forests 100 to 200 m. Endemic. T., *Bilucao.*

2. **G. venulosa** (Blanco) Choisy; Vesque l. c. 408. (?)

(615, 712, 2494, 3062 *Borden*) April, *May*; (1240 *Whitford*) May; (2511 *Meyer*) January. In forests, 25 to 160 m. Endemic. T., *Tatlong anac.*

The above specimens agree in most of the characters assigned to this species by Blanco, but I am unable to determine at present whether or not material referred here by other authors is the same.

DIPTEROCARPACEÆ.

1. DIPTEROCARPUS Gaertn.

1. **D. grandiflorus** Blanco, Fl. Filip. ed. 2 (1847) 314; Brandis, Journ. Linn. Soc. Bot. 31 (1895) 37.

(2908 *Borden*) March; (186 *Barnes*) January; (*Whitford*) June. Abundant in the hill forests 100 to 300 m. Malaya. T., *Apitong.*

2. **D. vernicifluus** Blanco l. c.; Brandis l. c. 31. *Dipterocarpus velutinus* Vidal, Rev. Pl. Vasc. Filip. (1886) 59.

(358, 498, 501, 505, 524, 526, 537, 539, 552, 556, 561, 568, 577, 580, 592, 603, 609 *Barnes*) November to January; (309, 310 *Whitford*) May; (654, 655, 656, 664, 665, 666, 810, 1404, 1408, 1524, 1526, 1532, 1534, 1537, 1612, 1634, 1685, 1688, 2131, 2911 *Borden*) April to March. Abundant in the hill forests, ascending to 700 m. Endemic. T., *Panao.*

2. ANISOPTERA Korth.

1. **A. vidaliana** Brandis Journ. Linn. Soc. Bot. 31 (1895) 45.

(707, 743, 1317, 1322, 1377, 1381, 1390, 1407, 1409, 1527, 1616, 1623, 1633, 1635, 1637, 1638, 1641, 1643, 1647, 1649, 1657, 1658, 1667, 1675, 1691, 1788, 1789, 1792, 2128 *Borden*) May to September; (352, 1223 *Whitford*) June, April; (488, 593 *Barnes*) March, (3154 *Merrill*) October; (2256 *Meyer*) December; (1485 *Ahern's collector*) August. Abundant in forests near the river below 200 m. Endemic. T., *Mayapis.*

This species is apparently not sufficiently distinct from *A. thurifera* Blanco, abundant material showing intergradations between this species and *A. thurifera* Blanco and *A. calophylla* Perk.

3. HOPEA Roxb.

1. **A. acuminata** Merr. Govt. Lab. Publ. **29** (1905) 30.

(335 *Whitford*) May; (786, 825, 1175, 1245, 1592 *Borden*) May, August; (3864 *Merrill*) August. Forests 100 to 800 m. Endemic. T., *Dalindingan.*

4. SHOREA Roxb.

1. **S. contorta** Vidal, Sinopsis, Atlas (1883) 15 *t. 15. f. E.;* Rev. Pl. Vasc. Filip. (1886) 61; Brandis, l. c. 88.

(504, 511, 519, 536, 538, 534, 598, 605 *Barnes*) November, March; (293 *Whitford*) May; (72 *Merrill*) Decades Phil. Forest Fl., coll. *Barnes,* January; (650, 653, 677, 821, 1748 *Borden*) April, August. In forests 100 to 600 m. Endemic. T., *Lauan.*

2. **S. guiso** (Blanco) Blume; Brandis l. c. 89.

(659, 1179, 1398, 1525, 1530, 1533, 1559, 1572, 1799 *Borden*) April, September; (490, 491, 530, 508, 543, 545, 550, 553, 572, 576, 581 *Barnes*) November, March; (71 *Merrill*) Decades Phil. Forest Fl., coll. *Barnes,* January. In forest 100 to 300 m. Endemic. T., *Guiso, Guijo.*

3. **S. polysperma** (Blanco) Merr. Govt. Lab. Publ. **29** (1905) 29.

(734, 784, 819, 1248, 1410, 2130 *Borden*) May, September; (132 *Whitford*) May; (606 *Barnes*) January; (187 *Merrill*) Decades Phil. Forest Fl., coll. *Borden,* June. Forests 100 to 800 m. Endemic. T., *Tinguili.*

4. **S. furfuracea** Miq.; Brandis l. c. 98.

(*Meyer*) April. In forests at 800 m., sterile specimens but manifestly this species. Malayan Peninsula and Archipelago.

5. VATICA Linn.

1. **V. mangachapoi** Blanco; Brandis, l. c. 134.

(804, 815, 1593 *Borden*) May, August; (3896 *Merrill*) August; (306, 1224 *Whitford*) May, April. Forests 700 to 1,200 m. Endemic.

The above specimens certainly represent the species as interpreted by Vidal and accepted by Brandis, but as noted by Brandis, Blanco's description does not apply closely. The tree is apparently not well known to the natives of the region surrounding Mount Mariveles, as no native name was obtained. Specimens from the mountains back of Manila, identical with those cited above, bear the Tagalog names *Lisican* and *Dangui.*

BIXACEÆ.

1. BIXA Linn.

1. **B. orellana** Linn. Sp. Pl. (1753) 512.

(2247 *Meyer*) December. In deserted clearings, below 100 m., introduced from tropical America and now widely distributed in the Philippines. Sp.-Fil., *Achuete.*

FLACOURTIACEÆ.

1. SCOLOPIA Schreb.

1. **S. luzonensis** (Presl) Warb. in Engler und Prantl, Nat. Pflanzenfam. 3 (1893) 6: 30. *f. 11.*

(1197, 1244 *Whitford*) March, May; (773 *Borden*) May. In thickets near the seashore and also on forested ridges at 800 m. Endemic.

A species doubtfully distinct from the widely distributed *Scolopia crenata* Clos.

2. HOMALIUM Jacq.

1. **H. luzoniense** F.-Vill. Nov. App. (1880–83) 94.

(2071 *Borden*) October. In thickets below 100 m. Endemic.

3. FLACOURTIA Juss.

1. **F. inermis** Roxb.; Hook. f. et Th. Fl. Brit. Ind. 1 (1872) 192.

(1744 *Borden*) August; (1252 *Whitford*) May. In forests at about 200 m. Malayan Peninsula and Archipelago.

4. CASEARIA Jacq.

1. **C. cinerea** Turcz. Bull. Soc. Nat. Mosc. 31 (1858) 462.

(1775 *Borden*) August; (2822 *Meyer*) March. In forests at 600 m. Endemic. (?)

Vidal retains this species as a distinct one, but Hooker f., and King reduce it to the widely distributed *Casearia grewiæfolia* Vent.

2. **C. fuliginosa** Blanco, Fl. Filip. ed. 2 (1845) 262.

(2300 *Meyer*) December; (2706 *Borden*) February. In thickets below 100 m. Endemic.

3. **C. solida** Merr. Govt. Lab. Publ. 35 (1906) 46.

(2499, 3722 *Merrill*) June, January; (626, 670, 1230, 1233, 3055 *Borden*) April, May; (192, 526, 1194 *Whitford*) July, May; (6791, 7006 *Elmer*) November; (2810 *Meyer*) March. Forests 100 to 800 m. Endemic.

4. **Casearia crenata** Merrill, sp. nov.

A shrub or small tree, 4 to 12 m. high. Branches slender, glabrous, often slightly glaucous, nearly black when dry. Leaves elliptical ovate, glabrous on both surfaces, submembranous, 7 to 12 cm. long, 4 to 6.5 cm. wide, the base acute, rarely subtruncate, inequilateral, the apex rather prominently acuminate, the acumen blunt, the margins crenate except near the base, the teeth small; nerves 7 to 9 on each side of the midrib, somewhat prominent beneath, the reticulations distinct; petioles slender, 1 to 1.5 cm. long. Flowers few, two to four in each axil, greenish white, the pedicels cinereous-puberulous, 2 to 3 mm. long. Calyx lobes 5, elliptical ovate, acute or obtuse, 3.5 to 4 mm. long, 2.5 to 3 mm. wide, slightly pubescent. Stamens 8; filaments 1.2 mm. long, glabrous; anthers ovate, 0.8 mm. long. Staminodes oblong, 1 mm. long, glabrous below, the apex and margins above lanate. Ovary narrowly ovoid, 2 mm. long, glabrous; style nearly obsolete; stigma capitate. Fruit yellow, glabrous, ellipsoid, about 2 cm. long, 3-valved. Seeds few, broadly ovoid, glabrous, acute, 4.5 mm. long, surrounded by a thin, pale, more or less lacerate aril.

(1150, 1210 *Whitford*) March, 1905; (1504 *Ahern's collector*) July, 1904. On exposed forested ridges in the mossy forest at 900 m.

5. **Casearia polyantha** Merrill, sp. nov.

A tree about 12 m. high, glabrous throughout. Branches slender, gray or grayish brown. Leaves oblong, subcoriaceous, glabrous, shining, 10 to 13 cm. long, 3.5 to 5.5 cm. wide, the base inequilateral, subtruncate or sometimes somewhat acute, the apex acute or somewhat acuminate, the margins rather finely crenate-dentate; nerves 10 to 12 on each side of the midrib, somewhat prominent beneath, the reticulations fine, distinct; petoles 1 to 1.7 cm. long. Flowers very numerous, crowded in the axils of the leaves, frequently 50 to 80 flowers in an axil, greenish white or yellowish, the pedicels slender minutely cinereous puberulent, 6 to 8 mm. long. Calyx lobes 5, oblong, acute, somewhat puberulent, 3 mm. long, 1.2 mm. wide. Stamens 8 to 10; filaments slender, glabrous, nearly 3 mm. long; anthers narrowly ovoid, 1 mm. long. Staminodes linear, 1.5 mm.

long, densely lanate. Ovary glabrous, narrowly ovoid; style 2 mm. long; stigma capitate. Fruit oblong-ovoid about 2 cm. long, 1 cm. thick when dry, yellow, glabrous, apiculate, 6 ribbed when dry, 3-valved. Seeds many, ovoid to oblong ovoid, 4 to 5 mm. long, somewhat compressed, acute, often minutely apiculate, glabrous, nearly or quite surrounded by the thin, pale, lacerate aril.

(3039 *Borden*) May, 1905; (138 *Merrill*) Decades Philip. Forest Fl., coll. *Borden*) July, distributed as *Cascaria fuliginosa* Blanco. In forests at about 130 m., T., *Calauag*.

The type of the species is No. 3143 *Ahern's collector*, Antipolo, Province of Rizal, June, 1905.

PASSIFLORACEÆ.

1. MODECCA Lam.

1. **M. coccinea** Blanco, Fl. Filip. ed. 2 (1845) 453.

(7, 69, 1048 *Whitford*) April, January; (2927 *Borden*) March; (6782 *Elmer*) November. In forests 70 to 200 m.

The above specimens are all with fruits only, and accordingly I am unable definitely to determine at this time whether or not Blanco's species is valid, or whether it should be reduced to some Malayan or Asiatic form. The species is rather common and widely distributed in Luzon, in dry thickets and open forests. Following Engler, *Modecca* is a synonym of *Adenia*, but with the present doubt regarding the validity of Blanco's species, it is for the present retained in *Modecca* rather than to make a new combination.

2. **M. triloba** Blanco, l. c. 452 non (?) Roxb.

(1757, 2352 *Borden*) August, January. In forests at about 100 m. The remarks under the preceding species apply also to the present form.

CARICACEÆ.

1. CARICA Linn.

1. **C. papaya** Linn. Sp. Pl. (1753) 1056.

Occasionally cultivated about dwellings at Lamao, widely distributed in the Philippines. Introduced from tropical America. Sp.-Fil., *Papaya*.

DATISCACEÆ.

1. OCTOMELES Miq.

1. **O. sumatrana** Miq. Fl. Ind. Bat. Suppl. (1860) 336.

(2943 *Borden*) March. In forests at 130 m. Malaya and New Guinea. T., *Cabal*.

According to Warburg, the Philippine and Eastern Malayan form is a distinct species, *Octomeles moluccana* Warb., but this is reduced by Schumann and Lauterbach[1] to *O. sumatra* Miq.

BEGONIACEÆ.

1. BEGONIA Linn.

1. **B. rhombicarpa** A. DC. Ann. Sc. Nat. IV. 11 (1859) 129.

(204, 492, 499, 500, 1297, 1345 *Whitford*) July to September; (3124, 3862 *Merrill*) October, August; (6949, 6680 *Elmer*) November; (753 *Borden*) May. On damp banks in ravines, wet or dry cliffs, along streams, and on usually

[1] Fl. Deutsch. Schutzgebiete Südsee (1901) 457.

damp mossy cliffs on exposed ridges, 75 to 1,300 m. Endemic. T., *Pingol bato.*

Variable in vegetative characters, the form growing on dryer banks and cliffs with small leaves like the type (510 *Cuming*), the form in more shaded moist places with larger leaves approaching *Begonia merrillii* Warb., which is possibly not distinct from *B. rhombicarpa* A. DC.

2. **B.** sp.

(3734 *Merrill*) January. On damp cliffs, exposed ridges at 1,100 m. Vegetative characters of luxuriant forms of the preceding species but with very much larger fruits.

MYRTIFLORÆ.

THYMELIACEÆ.

1. PHALERIA Jack.

1. **P. cumingii** (Meissn.) F.-Vill. Nov. App. (1883) 183.

(1446 *Ahern's collector*) July; (3181 *Merrill*) October; (473, 1321 *Whitford*) July, June; (2219 *Meyer*) December, 1904. In thickets and forests 75 to 400 m. Endemic.

2. WICKSTRŒMIA Endl.

1. **W. lanceolata** Merr. Govt. Lab. Publ. 29 (1905) 31.

(1151 *Whitford*) March; (6901 *Elmer*) November. On exposed ridges in the mossy forest at 900 m. Endemic.

2. **W. meyeniana** Warb. in Perk. Frag. Fl. Philip. (1905) 171.

(6793 *Elmer*) November; (3892 *Merrill*) August; (2176 *Meyer*) December; (527 *Whitford*) July. In forests 75 to 200 m. Endemic.

3. **W. ovata** C. A. Mey.; Miessn. in DC. Prodr. 14 (1856) 1: 544.

(3860 *Merrill*) August; (1588 *Borden*) August; (1340 *Whitford*) September. Exposed ridges in the mossy forest at 1,000 m. Endemic.

ELAEAGNACEÆ.

1. ELÆAGNUS Linn.

1. **E. latifolia** Linn.; Hook. f. Fl. Brit. Ind. 5 (1886) 202.

(2805 *Meyer*) March. In the mossy forest on exposed ridges at 1,300 m. British India to Southern China and Malaya.

LYTHRACEÆ.

1. LAGERSTRŒMIA Linn.

1. **L. speciosa** (Linn.) Pers. Syn. 2 (1807) 72. *L. flos-reginæ* Retz.; Clarke in Hook. f. Fl. Brit. Ind. 2 (1879) 577.

(755, 1269, 1283, 1289, 1538, 1553, 1615, 1622, 1679, 1680 *Borden*) May to August; (42, 356 *Whitford*) April, June; (6770 *Elmer*) November. In forests and thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya. T., *Banaba.*

SONNERATIACEÆ.

1. SONNERATIA Linn. f.

1. **S. pagatpat** Blanco Fl. Filip. ed. 1 (1837) 424.

(1465 *Borden*) October; (1465 *Ahern's collector*) July. Along the rocky seashore, widely distributed in the Philippines. Malaya. T., *Pagatpat.*

2. CRYPTERONIA Blume.

1. **C. cumingii** Planch.; Niedenzu in Engler's Bot. Jahrb. **15** (1893) 178.

(327 *Barnes*) February; (1064 *Whitford*) January; (2585 *Meyer*) February; (2571 *Borden*) February. In forests 75 to 150 m. Endemic.

2. **C. paniculata** Blume; Niedenzu l. c. 175.

(65 *Merrill*) Decades Philippine Forest Fl. coll. *Barnes*, January. In forests at 300 m. British India and Malaya.

LECYTHIDACEÆ.

1. PLANCHONIA Blume.

1. **P. spectabilis** Merr. Govt. Lab. Publ. **17** (1904) 30.

(58, 590 *Barnes*) October, March; (363 *Whitford*) June; (756, 1395, 1571, 1644, 1666 *Borden*) July, August. In forests 100 to 600 m. Endemic. T., *Llamog*.

2. BARRINGTONIA Forst.

1. **B. reticulata** (Blume) Miq. Fl. Ind. Bat. **1** (1855) 490.

(71 *Whitford*) April; (6124 *Leiberg*) July. In thickets along streams below 100 m. Malaya. T., *Putat*.

2. **B. racemosa** (Linn.) Blume; Clarke in Hook. f. Fl. Brit. Ind. **3** (1879) 507.

(*Whitford*). In thickets near the seashore. British India to Malaya and Polynesia. T., *Putat*.

RHIZOPHORACEÆ.

1. GYNOTROCHES Blume.

1. **G. parvifolia** Merr. Govt. Lab. Publ. **35** (1906) 46.

(1173 *Whitford*) March. On exposed ridges in the mossy forest at about 1,000 m. Endemic.

2. CERIOPS Arn.

1. **C. roxburghiana** Arn.; Hook. f. Fl. Brit. Ind. **2** (1878) 436.

(1273, 1277 *Whitford*) May; (2313 *Meyer*) December; (2354 *Borden*) January. Tidal forests throughout the Philippines. Tropics of the Old World. T., *Bacauan*.

3. RHIZOPHORA Linn.

1. **R. conjugata** Lam.; Hook. f. l. c. 436.

(1432 *Ahern's collector*) August. Tidal forests throughout the Philippines. Tropics of the Old World. T., *Bacauan*.

4. CARALLIA Roxb.

1. **C. integerrima** DC.; Hook. f. l. c. 439.

(2578 *Meyer*) February; (1683, 2555, 2708 *Borden*) August, February; (6755 *Elmer*) November. In thickets below 100 m. British India to Southern China, Malaya and Australia.

5. BRUGUIERA Lam.

1. **B. gymnorrhiza** Lam.; Hook. f. l. c. 437.

(1494 *Ahern's collector*) August; (2273 Meyer) December; (7008 *Elmer*) November. Tidal forests throughout the Philippines. Tropics of the Old World. T., *Tagasa*.

6. PELLACALYX Korth.

1. **P. pustulata** Merr. Govt. Lab. Publ. 35 (1906) 47.

(1282 *Whitford*, 3040 *Borden*, 3019 *Meyer*) May. In forests 100 to 300 m. Endemic.

COMBRETACEÆ.

1. TERMINALIA Linn.

1. **T. catappa** Linn.; Clarke in Hook. f. Fl. Brit. Ind. 2 (1878) 444.

(2236 *Meyer*, 2125 *Borden*) December; (184 *Barnes*) January. Thickets near the seashore, widely distributed in the Philippines. Malaya, generally planted in most tropical countries. T., *Talisay*.

2. **T. edulis** Blanco Fl. Filip. ed. 2 (1845) 265.

(1387, 1652 *Borden*) July, August. In forests 85 to 150 m. Endemic. T., *Calumpit*.

3. **T. multiflora** Merr. Govt. Lab. Publ. 17 (1904) 34.

(6990 *Elmer*) November. In forests. Endemic.

4. **T. ovocarpa** Merr. l. c. 32.

(2249, 2579 *Meyer*) December, February; (347 *Whitford*) May; (1216, 2075 *Borden*) June, October; (67 *Barnes*) November. In forests 100 to 550 m. Endemic. T., *Talisay del monte*.

5. **T. nitens** Presl. Epim. Bot. (1849) 213.

(64 *Barnes*) November; (2241 *Meyer*) December; (1205, 1547, 1562, 1619, 1738 *Borden*) June, August; (393 *Whitford*) June. In forests 75 to 150 m. Endemic. T., *Sacat*.

2. COMBRETUM Linn.

1. **C. squamosum** Roxb.; Clarke in Hook. f. Fl. Brit. Ind. 2 (1878) 456.

(2173, 2304 *Meyer*) December; (2338, 2341 *Borden*) December; (6715 *Elmer*) November; (1032 *Whitford*) December. In thickets below 100 m. British India and Malaya.

3. QUISQUALIS Linn.

1. **Q. indica** Linn.; Clarke l. c. 459.

(1497 *Ahern's collector*) July; (39, 1287 *Whitford*) April, May. In thickets below 100 m., widely distributed in the Philippines. Malaya, generally cultivated in the Tropics. T., *Niogniogan*.

MYRTACEÆ.

1. PSIDIUM Linn.

1. **P. guajava** Linn.; Duthie in Hook. f. Fl. Brit. Ind. 2 (1878) 468.

(1323 *Borden*) July; (2196 *Meyer*) December; (6097 *Leiberg*) July; (6772 *Elmer*) November. Very abundant in thickets below 100 m., widely distributed in the Philippines. Introduced from tropical America. The Guava. Sp.-Fil., *Bayabas, Guayabas*.

2. DECASPERMUM Forst.

1. **D. blancoi** Vidal. Phan. Cuming. Philip. (1885) 173.

(3890 *Merrill*) August; (1331 *Borden*) July. Exposed ridges, mossy forest, at 1,000 m. Endemic.

2. **D. paniculatum** (Lindl.) Kurz.; Clarke l. c. 470.

(6992 *Elmer*) November; (455 *Whitford*) July; (1332, 1589 *Borden*) July, August; (3861 *Merrill*) August. With the preceding, widely distributed in the Philippines. Tropical Asia, Malaya and Australia.

3. EUGENIA Linn.

1. **E. acuminatissima** (Blume) Kurz.; Duthie in Hook. f. Fl. Brit. Ind. 2 (1878) 483. *E. cumingiana* Vidal, Phan. Cuming. Philip. (1885) 173, non *E. cumingii* Hook. et Arn. § *Syzygium*.

(811, 2385 *Borden*) June, January; (2406, 2628, 2801, 2807, 3004 *Meyer*) January, May; (1198, 1228 *Whitford*) March, April. In forests 600 to 1,000 m., widely distributed in the Philippines. Malayan Peninsula and Archipelago.

Vidal's name for this species is invalid, but at any rate the Philippine form referred by him to *Eugenia cumingiana* is apparently identical with *E. acuminatissima* Kurz. A cotype of Vidal's species (925 *Cuming*) is in our herbarium.

E. acuminatissima (Blume) Kurz, var. **parva** Merrill, var. nov.

Similar to the species but with much less acuminate reduced leaves 3 to 6 cm. long, 0.8 to 1.5 cm. wide.

(1136, 1218 *Whitford*) April, March; also No. 861 *Cuming*, Philippines, 1836–40, without locality. On exposed ridges in the mossy forests at about 1,000 m., apparently only a reduced form of the species due to habitat.

2. **Eugenia arcuatinervia** Merrill, sp. nov. § *Jambosa*.

A tree reaching a height of 20 m. Branches light gray or brownish, glabrous, terete. Leaves ovate lanceolate, glabrous, subcoriaceous, rather prominently acuminate, the acumen slender, blunt, base acute, 12 to 14 cm. long, 4.5 to 5.5 cm. wide; primary nerves about 10 on each side of the midrib, rather prominent beneath, spreading, anastomosing and forming an arched intramarginal nerve, 3 to 5 mm. from the margin of the leaf as prominent as the primary nerves, and a secondary marginal nerve as prominent as the lax reticulations; petioles 1.5 cm. long, channeled above, the lamina slightly narrowly decurrent. Inflorescence of narrow few flowered terminal and axillary racemose panicles 8 cm. long or less, the peduncles glabrous, often slightly angled, 3 to 5 cm. long. Flowers solitary or in pairs, white, fragrant, 1.5 cm. long including the stamens, the buds globose or obovoid. Calyx cup-shaped, narrowed to the 2 or 3 mm. long pedicel, obscurely 4-lobed, 5 to 6 mm. in diameter at the mouth. Petals 4, free, suborbicular-reniform, 4 mm. long, 4 to 6 mm. wide, glandular-punctate. Stamens indefinite; filaments 7 to 8 mm. long; anthers 0.6 mm. long.

(2598 *Meyer*) February, 1905. In forests at about 600 m.

3. **E. barnesii** comb. nov. *Jambosa barnesii* Merr. Govt. Lab. Publ. 17 (1904) 37. § *Jambosa*.

(140 *Barnes*) January; (2774 *Meyer*) February; (733, 1198, 1236 *Borden*) May, June; (251 *Whitford*) May. In forests 600 to 800 m. Endemic.

4. **E. bataanensis** comb. nov. *Jambosa bataanensis* Merr. l. c.

(2083, 2386 *Borden*) October, January; (6807 *Elmer*) November; (2407, 2765 *Meyer*) January, February; (177 *Barnes*) January; (3761 *Merrill*) January. In forests 800 to 1,000 m. Endemic.

5. **E. bordenii** Merr. Govt. Lab. Publ. 35 (1906) 47. § *Jambosa*.

(633, 644, 690, 691, 1206, 1208, 1630, 1736 *Borden*) April to August; (328, 492, 497, 540 *Barnes*) November, February; (362 *Whitford*) June. In forests 100 to 200 m. Endemic. T., *Malaruhat*, *Malaruhat maputi*.

6. **E. cinnamomea** Vid. (?) Phan. Cuming. Philip. (1885) 173. § *Jambosa*.

(344 *Whitford*) May; (1188 *Borden*) June; (2803 *Meyer*) March. Forests at 600 m. The above specimens being with fruit only, accurate identification is impossible at this time.

7. **Eugenia clavellata** Merrill, sp. nov. § *Jambosa*.

A tree 15 to 20 m. high. Branches slender, terete, grayish or light brown. Leaves elliptical ovate, the venation very dense, 4 to 8 cm. long, 2 to 4.5 cm. wide, short or somewhat caudate acuminate, the acumen blunt, the base acute, often

slightly decurrent acuminate, rather pale when dry, shining, with numerous scattered small dark colored glands on the lower surface, the veins very numerous, obscure, obscurely anastomosing; petioles about 4 mm. long. Panicles terminal and in the upper axils, 3 to 7 cm. long, the branches spreading-ascending, the flowers umbellately disposed at the ends of the short branchlets. Buds clavate. Flowers slender, nearly 1 cm. long, sessile in umbellate fascicles of 2 to 3 or more flowers each, the calyx proper subglobose, 2 mm. long, 3 mm. in diameter, truncate or very obscurely 4-lobed, abruptly contracted below to the 6 mm. long pseudostalk, glabrous. Petals 4, pink or white, suborbicular, about 2 mm. in diameter, free. Stamens indefinite; filaments 2 to 2.5 mm. long, thickened below; anthers less than 0.5 mm. long.

(2747 *Borden*) March, 1905; (2821 *Meyer*) March, 1905. In forests 500 to 600 m.

8. **E. congesta** Merr. Govt. Lab. Publ. **35** (1906) 49. § *Syzygium.*

(150, 448 *Whitford*) May, July; (6896 *Elmer*) November. On exposed ridges in the mossy forest above 1,200 m. Endemic.

9. **Eugenia densinervia** Merrill, sp. nov. § *Syzygium.*

A tree reaching a height of 25 m. Branches glabrous, light brown or grayish, terete, the ultimate branchlets strongly 4-angled. Leaves oblong elliptical to obovate elliptical, the apex broad, rarely obscurely acute, usually more or less narrowed to the acute or cuneate base, coriaceous, glabrous, pale when dry, shining above, 11 to 18 cm. long, 5 to 8 cm. wide, the nerves numerous, close, not distinct, parallel, anastomosing and forming a faint intramarginal nerve, the lower surface with numerous scattered obscure glands; petioles stout, 1.5 to 2 cm. long. Inflorescence a terminal cymose panicle 7 cm. long or less, the rhachis and branches stout, somewhat angled, the latter often 5 cm. long, ascending, flower bearing above only, the ultimate branchlets short, stout, each with about 3 flowers. Flowers white, about 1 cm. long. Calyx funnel-shaped, sessile or nearly so, about 6 mm. long, glabrous, obscurely 4-lobed, subtended by 2 or 3 small bracteoles. Corolla calyptrately deciduous, the petals connivent into a circular calyptra 5 to 6 mm. in diameter. Stamens indefinite; filaments 5 to 6 mm. long; anthers nearly 1 mm. long. Staminal disc nearly 1 mm. thick. Fruit subglobose to ovoid, 1 to 1.5 cm. long, crowned by the calyx rim.

(1249 *Whitford*) May, 1905; (719, 813, 1178, 1815, 2921 *Borden*) May, 1904, to March, 1905. In forests 200 to 600 m.

10. **E. glaucicalyx** Merr. Govt. Lab. Publ. **35** (1906) 50. § *Syzygium.*

(3949 *Merrill*) March; (817, 826, 1250, 2748 *Borden*) June, March. In forests at about 600 m. Endemic.

11. **E. javanica** Lam. (?) Duthie l. c. 474. § *Jambosa.*

(193 *Barnes*) January. In forests at 350 m., material in poor condition for identification.

12. **E. jambolana** Lam.; Duthie l. c. 499. § *Syzygium.*

(*Whitford*). In thickets below 100 m., common wild and cultivated throughout the Philippines. Tropical Asia to Malaya and Australia. T., *Duhat, Lumboy.*

13. **E. leptantha** Wight; Duthie l. c. 484. § *Syzygium.*

(2646, 2806 *Meyer*) February, March; (803, 827 *Borden*) May, June; (294 *Whitford*) May. In forests 600 to 800 m. Widely distributed in British India, Malaya, and Australia. T., *Carra.*

14. **E. luzonensis** comb. nov. *Jambosa luzonensis* Merr. Govt. Lab. Publ. **17** (1904) 37. § *Jambosa.*

(83 *Barnes*) November; (107, 357 *Whitford*) April, June; (172 *Merrill*) Decades Phil. Forest Fl., coll. *Barnes*, April; (6681 *Elmer*) November; (619, 658, 1197 *Borden*) April, August. In forests along the river 100 to 200 m. Endemic. T., *Malaruhat, Malaruhat mapula.*

15. **E. marivelesensis** Merrill, sp. nov. § *Jambosa.*

A tree 10 to 15 m. high. Branches slender, terete, light brown, glabrous. Leaves elliptical ovate, abruptly acuminate, the base acute, subcoriaceous, shining above, somewhat paler beneath, 6 to 10 cm. long, 3 to 4.5 cm. wide, the venation very dense, the veins slender, very numerous, not prominent, parallel, anastomosing in a slender intramarginal nerve; petioles slender 6 to 10 mm. long. Panicles terminal and in the upper axils, 4 cm. long or less, rather densely flowered, the branches and branchlets short, striate, terete. Flowers including the stamens 2 cm. long white, fragrant, the buds obovoid, sessile or very shortly pedicelled. Calyx funnel shaped, 7 to 8 mm. long, 5 to 6 mm. in diameter at the mouth, with 4 rounded lobes. Petals 4, suborbicular, concave, distinct, about 5 mm. in diameter. Stamens indefinite; filaments 10 to 12 mm. long; anthers 0.7 mm. long.

(618, 1184, 1522, 2922 *Borden*) April, March; (2597 *Meyer*) February. In forests 100 to 600 m. T., *Malaruhat.* The flower buds have a faint taste similar to that of cloves.

16. **Eugenia perpallida** nom. nov. *Syzygium pallidum* Merr. Govt. Lab. Publ. 17 (1904) 38, non *Eugenia pallida* Berg. § *Syzygium.*

(3124 *Meyer*) May; (1209 *Whitford*) March. In forests at 700 m. Endemic. Distinguished from *E. acuminatissima* Kurz, not only by the very pale leaves, but also by the dense venation.

17. **Eugenia robertii** Merrill, sp. nov. § *Jambosa.*

A tree 8 to 15 m. high. Branches light gray or brownish, usually slender, terete, shining, glabrous. Leaves elliptical ovate to lanceolate ovate, subcoriaceous, glabrous, dull, 5 to 10 cm. long, 2.5 to 4.5 cm. wide, short, often abruptly blunt acuminate, the base acute; nerves 7 to 10 on each side of the midrib, ascending-spreading, not prominent, the secondary ones slightly more obscure than the primary, anastomosing and forming an intramarginal nerve, with a more obscure secondary submarginal nerve, the reticulations obscure; petioles 5 to 7 mm. long. Inflorescence racemose, terminal and in the upper axils, about 3 cm. long, each raceme 3 to 5 flowered. Flowers 2.5 cm. long including the stamens, 3 to 3.5 cm. in diameter in anthesis, the buds obovoid. Calyx funnel shaped, 1 to 1.5 cm. long, 4-lobed, the lobes broad, rounded. Petals 4, free, suborbicular, concave, 1.2 to 1.5 cm. in diameter. Stamens indefinite; filaments 1.5 to 1.8 cm. long; anthers 1.2 mm. long.

(2636, 2857 *Meyer*) February, March, 1905; (349, 1182, 1211 *Whitford*) May, 1904, March, 1905. In forests and on exposed ridges 500 to 1,100 m. The type is No. 2857 *Robert Meyer*, for whom the species is named.

18. **Eugenia similis** Merrill, sp. nov. § *Syzygium.*

A tree 15 m. high or less. Branches slender, light gray or brownish, the ultimate branches terete, glabrous, often nearly black when dry. Leaves elliptical ovate to oblong ovate, 9 to 11 cm. long, 4 to 6 cm. wide, subcoriaceous, shining above, the apex short blunt acuminate, the base acute or slightly decurrent acuminate; primary nerves about 14 on each side of the midrib, spreading, not prominent, the secondary ones nearly as distinct, anastomosing, the reticulations fine; petioles slender, 2 to 2.5 cm. long. Panicles from the branches below the leaves, about 6 cm. long, the primary branches distant, horizontal, 2 cm. long or less, the flowers in threes at the apices of the branchlets. Buds obovoid. Flowers including the stamens 5 to 7 mm. long. Calyx funnel shaped, about 3 mm. long, 4-lobed, the lobes broadly triangular, acute, 1.5 to 2 mm. long. Petals connate, calyptrately deciduous, the calyptra about 4 mm. in diameter. Stamens indefinite; filaments 5 to 6 mm. long; anthers 0.4 mm. long.

(413 *Whitford*) June. In thickets along the river at about 40 m. T., *Malaruhat maputi.*

In leaf characters and inflorescence resembling *Eugenia luzonensis*, but belonging in a different section of the genus. Other specimens from various parts of Luzon apparently referable here: (1471 *Ahern's collector;* 2994, 2940, 3007 *Merrill;* 851 *Maule.*)

19. **E. whitfordii** Merr. Govt. Lab. Publ. 35 (1906) 49. § *Jambosa.*

(468 *Whitford*) July; (1182 *Borden*) June. In forests at 600 m. Endemic.

20. **E.** sp. § *Jambosa.*

(1227 *Whitford*) April. In forests at 500 m., fruiting specimen only.

21. **E.** sp. § *Jambosa.* (?)

(2781 *Meyer*) February. In forests at 600 m., young buds only.

4. TRISTANIA R. Br.

1. **T. decorticata** Merr. Govt. Lab. Publ. 35 (1906) 51.

(1324 *Whitford*) May. On exposed ridges in the mossy forest 800 to 900 m. Endemic. The above specimen differs from the type of the species in its somewhat pubescent inflorescence.

5. LEPTOSPERMUM Forst.

1. **L. amboinense** Blume; Duthie in Hook. f. Fl. Brit. Ind. 2 (1878) 464.

(788, 2118 *Borden*) May, November; (3246 *Merrill*) October; (123 *Whitford*) May; (285 *Copeland*) January. On exposed ridges in the mossy forest from 1,000 m. to the summit of the mountain, and on most of the higher mountains of the Philippines. Malaya and Australia.

Leptospermum annæ Stein, described from specimens from Mount Apo, Mindanao, is represented in our herbarium by several numbers from the type locality and is apparently not distinct from the species here considered to represent typical *L. amboinense.*

MELASTOMATACEÆ.

1. MELASTOMA Burm.

1. **M. fusca** Merr. Govt. Lab. Publ. 17 (1904) 39.

(204, 340 *Barnes*) January, February; (38, 106 *Whitford*) April; (1962, 2709 *Borden*) October, February; (6634 *Elmer*) November; (2180, 2609 *Meyer*) December, February; (298 *Copeland*) January. In forests 100 to 800 m. Endemic.

2. **M. polyanthum** Blume; Cogn. in DC. Monog. Phan. 7 (354) 1891.

(6818 *Elmer*) November; (2100 *Borden*) November; (6037 *Leiberg*) July. Forests 700 to 900 m. British India to Malaya and Australia.

2. MEDINILLA Gaud.

1. **M. amplifolia** Merr. Govt. Lab. Publ. 29 (1905) 37.

(1338 *Borden*) July. On exposed ridges in the mossy forests at 1,000 m. Endemic.

2. **M. astronioides** Triana; Merrill, l. c.

(206 *Whitford*) May; (3007 *Meyer*) May; (3895 *Merrill*) August. In forests along streams 100 to 800 m. Endemic.

3. **M. coriacea** Merr. l. c. 35.

(3121 *Meyer*) May; (228, 1159 *Whitford*) May, March. On exposed ridges in the mossy forest 900 to 1,000 m. Endemic.

4. **M. intermedia** Blume; Merr. l. c. 37.

(125 *Whitford*) May; (2405 *Meyer*) January; (3965 *Merrill*) March. In the mossy forests 900 to 1,000. Java.

5. **M. megacalyx** Merr. l. c. 36.

(1514 *Ahern's collector*) July. In forests. Endemic.

6. **M. ramiflora** Merr. l. c. 35.

(2208, 2758 *Meyer*) December, February; (1590 *Borden*) August; (3222 *Merrill*) October; (6036 *Leiberg*) July; (6803 *Elmer*) November; (267 *Copeland*) January; (148 *Whitford*) May. On exposed ridges in the mossy forest 900 to 1,300 m. Endemic.

3. ASTRONIA Blume.

1. **A. candolleana** Cogn. in DC. Monog. Phan. 7 (1891) 1099.

(750 *Borden*) May. In forests along the river below 100 m. Endemic.

2. **A. cumingiana** Vid.; Cogn. l. c. 1098.

(2757 *Meyer*) February; (6827 *Elmer*) November. On exposed ridges in the mossy forest at about 1,200 m. Endemic.

3. **A. meyeri** Merr. Govt. Lab. Publ. 35 (1906) 51.

(2840 *Meyer*) March. In forests, ravines at 1,050 m. Endemic.

4. **A. rolfei** Vid.; Cogn. l. c. 1095.

(238 *Whitford*) May; (2610 *Meyer*) February; (6056 *Leiberg*) July. In forests 550 to 900 m. Endemic.

4. MEMECYLON Linn.

1. **M. affine** Merr. Govt. Lab. Publ. 35 (1906) 52.

(454 *Whitford*) July; (6059 *Leiberg*) July; (3184, 3190 *Merrill*) October; (1336 *Borden*) July. In forests on exposed ridges at about 1,000 m. Endemic.

2. **M. edule** Roxb. var. **ovata** Clarke; Cogn. l. c. 1056.

(2495, 2563, 3788 *Merrill*) June, January; (82, 206 *Barnes*) November, January; (2191 *Meyer*) May; (730, 820, 1185, 1304, 1781 *Borden*) May, August; (83, 299, 1022 *Whitford*) April, December; (6723, 6796 *Elmer*) November; (6163 *Leiberg*) July. Abundant in thickets and forests 10 to 600 m., widely distributed in the Philippines. British India and Malaya. T., *Colis.*

3. **M. preslianum** Triana; Cogn. l. c. 1139.

(*Whitford*). In thickets below 100 m. Endemic.

ŒNOTHERACEÆ.

1. JUSSIEUA Linn.

1. **J. suffruticosa** Linn. Clarke in Hook. f. Fl. Brit. Ind. 2 (1879) 587.

(1942, 1956 *Borden*) October. In thickets and waste places below 100 m., widely distributed in the Philippines. Tropics generally.

2. LUDWIGIA Linn.

1. **L. prostrata** Roxb.; Clarke l. c. 588.

(1957 *Borden*) October. In thickets and open places below 100 m. Tropical Asia and Africa.

UMBELLIFLORÆ.

ARALIACEÆ.

1. ARALIA Linn.

1. **A.** sp.

(*Whitford*). In forests, sterile specimen only, resembling *Aralia hypoleuca* Presl., but the leaf rhachis, pinnæ, and leaflets with numerous short and long spines.

2. ARTHROPHYLLUM Blume.

1. **Arthrophyllum ahernianum** Merrill, sp. nov.

A tree about 12 m. high, with very long pinnate leaves, the leaflets oblong to oblong lanceolate, short acuminate, glabrous. Leaves up to 1 m. in length, the upper ones much smaller, the lower ones with 30 or more leaflets, the upper ones with 5 or 6 leaflets, the rhachis jointed, glabrous; leaflets 10 to 18 cm. long, 2.5 to 5 cm. wide, membranous, pale when dry, entire, the base rather abruptly acute, usually strongly inequilateral, the apex short acuminate, the acumen blunt or sharp; primary nerves about 6 on each side of the midrib, arched ascending, somewhat prominent, the secondary nerves and reticulations distinct beneath, lax; petiolules 5 to 10 mm. long. Umbels subtended by 3 or 4 elliptical ovate leaves nearly as long as the umbellules, each umbel consisting of 8 to 10 umbellules, glabrous or deciduously ferruginous pubescent; umbellules 10 to 15 flowered, the peduncles 4 to 5 cm. long, the pedicels 1 cm. long or less. Calyx about 3 mm. long, truncate. Petals 5, oblong ovate, acute, 4 mm. long, about 2 mm. wide, free. Stamens 5; filaments 5 mm. long; anthers curved, about 2 mm. long. Ovary 1-celled, 1-ovuled; style 0. Fruit unknown.

(2780 *Meyer*) February; (*Whitford*). In dense forests on steep slopes at about 600 m., differing from *Arthrophyllum pinnatum* Clarke, to which it is apparently related, in its much longer leaves and larger more numerous leaflets which are not caudate acuminate.

3. SCHEFFLERA Forst.

1. **S. blancoi** nom. nov. *Nauclea digitata* Blanco, Fl. Filip. ed. 2 (1845) 102; ed. 3, 1 (1877) 188, non *Schefflera digitata* Forst. *Heptapleurum cephalotes* F.-Vill. Nov. App. (1883) 102, non Clarke. § *Cephaloschefflera*.

(3847 *Merrill*) August; (2834 *Meyer*) March. On forested slopes in ravines and on exposed ridges in the mossy forest 900 to 1,000 m. Endemic.

2. **Schefflera acuminatissima** Merrill, sp. nov.

Scandent on trees, reaching a height of 15 m. Branches gray or brownish, glabrous, striate, the ultimate branchlets often with few scattered stellate hairs. Leaves digitately 7 to 10 foliolate, alternate, the common petiole glabrous, 11 to 17 cm. long; leaflets narrowly oblong lanceolate or oblanceolate, glabrous submembranous, slightly shining above, the apex prominently slender caudate acuminate, often abruptly so, the base acute or slightly rounded, the margins entire, 8 to 15 cm. long, 2 to 4 cm. wide, for most part widest in the upper portion; primary nerves 15 or more on each side of the midrib, scarcely more prominent than the secondary nerves and reticulations, anastomosing; petioles slender, glabrous, 2 to 3.5 cm. long. Panicles terminal, each with 4 or 5 ascending branches 15 cm. long or less, the rhachis and branches more or less covered with weak, pale, somewhat stellately disposed hairs, the primary branches bearing numerous racemosely disposed slender, usually spreading 1 cm. long branchlets, each subtended by a deciduous, membranous, ovate or ovate lanceolate, acuminate bract about 1 cm. long, the flowers umbellately disposed at the tips of the branchlets, about 10 flowers in each umbel, their pedicels 1.5 to 2 mm. long. Calyx funnel shaped, truncate, 2 mm. long. Petals 5, greenish, narrowly ovate, acute, glabrous, 2 mm. long, 1.2 mm. wide, slightly united at their tips, separating from the base and falling as a whole. Stamens 5; filaments slender, 5 mm. long; anthers 1 mm. in diameter. Ovary 5-celled. Fruit yellow, ovoid to elliptical ovoid, 4 to 5 mm. long, 5-celled, 5-ridged, truncate, crowned by the flattened styles.

(172, 1222 *Whitford*) May, 1904 and 1905; (3005 *Meyer*) May, 1905. Scandent on trees in forests at about 700 m., the stems reaching a diameter of 5 cm. or more. Quite distinct from *Heptapleurum caudatum* Vidal.

3. **S. venulosa** (W. et A.) Harms. *Heptapleurum venulosum* Seem.; Clarke in Hook. f. Fl. Brit. Ind. 2 (1879) 729.

(3, 62 *Whitford*) April. In thickets along the river below 100 m. British India, Malaya, and Australia. T., *Galamai amo.*

In the identification of this species I have followed the earlier works of Vidal and F.-Villar, but the specimens here referred to *Schefflera venulosa* Harms, do not agree well with the description of that species and it is possible that it will be necessary to adopt one of Blanco's names for the Philippine form, there being available, *Polyscias odorata* Blanco=*Paratropia crassa* Blanco, and *Polyscias obtusa* Blanco=*Paratropia obtusa* Blanco, of the above, the description of the latter applying more closely to the form here referred to *Schefflera venulosa.*

4. **Schefflera bordeni** Merrill, sp. nov. § *Euschefflera, Heptapleurum.*

A tree (?) quite glabrous throughout with long petioled 7 to 8-foliolate leaves and terminal pinnately branched panicles nearly equaling the leaves. Branches light gray, rugose, the leaf scars prominent, the branchlets 5 mm. thick or less. Petioles 5 to 10 cm. long; leaflets elliptical lanceolate to elliptical or oblong oblanceolate or obovate, coriaceous, shining, 5 to 9 cm. long, 1.5 to 3 cm. wide, narrowed to the acute base, the apex gradually short or rather long acuminate, the acumen blunt; nerves 5 to 6 on each side of the midrib, ascending, not prominent, the reticulations obscure; petiolules 2 to 3.5 cm. long. Panicles about 15 cm. long, nearly as broad, the branches alternate, 6 to 8 cm. long, spreading, the upper ones somewhat shorter, the common rhachis about 10 cm. long, the branchlets racemosely disposed 8 mm. long or less, each bearing 4 to 6 umbellately disposed flowers, the pedicels 2 to 4 mm. long. Calyx about 1.5 mm. long, truncate. Petals 5, oblong ovate, acute, adherent by their apices and falling as a whole. Stamens 5; filaments 2.5 mm. long; anthers broadly elliptical ovate, 1 mm. long. Ovary 5-celled; style 0. Fruit unknown.

(1350 *Borden*) July, 1904. In forests at about 800 m., according to the collector, a tree about 12 m. high.

3. POLYSCIAS Forst.

1. **P. nodosa** (DC.) Seem. Journ. Bot. 3 (1865) 181.

(89 *Whitford*) April; (2306 *Meyer*) December; (2711 *Borden*) February; (363, 585 *Barnes*) March; (293 *Merrill*) Decades Phil. Forest Fl., coll. *Borden*, March. In thickets and forests below 100 m., widely distributed in the Philippines. Malaya. T., *Tocudlangit.*

UMBELLIFERÆ.

1. HYDROCOTYLE Linn.

1. **H. rotundifolia** Roxb.; Clarke in Hook. f. Fl. Brit. Ind. 2 (1879) 668.

(265 *Whitford*) May. On damp rocks and cliffs in forests at 800 m. British India and Malaya to New Guinea.

2. CENTELLA Linn.

1. **C. asiatica** (Linn.) Urb. *Hydrocotyle asiatica* Linn.; Clarke l. c. 669.

(2302 *Merrill*) October. In dry thickets below 100 m., widely distributed in the Philippines. Tropical and subtropical regions.

CORNACEÆ.

1. ALANGIUM Lam.

1. **A. meyeri** Merr. Govt. Lab. Publ. 35 (1906) 54.

(2284 *Meyer*) December; (2334, 2569, 2728 *Borden*) December, February, March. In forests and thickets 50 to 100 m. Endemic.

2. MASTIXIA Blume.

1. **M. pentandra** Blume; Koord. & Valeton, Bijd. Boomsoort. Java 5 (1900) 89.

(208, 222, 1195 *Whitford*) May, March; (2201, 2773 *Meyer*) December, February; (755, 1355, 2108 *Borden*) May, July, November; (3740 *Merrill*) January; (151, 207 *Barnes*) January. Abundant in forests above 700 m. Java.

All the above specimens are with fruit only, except No. 1195 *Whitford*, which has very young flowers, and agree closely with the long description given by Koorders and Valeton, and are accordingly referred to Blume's species. No representative of the genus has previously been found in the Philippines.

METACHLAMYDEÆ (SYMPETALÆ).

ERICALES.

CLETHRACEÆ.

1. CLETHRA Linn.

1. **C. lancifolia** Turcz. Bull. Soc. Nat. Mosc. 36 (1863) 2: 231.

(3226 *Merrill*) October; (794, 2095 *Borden*) May, November; (6994 *Elmer*) November; (1344 *Whitford*) September. On exposed ridges in the mossy forest at about 1,300 m. Endemic.

This species has erroneously been referred to *Clethra canescens* Reinw, by various authors, and in Index Kewensis is erroneously localized as Singapore.

ERICACEÆ.

1. RHODODENDRON Planch.

1. **R. quadrasianum** Vidal; Merr. Govt. Lab. Publ. 29 (1905) 43.

(6765 *Elmer*) November; (2090 *Borden*) November; (278, 1104 *Whitford*) May, February; (3215 *Merrill*) October; (6032 *Leiberg*) July. On exposed ridges in the mossy forest near the summit of the mountain. Endemic.

2. **R. schadenbergii** Warb.; Merr. l. c. 40.

(790, 2117 *Borden*) May, November; (6856 *Elmer*) November; (450 *Whitford*) July; (3255 *Merrill*) October; (6033 *Leiberg*) July. In forests on exposed ridges near the summit. Endemic.

3. **R. vidalii** Rolfe; Merr. l. c. 43.

(452 *Whitford*) July; (1591 *Borden*) August; (3743 *Merrill*) January; (300 *Merrill*) Decades Philip. Forest Fl., August. With the preceding. Endemic.

4. **R. xanthopetalum** Merr. l. c. 41.

(332 *Whitford*) May. Epiphytic in the mossy forest at 1,200 m. Endemic.

2. VACCINIUM Linn.

1. **V. cumingianum** Vidal, Rev. Pl. Vasc. Filip. (1886) 167.

(281 *Merrill*) Decades Philip. Forest Fl., March; (245, 459 *Whitford*) May, July; (1330, 1585 *Borden*) July, August; (2649 *Meyer*) February. Mossy forests on exposed ridges above 1,000 m. Endemic.

2. **V. jagori** Warb. in Perk. Frag. Fl. Philip. (1905) 174.

(282 *Merrill*) Decades Philippine Forest Fl., March, distributed as *V. subsessile* Merr.; (2623 *Meyer*) February; (145, 1101 *Whitford*) May, February; (7026 *Elmer*) November. With the preceding. Endemic.

PRIMULALES.

MYRSINACEÆ.

1. MAESA Forsk.

1. **M. cumingii** Mez. in Engler's Pflanzenreich **9** (1902) 49.

(2518, 3711 *Merrill*) June, January; (486 *Whitford*) July; (6084 *Leiberg*) July; (2257 *Meyer*) December. In forests and thickets 50 to 900 m. Endemic.

2. **M. denticulata** Mez. l. c. 48.

(2761 *Meyer*) February; (1128 *Whitford*) March. In forests 800 to 1,100 m. Endemic.

3. **M. hænkeana** Mez. l. c. 32.

(205 *Barnes*) January; (1258, 1931, 2390 *Borden*) June, January; (11, 190, 1059 *Whitford*) April, January; (2508 *Meyer*) January; (7036 *Elmer*) November; (2528 *Merrill*) June. In forests and thickets 20 to 350 m. Endemic.

2. AEGICERAS Gaertn.

1. **A. corniculatum** (Linn.) Blanco; Mez. l. c. 55.

(2314 *Meyer*) December; (2355, 2717 *Borden*) January, February; (136 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, July. Strand forests, widely distributed in the Philippines. Seashores of tropical Asia, Malaya, and Australia.

3. ARDISIA Swartz.

1. **A. boissieri** A. DC.; Mez. l. c. 129.

(2594, 2776 *Meyer*) February; (1228, 1252, 1906 *Borden*) June, September; (148 *Barnes*) January; (284 *Copeland*) January; (102 *Whitford*) April; (6636 *Elmer*) November. In forests 500 to 900 m., a tree reaching a height of 12 m. Endemic.

Strongly resembling the widely distributed *Ardisia humilis* Vahl, but the latter as it is found in the Philippines usually grows near the seashore and is a shrub 1 to 4 or 5 m. high.

2. **A. marginata** Blume; Mez. l. c. 108.

(135 *Barnes*) January; (3237 *Meyer*) June; (1080, 1310 *Whitford*) February, June. In forests 700 to 800 m. Java.

3. **A. philippinensis** A. DC.; Mez. l. c. 100.

(2853 *Meyer*) March. In forests at 600 m. Endemic.

4. **A. saligna** Mez. l. c. 143.

(3867 *Merrill*) August; (6048 *Leiberg*) July. On exposed ridges in the mossy forest at 1,000 m. Endemic.

5. **A.** sp.

(3726 *Merrill*) January. Exposed ridges at 1,100 m., fruiting specimen only.

4. DISCOCALYX Mez.

1. **D. cybianthoides** (A. DC.) Mez. l. c. 213.

(3745 *Merrill*) January; (2416, 2816 *Meyer*) January, March; (213 *Whitford*) May; (139, 341 *Barnes*) January, February; (6836 *Elmer*) November; (1348, 2085, 2392, 2467 *Borden*) July to January. In forests and on ridges 400 to 1,000 m. Endemic.

2. **D.** sp. (?)

(3881 *Merrill*) August. In forests, ravines at 800 m., material very imperfect.

5. EMBELIA Burm.

1. **E. bataanensis** Merr. Govt. Lab. Publ. 29 (1905) 44.

(2832 *Meyer*) March; (3207 *Merrill*) October; (1114 *Whitford*) February; (1349 *Borden*) July; (6893 *Elmer*) November. In the mossy forest, exposed ridges, 600 to 1,000 m. Endemic.

2. **Embelia whitfordii** Merrill, sp. nov. § *Eucembelia*.

A scandent shrub, glabrous except the inflorescence. Branches dark brown or nearly black when dry. Leaves coriaceous, elliptical ovate, narrowed at both ends, the base acute, the apex blunt, 7 to 9 cm. long, 2.5 to 4 cm. wide, slightly shining on both surfaces, entire, glabrous; nerves numerous, not prominent, the primary scarcely more prominent than the secondary ones and the reticulations; petioles about 1 cm. long. Panicles terminal, pyramidal, 12 to 15 cm. long, 6 to 8 cm. in diameter, many flowered, the primary branches spreading-ascending, the lower ones often 7 cm. long, the upper gradually shorter, the rhachis, branches, and branchlets minutely but densely ferruginous or cinereous puberulent, the rhachis becoming nearly glabrous. Flowers 1.5 to 1.7 mm. long, their pedicels 0.8 mm. long or less, papillose-puberulent, about as long as the narrowly ovate, acute, more or less puberulent bracteole, the margins of the bracteoles minutely papillose ciliate. Calyx 5-parted, the glandular punctate lobes narrowly ovate, acute 0.3 to 0.4 mm. long, minutely puberulent outside but the margins glabrous. Petals 5, free, ovate-lanceolate, acute, punctate with few large glands, 1.5 to 1.7 mm. long, 0.8 mm. wide. Stamens 5; filaments 0.8 mm. long; anthers 0.3 mm. long. Fruit subglobose, glabrous, about 2 mm. in diameter with numerous prominent glands, tipped with the persistent style.

(453, 1038 *Whitford*) July, June. On exposed ridges in the mossy forest at about 1,000 m.

6. RAPANEA Aubl.

1. **R. philippinensis** (A. DC.) Mez l. c. 364.

(3954 *Merrill*) March; (3114 *Meyer*) May. On exposed ridges in the mossy forest 1,000 to 1,200 m. Endemic.

EBENALES.

SAPOTACEÆ.

1. ILLIPE Kœnig.

1. **I. ramiflora** Merr. Govt. Lab. Publ. 17 (1904) 42.

(189, 583 *Barnes*) January, March. In forests at about 100 m. Endemic. T., *Baniti*.

2. PALAQUIUM Blanco.

1. **P. bataanense** Merr. Govt. Lab. Publ. 17 (1904) 44.

(156, 169 *Barnes*) January. In forests at about 100 m. Endemic.

2. **P. latifolium** Blanco; Merr. l. c. 6 (1904) 14.

(3785 *Merrill*) January; (131 *Barnes*) January; (63 *Merrill*) Decades Philip. Forest Fl., coll. *Barnes*, January. In forests at 100 m. Endemic.

3. **P. luzoniense** (F.-Vill.) Vid.; Merr. l. c. 15.

(155, 162, 179, 181, 486, 506 *Barnes*) November, January; (696, 698, 1671, 1739, 1918, 2325 *Borden*) May to December; (1016, 1026 *Whitford*) December; (2254, 2277 *Meyer*) December; (58 *Merrill*) Decades Philip. Forest Fl., coll. *Barnes*, January. In forests below 200 m. Endemic. T., *Tagatoy*.

4. **P. oleiferum** Blanco, Merr. l. c. 14.

(168 *Barnes*) January; (22 *Whitford*) April; (62 *Merrill*) Decades Philip. Forest Fl., coll. *Barnes*, January. In forests at about 100 m. Endemic. T., *Betis*.

5. **P. tenuipetiolatum** Merr. l. c. 17 (1905) 45.

(154, 191, 516, 520, 555, 566 *Barnes*) January, March; (1247, 1654, 1668, 1686, 2914 *Borden*) June to March. In forests 90 to 500 m. Endemic. T., *Manipnip*.

6. **P. whitfordii** Merr. Govt. Lab. Publ. 35 (1906) 55.

(496 *Barnes*) November; (1015, 1204 *Whitford*) December, March. Rare in forests at 100 m., quite common on ridges at about 1,100 m. Endemic.

3. SIDEROXYLON Linn.

1. **S. angustifolium** Merr. Govt. Lab. Publ. 35 (1906) 56. *Palaquium angustifolium* Merr. l. c. 17 (1904) 43.

(3744 *Merrill*) January; (159, 1166 *Whitford*) May, March. On exposed ridges in the mossy forest 1,000 to 1,100 m. Endemic.

2. **S. duclitan** Blanco Fl. Filip. ed. 1 (1837) 129. *S. ramiflorum* Merr. Govt. Lab. Publ. 17 (1905) 43.

(77 *Barnes*) November; (2308 *Meyer*) December; (2353 *Borden*) January; (225 *Merrill*) Decades Philip. Forest Fl., coll. *Borden*, October. In forests 100 to 200 m. Endemic.

3. **S. macranthum** Merr. Govt. Lab. Publ. 35 (1906) 56.

(1809, 2741 *Borden*) September, March; (51 *Barnes*) October; (291 *Merrill*) Decades Philip. Forest Fl., coll. *Borden*, February. In forests 40 to 150 m. Endemic.

4. MIMUSOPS Linn.

1. **M. elengi** Linn.; Clarke in Hook. f. Fl. Brit. Ind. 3 (1882) 548.

(1285 *Whitford*) May; (154 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, July. Thickets near the seashore. British India and Malaya. T., *Bansalagnin*.

EBENACEÆ.

1. DIOSPYROS Dalech.

1. **D. canomoi** A. DC.; Hiern Trans. Camb. Phil. Soc. 12 (1873) 1: 216.

(113 *Whitford*) May; (152 *Barnes*) January; (3739 *Merrill*) January. On exposed ridges in the mossy forest 900 to 1,200 m. Endemic. T., *Canomoi*.

2. **D. copelandi** Merr. Govt. Lab. Publ. 17 (1904) 45.

(246 *Copeland*) February; (3057 *Borden*) May. In forests 100 to 250 m. Endemic.

3. **D. discolor** Willd.; Hiern l. c. 260. *D. philippinensis* Gurke, non A. DC. (*Borden*). In thickets below 100 m., widely distributed in the Philippines. Borneo, occasionally cultivated in other tropical countries. T., *Mabolo.*

4. **D. nitida** Merr. Govt. Lab. Publ. 35 (1906) 57.

(6713 *Elmer*) November; (1067 *Whitford*) January; (267 *Merrill*) Decades Philip. Forest Fl., coll. *Borden*, January. In forests 100 to 200 m. Endemic.

5. **D. pilosanthera** Blanco; Hiern l. c. 213.

(564, 582, 584, 595, 600 *Barnes*) March; (709, 710, 833, 1752, 2738, 2952, 3038 *Borden*) May, April; (1225 *Whitford*) April; (148 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, July. In forests 100 to 500 m., widely distributed in the Philippines. Endemic. T., *Bolongeta.*

SYMPLOCACEÆ.

1. SYMPLOCOS Linn.

1. **S. confusa** Brand in Engler's Pflanzenreich 6 (1901) 88.

(1185, 1343 *Whitford*) March, September; (3240, 3723, 3960 *Merrill*) October, January, March; (2619 *Meyer*) February; (791 *Borden*) May. On exposed ridges in the mossy forest above 1,200 m. Malayan Peninsula, Southern China, and Borneo.

2. **S. elmeri** Brand in Perk. Frag. Fl. Philip. (1904) 36.

(1333 *Whitford*) May; (2718 *Borden*) February. In forests 150 to 600 m. Endemic.

3. **S. polyandra** (Blanco) Brand in Engler's Pflanzenreich l. c. 36.

(1925 *Borden*) September; (60 *Merrill*) Decades Philip. Forest Fl., coll. *Barnes*, January; (76 *Barnes*) November. In forests 100 to 200 m. Endemic.

4. **S. oblongifolia** (Presl) Vidal; Brand l. c. 55.

(199 *Barnes*) January; (2606 *Meyer*) February; (1223, 1246 *Borden*) June; (133 *Whitford*) May; (189 *Merrill*) Decades Philip. Forest Fl., coll. *Barnes*, January. In forests 300 to 700 m. Endemic.

5. **S.** sp.

(1157, 1196 *Whitford*) March; (2647 *Meyer*) February; (1511 *Ahern's collector*) August. In forests and on exposed ridges 800 to 1,100 m.

CONTORTÆ.

OLEACEÆ.

1. LINOCIERA Sw.

1. **L. coriacea** Vidal Rev. Pl. Vasc. Filip. (1886) 181.

(2305 *Meyer*) December; (1049 *Whitford*) January. In forests at about 100 m. Endemic.

2. **L. cumingiana** Vidal, Phan. Cuming. Philip. (1885) 185.

(749, 1403, 1539, 1552, 1621, 2348 *Borden*) May to January; (2226 *Meyer*) December. (1460 *Ahern's collector*) July; (82, 1023, 1070 *Whitford*) April, December, January. In forests and thickets 40 to 180 m. Endemic.

3. **L. luzonica** (Blume) F.-Vill. Nov. App. (1883) 128.

(2350 *Borden*) January; (1167 *Whitford*) March. In forests, the former at 100 m., the latter apparently dwarfed, at 1,100 m. Possibly not distinct from the preceding species. Endemic.

4. **L. pallida** comb. nov. *Mayepea pallida* Merr. Govt. Lab. Publ. 35 (1906) 58.

(1142 *Whitford*) March; (2792 *Meyer*) March; (2939 *Borden*) March. In forests at 100 m., and on ridges at 900 m. Endemic.

5. **L. racemosa** comb. nov. *Mayepea racemosa* Merr. l. c.

(3042 *Borden*) May. In forests at 60 m. Endemic.

2. LIGUSTRUM Linn.

1. **L. cumingiana** Decne. Nouv. Arch. Mus. Hist. Nat. Paris II. 2 (1879) 28.

(246 *Whitford*) May; (3006 *Meyer*) May; (467 *Topping*) May. On exposed ridges in the mossy forest 900 to 1,100 m. Endemic.

3. JASMINUM Linn.

1. **J. bifarium** Wall.; Clarke in Hook. f. Fl. Brit. Ind. 3 (1882) 595.

(2835 *Meyer*) March. On ridges in the mossy forest at 1,000 m. Malayan Peninsula and Archipelago.

The material represented by the above number is rather imperfect and is referred to the above species with some doubt.

LOGANIACEÆ.

1. MITRASACME Labill.

1. **M. alsinoides** R. Br.; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 80.

(3093 *Merrill*) October; (6779 *Elmer*) November. In open dry grass lands below 100 m. British India, Malaya, and Australia.

2. STRYCHNOS Linn.

1. **S. multiflora** Benth.; Hook. Icon. 23 (1894) *pl. 2213*.

(6864 *Elmer*) November. In forests, widely distributed in the Philippines. Endemic.

3. FAGRAEA Thunb.

1. **F. obovata** Wall.; Clarke l. c. 83.

(256 *Whitford*) May; (1899 *Borden*) September. Forests 700 to 900 m. British India and Malaya.

4. GENIOSTOMA Forst.

1. **G. cumingianum** Benth. Journ. Linn. Soc. Bot. 1 (1857) 97.

(3199 *Merrill*) October; (2836 *Meyer*) March. On exposed ridges above 1,000 m. Endemic.

APOCYNACEÆ.

1. ALSTONIA R. Br.

1. **A. parvifolia** Merr. Govt. Lab. Publ. 35 (1906) 59.

(1164 *Whitford*) March; (6876 *Elmer*) November; (2111 *Borden*) November; (2209 *Meyer*) December. On exposed ridges in the mossy forest 900 to 1,200 m. Endemic.

2. **A. scholaris** R. Br.; Hook. f. Fl. Brit. Ind. 3 (1882) 642.

(746, 1636 *Borden*) May, August; (579 *Barnes*) March. In forests 100 to 200 m., widely distributed in the Philippines. Tropical Asia, Africa, Malaya, and Australia. T., *Dita*.

2. PARALSTONIA H. Baill.

1. **P. clusiacea** H. Baill. Bull. Soc. Linn. Paris 1 (1888) 750.
(1793, 1798, 2546 *Borden*) September, February. In forests at 200 m. A monotypic endemic genus.

3. TABERNÆMONTANA Linn.

1. **T. pandacaqui** Poir.; Miq. Fl. Ind. Bat. 2 (1856) 419.
(2252, 2783 *Meyer*) December, February; (2511, 3137 *Merrill*) June, October; (629, 1370, 1790 *Borden*) April to September; (6148 *Leiberg*) July; (370 *Whitford*) June; (6783 *Elmer*) November. Common in forests 100 to 800 m. Endemic. T., *Pandacaqui*.
I have not seen Sonnerat's figure on which this somewhat doubtful species is based, and accordingly the above specimens are referred here tentatively. The form here considered is apparently sufficiently distinct from *T. cumingiana* A. DC., a species widely distributed in the Philippines and universally known to the natives under the same name as the above species.

4. VOACANGA Dup. Th.

1. **V. cumingiana** Rolfe. Journ. Linn. Soc. Bot. 21 (1884) 313.
(1079 *Whitford*) January; (684, 1521, 1755, 2331 *Borden*) May, December; (2282, 3014 *Meyer*) December, May; (3798 *Merrill*) January. In thickets and forests 75 to 200 m. Endemic.

5. ALYXIA Banks.

1. **A. monilifera** Vidal. *Gynopogon monilifera* Merr. Govt. Lab. Publ. 29 (1905) 46.
(6764, 6812 *Elmer*) November; (739, 792, 2112 *Borden*) May, November; (6035 *Leiberg*) July; (2204 *Meyer*) December; (224, 463 *Whitford*) May, July; (3857 *Merrill*) August. On exposed ridges in the mossy forest 900 to 1,200 m. Endemic.

6. KOPSIA Blume.

1. **K. longiflora** Merr. Govt. Lab. Publ. 29 (1905) 47.
(1207 *Whitford*) March; (611, 1802 *Borden*) April, September; (1448 *Ahern's collector*) August. On exposed ridges and in forests 250 to 1,100 m. Endemic.

7. CERBERA Linn.

1. **C. odollam** Gaertn.; Hook. f. Fl. Brit. Ind. 3 (1882) 638.
(2036, 2073, 2475 *Borden*) October, January; (2302 *Meyer*) December; (1435 *Ahern's collector*) August. In thickets along the seashore. Tropical Asia, Malaya, Australia, and Polynesia.

8. PARAMERIA Benth.

1. **P. philippinensis** Radlk. Sitzb. Math. Phys. Akad. Muench. 14 (1884) 519.
(84, 352 *Barnes*) November, March; (2186 *Meyer*) December; (6865 *Elmer*) November. In thickets and forests 20 to 100 m. Borneo. T., *Duetung ahas*.

9. ANODENDRON A. DC.

1. **A. paniculatum** (Roxb.) A. DC.; Hook. f. l. c. 668.
(2607 *Meyer*) February. In forests at 700 m. British India and Malaya.

10. AGANOSMA G. Don.

1. **A. marginata** (Roxb.) G. Don.; Hook. f. l. c. 663. *Echites procumbens* Blanco Fl. Filip. ed. 2 (1845) 78. *Holarrhena macrocarpa* F.-Vill., Nov. App. (1883) 130, non (?) *Physetobasis macrocarpa* Hassk. *Holarrhena procumbens* Merr. Govt. Lab. Publ. 27 (1905) 59.

(3299 *Merrill*) October; (398 *Whitford*) June. In thickets and forests near the river 100 to 200 m. British India and Malaya.

11. CARRUTHERSIA Seem.

1. **C. pilosa** (A. DC.) F.-Vill. Nov. App. (1883) 132.

(3117 *Meyer*) May, 1905. In forests at 950 m. Endemic.

12. ICHNOCARPUS R. Br.

1. **I. ovatifolius** A. DC.; Hook. f. l. c. 670.

(6013 *Leiberg*) July; (1464 *Ahern's collector*) August. In thickets below 100 m., widely distributed in the Philippines. British India and Malaya.

13. WRIGHTIA R. Br.

1. **W. laniti** (Blanco) Merr. Govt. Lab. Publ. 27 (1905) 59. *W. orata* A. DC.

(1260 *Whitford*) May; (770, 3067 *Borden*) May. In forests and thickets below 130 m. Endemic. T., *Laniti*.

14. PARSONSIA R. Br.

1. **Parsonsia confusa** nom. nov. *Parsonsia rheedii* F.-Vill. Nov. App. (1883) 130; Vidal, Rev. Pl. Vasc. Filip. (1886) 184, non *Heligme rheedii* Wight. *Echites spiralis* Blanco, Fl. Filip. ed. 1 (1837) 110; ed. 2 (1845) 79; ed. 3, 1 (1877) 146; Vidal, Sinopsis, Atlas (1883), *t. 66, f. E.*, non *Parsonsia spiralis* Wall.

(1784 *Borden*) August; (81 *Barnes*) November; (6146 *Leiberg*) July; (1216 *Whitford*) April; (2564, 3141 *Merrill*) June, October. In thickets and forests 20 to 100 m. Endemic.

ASCLEPIADACEÆ.

1. STREPTOCAULON W. et A.

1. **S. baumii** Decne. in DC. Prodr. 8 (1844) 496.

(3142 *Merrill*) October; (6768 *Elmer*) November. In thickets below 100 m., widely distributed in the Philippines. Endemic.

2. CEROPEGIA Linn.

1. **C. cumingiana** Decne. l. c. 643.

(2221 *Meyer*) December; (2066 *Borden*) October. In thickets below 100 m. Endemic.

3. DISCHIDIA R. Br.

1. **D. pectenoides** Pearson, Journ. Linn. Soc. Bot. 35 (1902) 377. *D. lanceolata* Vidal, Sinopsis, Atlas (1883), *t. 68, f. E.*, non Decne.

(2735 *Borden*) March; (49, 1279 *Whitford*) April, May; (2566 *Merrill*) June. In thickets, usually on dead bamboo, below 100 m. Endemic.

2. **D. purpurea** Merr. Govt. Lab. Publ. 17 (1904) 39.

(1182 *Whitford*) March; (3736 *Merrill*) January. On trees, exposed ridges in the mossy forest at about 1,200 m. Endemic.

4. DISCHIDIOPSIS Schlechter.

1. **D. philippinensis** Schlechter in Perk. Frag. Fl. Philip. (1904) 128.
(3809 *Merrill*) April, 1904. In thickets below 50 m. Endemic.

5. HOYA R. Br.

1. **H. cumingiana** Decne. l. c. 636.
(311 *Whitford*) May. An epiphyte in forests at 700 m. Endemic.
This species is abundant in the region of *Pinus insularis*, northern Luzon, where it is always found on bowlders, outcroppings, and cliffs.
2. **H. luzonica** Schlechter l. c. 130.
(2565 *Merrill*) June. In thickets along the river at 150 m. Endemic.
3. **H. multiflora** Blume; Hook. f. l. c. 52.
(129 *Barnes*) January; (2330 *Borden*) December; (1047, 1258 *Whitford*) January, May; (2264 *Meyer*) December. Epiphytic, 75 to 150 m. Malayan Peninsula and Archipelago.

6. MARSDENIA R. Br.

1. **M. philippinensis** Schlechter l. c. 133.
(3315 *Merrill*) October; (6147 *Leiberg*) July. In thickets below 100 m. Endemic.

In addition to the above *Asclepiadaceæ*, 9 other distinct species from the Lamao region are represented in our herbarium, but as duplicates of these are in the hands of Dr. R. Schlechter for identification, no attempt has here been made to determine them.

TUBIFLORÆ.

CONVOLVULACEÆ.

1. RIVEA Choisy.

1. **R. barnesii** Merr. Govt. Lab. Publ. 17 (1904) 40.
(68 *Barnes*) November. In thickets at 30 m. Endemic.
2. **R. luzonensis** Hallier f. Bull. Herb. Boiss. 6 (1898) 715.
(60, 351 *Barnes*) October, March; (2253, 2417 *Meyer*) December, January; (2048, 2391 *Borden*) October, January; (1035 *Whitford*) January; (3120 *Merrill*) October. In thickets along the stream 25 to 500 m. Endemic.

2. QUAMOCLIT Tournef.

1. **Q. vulgaris** Choisy; DC. Prod., 9 (1845) 336.
(3097 *Merrill*) October. In thickets below 100 m., introduced from tropical America, now spontaneous and widely distributed in the Philippines.

3. IPOMŒA Linn.

1. **I. batatas** (Linn.) Lam.; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 202.
Occasionally cultivated about Lamao, generally cultivated in tropical and subtropical regions. Sp.-Fil., *Camote*.
2. **I. blancoi** Choisy l. c. 389.
(1606 *Borden*) August. In thickets below 100 m., widely distributed in the Philippines.
3. **I. obscura** (Linn.) Ker; Clarke l. c. 207.
(3099 *Merrill*) October. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, and Malaya.
4. **I. paniculata** (Linn.) R. Br. *I. digitata* Linn.; Clarke l. c. 202.

(2020 *Borden*) October; (3288 *Merrill*) October. In thickets on the seashore. Tropics generally.

5. I. **pes-capræ** (Linn.) Roth. *I. biloba* Forsk.; Clarke l. c. 212.

(2069 *Borden*) October; (2293 *Meyer*) December; (*Whitford*) April. Sandy seashore. Tropical shores of both hemispheres.

4. MERREMIA Dennst.

1. **M. gemella** (Burm.) Hallier f. *Convolvulus gemellus* Burm.; *Ipomœa gemella* Roth; Choisy l. c. 380.

(2714 *Borden*) February; (2502 *Meyer*) January. In thickets below 100 m. Tropical Asia and Malaya.

2. **M. hastata** (Lam.) Hallier, Bot. Jahrb. **16** (1893) 552.

(3105 *Merrill*) October; (6119 *Leiberg*) July; (403 *Whitford*) June; (7030 *Elmer*) November; (2503 *Meyer*) January. Abundant in thickets below 100 m., widely distributed in the Philippines. Tropics generally.

3. **M. umbellata** (Meyer) Hallier, f. l. c., var. **orientalis** Hallier f.

(*Whitford*) April. In thickets below 100 m., widely distributed in the Philippines.

5. HEWITTIA W. et A.

1. **H. bicolor** (Vahl.) Wight; Clarke l. c. 216.

(1913 *Borden*) September. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, and Malaya.

6. ERYCIBE Roxb.

1. **E.** sp. (?)

(3717 *Merrill*) January. In forests at 600 m., fruiting specimen only.

BORRAGINACEÆ.

1. CORDIA Linn.

1. **C. blancoi** Vidal; Merr. Govt. Lab. Publ. **35** (1906) 61.

(1262 *Whitford*) May; (768, 1267, 1273 *Borden*) May, July; 191 *Merrill*) Decades Philip. Forest Fl., coll *Borden*, July. In thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Anonang*.

2. EHRETIA Linn.

1. **E. microphylla** Lam. *E. buxifolia* Roxb.; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 144.

(2538 *Merrill*) June; (1603 *Borden*) August; (6850 *Elmer*) November. In thickets below 100 m., widely distributed in the Philippines. British India and Malaya. T., *Cha, Cha bundoc*.

2. **E. philippinensis** A. DC. in DC. Prodr. **9** (1845) 504.

(2103 *Borden*) November; (6830 *Elmer*) November. In forests at about 300 m. Endemic.

3. TOURNEFOURTIA Linn.

1. **T. sarmentosa** Lam.; A. DC. l. c. 516.

(2525 *Merrill*) June; (15 *Whitford*) April; (2844 *Meyer*) March. In thickets and forests along streams 100 to 900 m. Malaya and Australia.

4. HELIOTROPIUM Linn.

1. **H. indicum** Linn.; Clarke l. c. 152.

(1954 *Borden*) October. A weed in waste places, widely distributed in the Philippines. Tropics generally. Sp.-Fil., *Trompa elefante*.

VERBENACEÆ.

1. CALLICARPA Linn.

1. **C. bicolor** Juss.; Schauer in DC. Prodr. **11** (1857) 642.

(1484 *Ahern's collector*) July. In forests. Malaya and Australia.

2. **C. blancoi** Rolfe Journ. Linn. Soc. Bot. **21** (1884) 315.

(2520 *Meyer*) February; (55 *Barnes*) October; (2522 *Merrill*) June; (404 *Whitford*) June. In thickets below 100 m. Endemic. T., *Tubang dalag.*

The specimens cited above agree with the figure cited by Rolfe as representing this species, but are quite distinct from No. 1283 *Cuming*, which is referred by Schauer to *Callicarpa bicolor* Juss., and which species Rolfe states must be excluded from the Philippine flora.

3. **C. formosana** Rolfe Journ. Bot. **20** (1882) 358.

(6000 *Leiberg*) July. In forests at about 80 m. Formosa.

4. **C. erioclona** Schauer in DC. Prodr. **11** (1857) 643.

(2536 *Merrill*) June; (1595 *Borden*) August; (6018 *Leiberg*) July; (487 *Whitford*) July; (6647 *Elmer*) November. In thickets along streams below 150 m. Endemic.

2. PREMNA Linn.

1. **P. nauseosa** Blanco; Schauer l. c. 638.

(769, 1271, 1275, 1613 *Borden*) May, October; (6841 *Elmer*) November; (387 *Whitford*) June. In thickets below 100 m. Endemic. T., *Molauin aso.*

2. **P. odorata** Blanco; Schauer l. c. *P. restita* Schauer l. c. 631.

(2590 *Meyer*) February. In thickets below 100 m. Endemic. T., *Alagao.*

3. **P. cumingiana** Schauer l. c. 634.

(*Whitford*). In thickets below 100 m., widely distributed in the Philippines. Endemic.

4. **P. integrifolia** Linn.; Clarke in Hook. f. Fl. Brit. Ind. 4 (1885) 574.

(2043 *Borden*) September. In thickets along the seashore. British India to Malaya.

3. VITEX Linn.

1. **V. littoralis** Decne.; *V. timorensis* Walp.; Schauer l. c. 686.

(1243 *Whitford*) May; (771, 2022 *Borden*) October; (1445 *Ahern's collector*) August. In thickets near the seashore, widely distributed in the Philippines. Timor. T., *Malauin, Molave.*

2. **V. negundo** Linn.; Clarke in Hook. f. Fl. Brit. Ind. 4 (1885) 583.

(2035 *Borden*) October; (2276 *Meyer*) December. In thickets near the seashore, widely distributed in the Philippines. Tropical Asia and Malaya.

3. **V. ovata** Thunb. *V. trifolia* Linn. var. *unifoliolata* Schauer l. c. 683.

(1940 *Borden*) October. Sandy seashore. Tropical shores Asia and Malaya.

4. **V. turczaninowii** Merr. Govt. Lab. Publ. **35** (1906) 77.

(1335 *Borden*) May; (3059 *Borden*) May. In forests 100 to 150 m. Endemic. T., *Malausa.*

5. **V.** sp.

(*Whitford*). A large tree in forests, sterile specimens only.

4. GMELINA Linn.

1. **G. hystrix** Kurz; Clarke l. c. 582.

(6105 *Leiberg*) July; (362 *Barnes*) March; (395 *Whitford*) June; (1780 *Borden*) August. In open thickets below 100 m. Burma, Siam. T., *Calulut.*

5. CLERODENDRON Linn.

1. **C. blancoi** Naves; Merr. Govt. Lab. Publ. 35 (1906) 62.

(6012, 6115 *Leiberg*) July; (1609, 1915 *Borden*) August, September; (418 *Whitford*) June; (3089, 3866 *Merrill*) October, August. In thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Bagauac*.

2. **C. inerme** Gaertn.; Clarke l. c. 589.

(146 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, July. In tidal thickets. Tropical Asia and Malaya.

3. **C. intermedium** Cham.; Schauer l. c. 669.

(3153 *Merrill*) October; (2177 *Meyer*) December; (1324 *Borden*) July; (483 *Whitford*) July; (6678 *Elmer*) November. In thickets and damp places below 100 m., widely distributed in the Philippines. Endemic.

4. **C. quadriloculare** (Blanco) Merr. Govt. Lab. Publ. 35 (1906) 63.

(339 *Barnes*) February; (6767, 6762 *Elmer*) November; (3746 *Merrill*) January; (2521 *Meyer*) February. In forests 50 to 700 m. Endemic.

6. SYMPHOREMA Roxb.

1. **S. luzonicum** (Blanco) F.-Vill.; Perk. Frag. Fl. Philip. (1904) 3.

(343 *Barnes*) February; (2516 *Meyer*) January; (2549 *Borden*) February; (2 *Whitford*) April. In thickets along the river 75 to 150 m., widely distributed in the Philippines. Endemic.

7. AVICENNIA Linn.

1. **A. officinalis** Linn.; Clarke l. c. 604.

(140 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, July; (1265 *Whitford*) May. Mangrove swamps. Tropical shores of Asia, Malaya, and Polynesia. T., *Calapini*.

LABIATE.

1. SCUTELLARIA Linn.

1. **S. luzonica** Rolfe Journ. Linn. Soc. Bot. 21 (1884) 315.

(2217 *Meyer*) December; (2110 *Borden*) November; (6984 *Elmer*) November; (*Copeland*) January; (203 *Whitford*) May; (3114 *Merrill*) October. On exposed ridges, mossy forest 600 to 1,200 m., occasionally along the river below to 100 m. Formosa.

2. LEUCAS R. Br.

1. **L. zeylanica** (Linn.) R. Br.; Hook. f. Fl. Brit. Ind. 4 (1885) 689.

(6093 *Leiberg*) July; (514 *Whitford*) July; (3095 *Merrill*) October. In open grass lands below 100 m. Tropical Asia and Malaya.

3. ANISOMELIS R. Br.

1. **A. indica** (Linn.) O. Kuntze. *A. orata* R. Br.; Hook. f. l. c. 672.

(2184 *Meyer*) December. In thickets and open places below 100 m. Tropical Asia and Malaya.

4. HYPTIS Jacq.

1. **H. brevipes** Poir.; Benth. l. c. 107.

(3270 *Merrill*) October. In open places below 100 m., widely distributed in the Philippines, introduced from tropical America. Malaya, tropical Africa, and Asia.

2. **H. spicigera** Lam.; Benth. l. c. 87.

(3293 *Merrill*) October. With the preceding, introduced from tropical America.

3. **H. suaveolens** (Linn.) Poir.; Benth. l. c. 126.

(1782 *Borden*) August: (*Whitford*) July. With the preceding, distribution of *Hyptis brevipes* Poir.

5. COLEUS Lour.

1. **C. multiflorus** Benth. l. c. 75.

(6720 *Elmer*) November; (1582, 2115, 3068 *Borden*) August, May; (185 *Whitford*) May; (3741 *Merrill*) January. On exposed ridges in the mossy forest and in ravines 600 to 1,200 m. Endemic.

SOLANACEÆ.

1. CAPSICUM Linn.

1. **C. frutescens** Linn.; Prain in King & Gamble, Journ. As. Soc. Beng. 74 (1905) 2: 337.

(6846 *Elmer*) November. In thickets and waste places near Lamao. Commonly cultivated and subspontaneous throughout the Philippines. Tropical Asia and Malaya. T., *Sili*.

2. SOLANUM Linn.

1. **S. ferox** Linn.; Clarke l. c. 233.

(2233 *Meyer*) December; (6732 *Elmer*) November; (515 *Whitford*) July. Usually a weed in cultivated grounds below 100 m., also on recently burned places near the summit of the mountain. Tropical Asia.

2. **S. cumingii** Dun. in DC. Prodr. 13 (1852) 1: 363.

(1948 *Borden*) October. In open places and thickets below 100 m.

Reduced to *S. melongena* Linn., by Clarke, but quite different from the cultivated forms of that species.

3. **S. nigrum** Linn.; Clarke l. c. 229.

(2070 *Borden*) October. In thickets and open lands below 100 m. Temperate and tropical regions of the world.

4. **S. torvum** Swartz; Clarke l. c. 234.

(2285 *Meyer*) December; (2336 *Borden*) December. In thickets below 100 m. Malaya, tropical Asia, and America.

5. **S. verbascifolium** Linn.; Clarke l. c. 230.

(7029 *Elmer*) November; (2523 *Meyer*) February. In thickets below 100 m. Malaya, tropical Asia, Australia, and America.

3. NICOTIANA Linn.

1. **N. tabacum** Linn.; Clarke l. c. 245.

(1351 *Whitford*) September. In Negrito "caingins" (clearings) at 400 m., not spontaneous. Native of tropical America, cultivated in most temperate and tropical countries. Sp.-Fil., *Tabaco*.

SCROPHULARIACEÆ.

1. LIMNOPHILA R. Br.

1. **L. gratissima** Blume; Hook. f. Fl. Brit. Ind. 4 (1884) 268.

(2268 *Meyer*) December. In shallow, stagnant water and along streams below 50 m. British India to Japan, Malaya, and Australia.

2. TORENIA Linn.

1. **T. peduncularis** Benth.; Hook. f. l. c. 276.

(6743 *Elmer*) November. In thickets below 100 m. British India and Malaya.

3. VANDELLIA Linn.

1. **V. crustacea** (Linn.) Benth.; Hook. f. l. c. 279.

(2062 *Borden*) October; (6780 *Elmer*) November; (3267 *Merrill*) October. In open grass lands below 100 m. Tropics of the Old World, introduced into the New.

2. **V. scabra** Benth.; Hook. f. l. c. 281.

(3266 *Merrill*) October. With the preceding. Tropical Asia, Africa, and Malaya.

3. **V.** sp.

(2027 *Borden*) October. On bluffs near the seashore.

4. BONNAYA Link. et Otto.

1. **B. brachiata** Link et Otto.; Hook. f. l. c. 284.

(6781 *Elmer*) November; (3106 *Merrill*) October. In open waste lands and grassy places below 100 m. British India and Malaya.

5. SCOPARIA Linn.

1. **S. dulcis** Linn.; Clarke l. c. 289.

(*Whitford*) April; (*Copeland*) January. In thickets and open places below 100 m., widely distributed in the Philippines. Tropics generally, a native of tropical America.

BIGNONIACEÆ.

1. OROXYLUM Vent.

1. **O. indicum** (Linn.) Vent.; Clarke in Hook. f. Fl. Brit. Ind. 4 (1884) 278.

(*Whitford*) June; (6863 *Elmer*) November; (1277, 1280, 1301, 1309 *Borden*) July. In thickets below 100 m. Tropical Asia and Malaya. T., *Pincapincahan*.

2. RADERMACHERA Hassk.

1. **R. banaibana** Bureau in Baill. Adansonia 2 (1861–62) 194. *Stereospermum banaibanai* Rolfe.

(185, 548 *Barnes*) January, March; (2424 *Meyer*) January; (24 *Whitford*) April; (81 *Merrill*) Decades Philip. Forest Fl. coll. *Barnes*, March, distributed as *S. seemannii* Rolfe. (725, 1541, 1542, 1540, 1550, 1566, 2469 *Borden*) May to January. In forests 75 to 150 m. Endemic. T., *Banaibanai*.

PEDALIACEÆ.

1. SESAMUM Linn.

1. **S. indicum** Linn.; Clarke in Hook. f. Fl. Brit. Ind. 4 (1884) 387.

(1914 *Borden*) September. In an old clearing at about 20 m., occasionally cultivated and subspontaneous in the Philippines, cultivated in all tropical countries. T., *Linga*.

GESNERIACEÆ.

1. TRICHOSPORUM Don.

1. **T. philippinensis** (Clarke) O. Kuntze. *Aeschynanthus philippinensis* Clarke in DC. Monog. Phan. 5 (1883) 39.

(3748, 3855 *Merrill*) January, August. In the mossy forest, exposed ridges 1,000 to 1,200 m. Endemic.

2. CYRTANDRA Forst.

1. **C. incisa** Clarke l. c. 250.
(2409 *Meyer*) January; (29, 1112 *Whitford*) May, February. In ravines along the river 400 to 800 m. Endemic.

ACANTHACEÆ.

1. THUNBERGIA Linn. f.

1. **T. fragrans** Roxb.; Clarke in Hook. f. Fl. Brit. Ind. 4 (1884) 390.
(*Merrill*). In thickets below 100 m. Tropical Asia, Malaya, and Australia.

2. BLECHUM P. Br.

1. **B. brownei** Juss.; Nees in DC. Prodr. 11 (1857) 467.
(91 *Whitford*) April. In thickets and waste places below 100 m., widely distributed in the Philippines, generally considered to have been introduced from tropical America.

3. HEMIGRAPHIS Nees.

1. **H. parabolica** (Nees) F.-Vill.; *Ruellia parabolica* Nees l. c. 144.
(495 *Whitford*) July, 1904. In thickets along the river below 100 m. Endemic.
2. **H. rapifera** Hallier f. ex Koorders in Meded. 's Lands. Plantent. 19 (1898) 555.
(6667 *Elmer*) November; (3150 *Merrill*) October; (438 *Whitford*) June; (1930 *Borden*) October. On ridges in the mossy forest at 1,200 m., extending below along the river to 100 m. Celebes.

4. STROBILANTHES Blume.

1. **S. merrillii** C. B. Clarke, Govt. Lab. Publ. 35 (1906) 92.
(6815 *Elmer*) November; (1581, 2094 *Borden*) August, September; (155 *Whitford*) May; (3713 *Merrill*) January. On exposed ridges in the mossy forest above 1,200 m. Endemic.
2. **S. pluriformis** C. B. Clarke, l. c. 93.
(3956 *Merrill*) March; (1092 *Whitford*) February. With the preceding. Endemic.

5. RUELLIA Linn.

1. **R. repens** Linn.; Clarke in Hook. f. l. c. 412.
(3110 *Merrill*) October; (2054 *Borden*) October. (411 *Whitford*) June. In thickets below 100 m. China, Malayan Peninsula and Archipelago.

6. LEPIDAGATHIS Willd.

1. **L. incurva** D. Don. *L. hyalina* Nees, l. c. 252.
(493 *Whitford*) July; (3119 *Merrill*) October. On banks along the river below 150 m. British India to China and Malaya.

7. BARLERIA Linn.

1. **B. prionitis** Linn.; Clarke in Hook. f. l. c. 482.
(2343 *Borden*) December. In thickets and waste places below 100 m. Tropical Asia, Africa, and Malaya.

8. GYMNOSTACHYUM Nees.

1. **G. affine** Nees, l. c. 94.

(2732 *Borden*) March; (300 *Copeland*) January. In forests 75 to 150 m. Endemic.

9. ACANTHUS Linn.

1. **A. ilicifolius** Linn.; Clarke l. c. 481.

(2232 *Meyer*) December. In tidal thickets, common. Seashores British India to Malaya and Australia. T., *Dolariu.*

10. ERANTHEMUM Linn.

1. **E. bicolor** Schrank; Nees l. c. 456.

(2267 *Meyer*) December; (2365 *Borden*) January; (7021 *Elmer*) November; (44 *Whitford*) April. Abundant in thickets below 100 m., widely distributed in the Philippines. Malaya.

2. **E. curtatum** C. B. Clarke, Govt. Lab. Publ. 35 (1906) 89.

(3952 *Merrill*) March; (2727 *Borden*) March. In forests 100 to 200 m. Endemic.

11. HYPOESTES R. Br.

1. **H. cinerea** C. B. Clarke, l. c. 89.

(2292 *Meyer*) December. In thickets below 100 m. Endemic.

2. **H. subcapitata** C. B. Clarke, l. c. 90.

(751, 2367, 2561 *Borden*) May, February; (2288 *Meyer*) December; (173 *Barnes*) January. In thickets and recent clearings 100 to 150 m. Endemic.

12. JUSTICIA Linn.

1. **J. gendarussa** Linn.; Clarke in Hook. f. l. c. 532.

(2426 *Meyer*) January; (188 *Barnes*) January; (2485 *Borden*) January; (25 *Whitford*) April. Along streams in forests 25 to 200 m., certainly indigenous, rarely or never cultivated in the Philippines.

2. **J. luzonensis** C. B. Clarke Govt. Lab. Publ. 35 (1906) 91.

(2363 *Borden*) January; (3117, 3253 *Merrill*) October; (6727 *Elmer*) November; (6151 *Leibery*) July; (*Copeland*) January. In forests and on ridges 100 to 1,200 m. Endemic.

13. ROSTELLULARIA Reichb.

1. **R. procumbens** (Linn.) Nees l. c. 371.

(2029 *Borden*) October. In thickets below 100 m. Tropical Asia to Malaya and Australia.

RUBIALES.

RUBIACEÆ.[1]

1. OLDENLANDIA Linn.

1. **O. filifolia** Elmer in herb.

A slender erect, simple or somewhat branched annual 5 to 14 cm. high. Stems and branches slender, striate, glabrous or slightly pubescent. Leaves linear or

[1] Mr. A. D. E. Elmer, formerly of this Bureau, had partly worked over the *Rubiaceæ* represented in the herbarium, previous to his transfer to another Bureau, and his identifications have been accepted where they are apparently correct.

filiform, 1 to 2.5 cm. long, 1.5 mm. wide or less, sessile, glabrous or scabrous above, slightly pubescent beneath, the margins recurved; stipules united, hyaline, with two or three filiform segments 2 to 3 mm. long. Flowers sessile in the leaf axils, or shortly pediceled, solitary or 2 to 3 in each axil. Calyx 3 mm. long, ciliate, 4-lobed, the lobes recurved, acuminate. Corolla white, tubular, 4 mm. long, pubescent inside, 4-lobed, the segments oblong, obtuse, 1.5 mm. long, ultimately spreading. Stamens 4, the filaments glabrous, 1.5 mm. long. Ovary globose; style persistent, slender, 3 mm. long, glabrous, the 2 stigmatic arms strongly recurved. Capsule about 2 mm. long, hispid-ciliate, 2-celled. Seeds numerous, minute, brown, angular.

(3295 *Merrill*) October, 1903. On bluffs along the seashore, not common.

2. **O. nudicaulis** Roth.; Hook. f. Fl. Brit. Ind. 3 (1880) 70.

(3303 *Merrill*) October. Along trails in forests at 100 m. Tropical Asia and Malaya.

3. **O. paniculata** Linn.; Hook. f. l. c. 69.

(489 *Whitford*) July; (6020 *Leiberg*) July; (1928 *Borden*) October; (2494 *Merrill*) June. In thickets and open forests 50 to 150 m. Tropical Asia to Malaya and Polynesia.

2. HEDYOTIS Linn.

1. **H. congesta** R. Br.; Hook. f. l. c. 61.

(1224, 1579, 1583, 2379, 3061 *Borden*) June, May; (6822 *Elmer*) November; (3243, 3753, 3894 *Merrill*) October, August, January; (287 *Copeland*) February; (212 *Whitford*) May. In forests 100 to 1,200 m. Malayan Peninsula and Archipelago.

Possibly two species are included in the above, the material from the higher altitudes being somewhat different from specimens collected in the lower forests. The identification has been made from the description only, the material having been named by Mr. Elmer, in herb., *Knoxia corymbosa*.

2. **Hedyotis elmeri** Merrill, sp. nov.

A shrub 1 to 3 m. high, glabrous or nearly so throughout. Branches brown or greenish, glabrous, more or less 4-angled. Leaves oblong-ovate, submembranous, often yellowish when dry, 5 to 10 cm. long, 2 to 4.5 cm. wide, glabrous, shining above, the base acute, the apex blunt acuminate; nerves 6 to 7 on each side of the midrib, somewhat prominent beneath, loosely anastomosing, the reticulations lax; petioles 0.5 to 3 cm. long; stipules pectinate or tri-partite, the lobes slender, 2 to 3 mm. long, glandular at the apex. Cymes terminal and axillary, many flowered, glabrous, usually about 6 cm. long, the peduncles 3 to 4 cm. long. Calyx glabrous, 4 to 5 lobed, 3.5 mm. long, the lobes ovate, acute, 1 mm. long; pedicels about 2 mm. long. Corolla white, more or less funnel-shaped, 6 to 7 mm. long, glabrous outside, densely hairy within, 4 to 5 lobed, the lobes oblong ovate, 3 mm. long, acute. Stamens equaling the corolla; anthers linear oblong, 2 mm. long. Fruit oblong ovoid, 4.5 mm. long including the persistent calyx lobes, glabrous, separating into 2 cocci. Seeds 1 mm. long, black, angular.

(793, 2113 *Borden*) November, May; (2210 *Meyer*) December; (151 *Whitford*) May; (3227 *Merrill*) October; (6834, 6979 *Elmer*) November. On exposed ridges in the mossy forest above 1,000 m. *Hedyotis stylosa* Elmer, in herb., non R. Br.

3. OPHIORRHIZA Linn.

1. **O. oblongifolia** DC. l. c. 415.

(205, 258, 350, 509 *Whitford*) May, July; (2178 *Meyer*) December. On damp, shaded banks along the river 50 to 800 m. Endemic.

4. ARGOSTEMMA Wall.

1. **A. neesianum** Walp. Nov. Act. Acad. Cur. **19** (1843) Suppl. 1: 349.

(3126 *Merrill*) October; (6657 *Elmer*) November; (97, 183, 435 *Whitford*) April, June; (290 *Copeland*) January. On damp mossy ledges along streams 100 to 600 m. Endemic.

5. WENDLANDIA Bartl.

1. **Wendlandia brachyantha** Merrill, sp. nov.

A shrub or small tree about 5 m. high. Branches brown, glabrous, striate, the younger parts often densely ferruginous pubescent. Leaves oblong ovate to ovate lanceolate, coriaceous, entirely glabrous, or the midrib beneath somewhat pubescent, 9 to 12 cm. long, 3 to 5 cm. wide, brown when dry, shining on both surfaces but somewhat paler beneath, entire, short acuminate, the base acute or obscurely rounded; nerves prominent beneath, 10 to 12 pairs; petioles 1 to 1.5 cm. long, pubescent or glabrous; stipules entire. Panicles terminal, pyramidal, many flowered, 12 to 15 cm. long, very densely ferruginous pubescent in anthesis, becoming more or less glabrous in infrutescence, the lower branches about 5 cm. long, the upper gradually shorter. Flowers white, sessile or short pedicelled, about 4 mm. long, each subtended by one or two linear pubescent bracteoles. Calyx cup-shaped, 1.7 mm. long, densely pubescent, 5-toothed, the teeth short, acute. Corolla, including the lobes, 3 mm. long, glabrous or with few ciliate hairs on the inner side of the corolla lobes, the tube about 2 mm. long, the 5 lobes elliptical, rounded, reflexed, about 1 mm. long. Stamens equaling the corolla lobes; anthers 1 mm. long. Style 2 mm. long, glabrous; stigmas obovoid. Fruit ovoid or subglobose, about 2 mm. in diameter, pubescent with few short scattered hairs, crowned by the persistent calyx lobes.

(449 *Whitford*) July, 1904 (type). On exposed ridges in the mossy forests at 1,100 m. Also No. 3834 *Merrill*, Mount Arayat, Province of Pampanga, Luzon, May, 1904, at an altitude of 870 m.

A species at once distinguishable from *Wendlandia luzoniensis* DC., by its smaller glabrous leaves and very short flowers. *Wendlandia paniculata* Elmer, in herb., non DC.

6. UNCARIA Schreb.

1. **U.** sp.

(*Whitford*). In thickets below 100 m., sterile specimen.

7. NAUCLEA Linn.

1. **N. media** Haviland, Journ. Linn. Soc. Bot. **33** (1897) 56.

(3125 *Merrill*) October; (2817 *Meyer*) March. In forests, river cañon 100 to 450 m. Endemic.

2. **N. philippinensis** (Vid.) Haviland l. c. 52.

(2625 *Meyer*) February; (1158 *Whitford*) March. In forests 600 to 900 m. Endemic.

8. SARCOCEPHALUS Afzel.

1. **S. cordatus** Miq.; Haviland l. c. 27.

(374 *Whitford*) June; (727, 1263, 1386, 1391, 1568 *Borden*) May to August. In thickets and forests below 150 m., widely distributed in the Philippines. Southeastern Asia to Malaya and Australia. T., *Bancal*.

9. MUSSÆNDA Linn.

1. **M. grandiflora** (Meyen) Rolfe, Journ. Linn. Soc. Bot. **21** (1884) 311.

(6095 *Leiberg*) July; (1220 *Borden*) June; (388, 524 *Whitford*) June, July;

(6673 *Elmer*) November. In thickets below 100 m., exceedingly variable and perhaps not distinct from the widely distributed *Mussaenda frondosa* Linn.

2. **M. anisophylla** Vid. Phan. Cuming. Philip. (1885) 178.

(2508 *Merrill*) June; (3020 *Meyer*) May. In forests 150 to 300 m. Endemic.

10. UROPHYLLUM Wall.

1. **Urophyllum bataanense** Elmer in herb.

A shrub 1 to 3 m. high. Branches light brown or grayish, glabrous, terete or obscurely angled. Leaves opposite, subcoriaceous, ovate lanceolate to elliptical lanceolate, short, sharp acuminate, the base acute, glabrous except for few scattered ciliate hairs on both surfaces, shining, 9 to 16 cm. long, 3 to 7 cm. wide; nerves 10 to 13 on each side of the midrib; prominent beneath, the reticulations distinct; petioles 2 to 3.5 cm. long; stipules ovate, acute or acuminate, membranous, ciliate above, about 1.5 cm. long, caducous, the stipular scar ciliate. Flowers axillary, solitary, or two or three in a short raceme, subtended by short ciliate bracts, the pedicels about 1 cm. long, glabrous. Calyx glabrous, campanulate, thick, 5 mm. long, the teeth broad, short, obscure. Corolla glabrous outside, 8 mm. long, the lobes about 4 mm. long, the tube 3 to 4 mm. in diameter below, constricted above at the pilose throat, the 5 segments reflexed. Filaments 5, alternating with the corolla segments. Stigma 3-lobed. Fruit glabrous, 5-celled with many seeds in each cell, subglobose or somewhat compressed, about 5 mm. in diameter, the seeds subglobose, pitted, about 0.5 mm. in diameter.

(1335, 2080 *Borden*) July, November, 1904; (2213 *Meyer*) December, 1904; (461 *Whitford*) July, 1904; (3186, 3874 *Merrill*) October, 1903, August, 1904; (6810 *Elmer*) November, 1904. On exposed ridges in the mossy forest above 900 m.

2. **Urophyllum acuminatum** Merrill, sp. nov.

A shrub 3 to 5 m. high. Branches slender, light gray, pubescent with appressed hairs. Leaves opposite, lanceolate to oblong lanceolate, long, slender acuminate, the base acute, submembranous, the nerves and midrib beneath, and frequently also above, appressed pubescent, becoming more or less glabrous, usually pale when dry and somewhat shining, 5 to 8 cm. long, 1.5 to 3 cm. wide; nerves about 6 on each side of the midrib, curved-ascending, prominent beneath; petioles 1 cm. long or less, slender, pubescent. Flowers solitary or in very short 3 or 4 flowered axillary cymes, white, subsessile, or the pedicels 2 to 3 mm. long, subtended by 2 or 3 lanceolate pubescent bracts about 2 mm. long. Calyx cup-shaped, obscurely toothed, very slightly pubescent, 3 mm. long. Corolla including the lobes 5 mm. long, glabrous outside, the tube 2 mm. long, densely villous at the throat inside, the lobes usually 6, spreading or reflexed, oblong ovate, acute, 3 mm. long. Anthers 1 mm. long. Fruit subglobose, glabrous, fleshy, about 5 mm. in diameter, purplish when mature, the numerous seeds reddish, subglobose, minutely pitted, 0.5 mm. in diameter.

(236 *Whitford*) May, 1904; (6047 *Leiberg*) July, 1904; (1334 *Borden*) July, 1904; (3188 *Merrill*) October, 1903; (2825 *Meyer*) March, 1905; (6814 *Elmer*) November, 1904. In the mossy forest on exposed ridges above 900 m. *Urophyllum streptopodium* Elmer in herb., non Wall.

11. STYLOCORYNA Cav., non W. et A.

1. **S. macrophylla** Bartl. in DC. Prodr. 4 (1830) 377. (?)

(2573, 3030 *Borden*) February, May; (1245 *Whitford*) May. In forests 150 to 350 m. Endemic.

12. RANDIA Houst.

1. **R. angatensis** (Blanco) F.-Vill. Nov. App. (1883) 108.

(2604 *Meyer*) February. In forests at 900 m. Endemic.

2. **R. cumingiana** Vidal, Phan. Cuming. Philip. (1885) 179.

(1779, 1958, 2123, 3049 *Borden*) August May; (6871 *Elmer*) November; (3090 *Merrill*) October; (1458 *Ahern's collector*) August. In thickets below 100 m. Endemic.

3. **R. densiflora** (Wall.) Benth.; Hook. f. Fl. Brit. Ind. 3 (1880) 112.

(6873 *Elmer*) November; (2047 *Borden*) October; (1472 *Ahern's collector*) August. In forests at about 200 m. Tropical Asia to Malaya and Australia.

4. **Randia whitfordii** (Elmer).

A small tree 7 to 10 m. high. Branches glabrous, light gray. Leaves opposite, subcoriaceous, glabrous, oblong to narrowly elliptical-lanceolate or oblong-lanceolate, acuminate, the acumen abrupt, rather sharp, the base acute, 8 to 15 cm. long, 2.5 to 6 cm. wide, usually pale when dry and slightly shining; nerves 5 to 7 on each side of the midrib, somewhat prominent beneath, curved-ascending; petioles glabrous, about 8 mm. long; stipules coriaceous, 5 mm. long, sharply acuminate. Flowers fascicled or in very short congested axillary cymes, white, very fragrant, 3 to 5 or more in each fascicle, the inflorescence glabrous. Calyx cup-shaped, 2 mm. long, short pedicelled or sessile, with 4 minute distant teeth. Corolla tube 4 mm. long, glabrous outside, densely hirsute within except at the base, the lobes 4, spreading, oblong, about 9 mm. long, 4 mm. wide, acute or acuminate, glabrous outside, more or less pilose on the inner surface. Stamens 4; filaments glabrous, 2 mm. long; anthers oblong-lanceolate, 4 mm. long. Ovary 2-celled, ovules several in each cell. Stigma bifid, the arms flattened. Fruit usually solitary in axils of fallen leaves on 5 mm. long bracteate peduncles, globose, 2.5 cm. in diameter, firm, glabrous, minutely roughened, marked at the apex with a large circular ring, the calyx not persistent, the pericarp hard, rather brittle when dry, 5 to 8 mm. thick, 2-celled, the placenta very thin. Seeds 9 to 12 in each cell, irregularly strongly flattened, circular in outline, about 5 mm. in diameter, brown, strongly imbricated, pulp wanting.

(2787, 2998 *Meyer*) February, May; (1212, 2929 *Borden*) June, May; (3725 *Merrill*) January; (202, 1123 *Whitford*) May; (6643 *Elmer*) November. Also from the Province of Rizal, Luzon (1726 *Merrill*); (No. 2988 *Ahern's collector*) *Gardenia whitfordii* Elmer in herb., *Randia fasciculiflora* Elmer in herb., in part. In forests 150 to 700 m.

5. **R. fitzalani** F. Muell. in Benth. Fl. Austr. 3 (1866) 411.

(2279, 2996 *Meyer*) August; (3031 *Borden*) May; (360, 1017, 1057, 1239 *Whitford*) May; (586 *Barnes*) March. In forests 100 to 700 m. Australia.

I have been unable to verify Mr. Elmer's identification of the above material, but as the specimens agree rather closely with the description of the above species, his determination is provisionally accepted.

6. **Randia uncaria** Elmer, n. sp. in herb.

Scandent, 6 to 8 m. high, the branches with stout recurved spines about 1 cm. long. Branches glabrous, slender, light gray or brown. Leaves opposite, equal, glabrous throughout, oblong to oblong-ovate or oblong-lanceolate, rather sharply acuminate, the base acute, 10 to 18 cm. long, 3.5 to 6 cm. wide, subcoriaceous; nerves about 8 on each side of the midrib, prominent beneath, anastomosing, the reticulations lax; petioles about 1 cm. long, usually rugose; stipules glabrous, 4 mm. long, acuminate; spines axillary or in the axils of fallen leaves on the older branches, glabrous. Inflorescence terminal, cymosely paniculate, the peduncle short, stout, the branches few, short, few flowered, the branches and pedicels subtended by small bracts and bracteoles. Calyx tubular, 7 mm. long, very

slightly pubescent 5 to 7 toothed, the slender teeth less than 2 mm. long. Corolla white, the tube slender, 2 to 2.5 cm. long, about 2 mm. in diameter, glabrous outside, pubescent inside above the middle, the lobes 5, spreading, 12 mm. long, 4 mm. wide, obtuse or acute. Stamens 5, the filament very short, slender, pubescent; anthers linear, 6 mm. long, acuminate, the base sagittate. Style glabrous, the stigma cleft into 2 flattened arms. Fruit subglobose or ovoid, about 1 cm. in diameter, 2-celled. Seeds triquetrous, black, 3 to 5 in each cell, embedded in a pulpy mass.

(1751, 2730 (type) *Borden*) August, March; (1251 *Whitford*) May; (3943 *Merrill*) March; (7001 *Elmer*) November; (6006 *Leiberg*) July. In forests 100 to 400 m. The flowers very fragrant. Apparently closely related to *R. longiflora* Lam.

13. GARDENIA Ellis.

1. **G. barnesii** Merr. Govt. Lab. Publ. 17 (1904) 47.

(163 *Barnes*) January; (2788 *Meyer*) February; (1235 *Whitford*) May; (2916 *Borden*) March; (6714 *Elmer*) November. In forests 100 to 500 m. Endemic.

2. **G.** sp.

(1479 *Ahern's collector*) August; (2041 *Borden*). In thickets on bluffs by the seashore, in fruit only. Considered by Mr. Elmer to be a distinct, undescribed species of *Gardenia*, but the material, with fruit only, is too imperfect to warrant a description.

14. TRICALYSIA A. Rich.

1. **T.** sp.

(1061 *Whitford*) January; (1374, 2928 *Borden*) July, March. In forests 130 to 500 m., considered by Mr. Elmer to be a distinct undescribed species, but the material is too imperfect to warrant description at this time.

2. **T.** sp.

(1507 *Ahern's collector*) July; (6900 *Elmer*) November; (1306 *Whitford*) June; (3113 *Meyer*) May. In forests on exposed ridges above 900 m. A species apparently closely related to and possibly identical with *Diplospora singularis* Korth. *Randia fasciculiflora* Elmer in herb., in part.

15. PLECTRONIA Linn.

1. **P. peduncularis** (Cav.) Elmer, in herb. *Canthium pedunculare* Cav. Icon. 5 (1799) 21. *t. 436.*

(1221 *Borden*) June; (401 *Whitford*) June; (2545 *Merrill*) June. In thickets below 100 m. Endemic.

2. **P. mitis** (Bartl.) *Canthium mite* Bartl. in DC. Prodr. 4 (1830) 474.

(2234 *Meyer*) December; (7020 *Elmer*) November. In thickets below 100 m. Endemic.

3. **P. umbellata** (Bartl.) K. Sch. in Engl. und Prantl. Nat. Pflanzenfam. 4 (1891) 4: 92. *Myonima umbellata* Bartl. *Canthium villarii* Vidal. *Canthium gynochthodes* Baill.

(1807, 1808 *Borden*) September; (1452, 1456, 1459 *Ahern's collector*) July. In forests 100 to 200 m. Endemic.

Bentham and Hooker f. are frequently cited as the authority for the transfer of this species to *Plectronia*, but they only indicated and did not actually make the transfer. K. Schumann is the proper authority.

4. **Plectronia viridis** Merrill, sp. nov.

A small tree, 10 m. high or less. Branches slender, terete, glabrous, light brown or gray. Leaves opposite, glabrous, subcoriaceous, elliptical-ovate to ovate or elliptical-lanceolate, dull or slightly shining, pale green when dry, 6 to 11 cm.

long, 2 to 4 cm. wide, nerves 4 to 5 on each side of the midrib, ascending, distant, not or only obscurely anastomosing, the reticulations obsolete; petioles 5 to 8 mm. long; stipules oblong, 2 to 3 mm. long, deciduous, apex rather strongly, often caudate acuminate, the acumen blunt, the base acute or somewhat decurrent acuminate. Flowers pale green, somewhat fragrant, fasciculate, 3 to 6 in each axil, 4 to 5 mm. long, the pedicels slender, glabrous, 2 to 3 mm. long. Calyx short, broad, 5-toothed, glabrous, about 1 mm. long, 2 mm. in diameter. Corolla about 4.5 mm. long, the tube short, broad, not contracted, glabrous outside, villous within, about 2 mm. long, the lobes 5, about equaling the tube, reflexed, ovate or oblong-ovate, acute. Stamens 5; filaments villous, about 1 mm. long; anthers 1.5 mm. long. Ovary glabrous, 2-celled; style 1.5 mm. long, glabrous; stigma capitate, entire, ridged. Fruit yellow when mature, obovoid, or oblong-obovoid, glabrous, didynamous, fleshy, 1 to 1.3 cm. long, about 8 mm. in diameter, 2-seeded, the seeds narrowly oblong-ovoid, rugose, somewhat triquetrous, 8 or 9 mm. long.

(3945 *Merrill*) March, 1905 (type); (349 *Barnes*) February, 1904; (2587, 3000 *Meyer*) February, May, 1905; (731, 2560, 2751 *Borden*) May, 1904, February, March, 1905; (98, 298 *Whitford*) April, May, 1904. Abundant in forests 300 to 700 m. *Plectronia villarii* Elmer in herb., non K. Sch.

5. **P.** sp.

(1263 *Whitford*) May; (3036 *Borden*) May. In forests and thickets 80 to 130 m., material very imperfect.

16. TIMONIUS Rumph.

1. **T. arborea** Elmer n. sp. in herb.

A small tree 8 to 12 m. high. Leaves opposite, 7 to 16 cm. long, 2.5 to 6 cm. wide, oblong-lanceolate to broadly oblanceolate or elliptical oblanceolate, the apex acuminate, gradually narrowed below to the acute base, glabrous on both surfaces; nerves 6 to 7 on each side of the midrib, ascending, prominent beneath, the reticulations obscure, dense; petioles glabrous or very slightly pubescent, 0.5 to 1 cm. long; stipules 4 mm. long, acuminate, pubescent. Female flowers axillary, solitary, the pedicels 1.5 cm. long, pubescent. Calyx 6 mm. long, pubescent, subtended by two small bracteoles, the limb with 5 or 6 small teeth. Corolla pubescent outside, 13 mm. long, the tube cylindrical, about 9 mm. long, the lobes 6 to 8, spreading or reflexed, about 4.5 mm. long, oblong. Stamens 6 to 8, sessile, inserted on the corolla tube at about the middle, the anthers nearly 3 mm. long. Style equaling the corolla tube, glabrous, channeled, divided above into 5 or 6 linear branches. Fruit globose or ovoid, glabrous, about 1 cm. long, costate, the seeds many, subterete, more or less curved, about 7 mm. long.

(1248 *Whitford*) May, 1905; (1364 *Borden*) July, 1904; (1421 *Ahern's collector*) July, 1904. In forests 200 to 600 m. A species apparently related to *Timonius jambosella* Thwaites, differing, however, in many characters.

17. PAVETTA Linn.

1. **P. barnesii** Elmer n. sp. in herb.

A spreading shrub about 5 m. high. Leaves chiefly clustered at the ends of the branchlets, membranous, glabrous, turning black in drying, oblanceolate to oblong-obovate, opposite, 9 to 14 cm. long, 2.5 to 5 cm. wide, the apex usually slender acuminate, the base attenuate; nerves 7 to 9 on each side of the midrib, curved-ascending, rather prominent on both surfaces, the reticulations lax; petioles about 2 cm. long; stipules glabrous; subcoriaceous, acute, 5 mm. long, nearly as broad at the base. Inflorescence a terminal cymose panicle not exceeding the leaves, the lower branches subtended by broad bracts, glabrous or very

obscurely pubescent, the pedicels slender, 1 cm. long, ebracteolate. Calyx 3 mm. long, minutely pubescent outside, the teeth 4, short. Corolla white, straight or often curved, nearly 3 cm. long, slender, glabrous on the outside, the 4 broadly linear lobes spreading, obtuse, 8 mm. long. Stamens 4, inserted on the throat of the corolla; filaments very short; anthers linear, 12 mm. long, sagittate at the base. Style slender, glabrous except for the puberulous exserted portion, 2 cm. longer than the corolla tube. Fruit 5 mm. in diameter, globose, glabrous, black and strongly wrinkled when dry.

(1369, 2037 *Borden*) July, October, 1904; (2627 *Meyer*) February, 1905; (6788 *Elmer*) November, 1904 (type). Also No. 574 *Whitford*, Sariaya, Province of Tayabas, Luzon, August, 1904.

18. IXORA Linn.

1. **I. coccinea** Linn.; Hook. f. Fl. Brit. Ind. 3 (1880) 145.

(1270 *Whitford*) May; (6118 *Leiberg*) July; (1463 *Ahern's collector*) July; (2299 *Meyer*) December. In thickets near the seashore. British India and Malaya.

2. **I. cumingiana** Vidal, Phan. Cuming. Philip. (1885) 183, ex descr.

(1473, 1487, 1490 *Ahern's collector*) July, August; (1772, 1938 *Borden*) August, October; (2242, 3015 *Meyer*) May; (3174, 3262 *Merrill*) October; (6658, 6868 *Elmer*) November; (297 *Copeland*) January; (31, 54 *Whitford*) April; (6104 *Leiberg*) July. Abundant in thickets and forests 50 to 250 m. Endemic.

The above specimens were all identified by Mr. Elmer as *Ixora barbata* Roxb., but differ from that species in the glabrous, not barbate corolla throats. The vegetative characters are very similar in both species.

3. **I. macrophylla** Bartl. in DC. Prodr. 4 (1830) 487, ex descr.

(613, 1759 *Borden*) April, August; (2611 *Meyer*) February; (6094 *Leiberg*) July; (462 *Topping*) May; (1437 *Ahern's collector*) August; (6728 *Elmer*) November; (2503, 3145 *Merrill*) June, October. Abundant in thickets and forests, ascending to 500 m. Endemic.

The above specimens were identified by Mr. Elmer as *Ixora cumingiana* Vidal, but agree more closely with the description of *I. macrophylla* Bartl.

19. WEBERA Schreb.

1. **W. luzoniensis** Vidal, Phan. Cuming. Philip. (1885) 179.

(2505, 2524, 3260 *Merrill*) June, October; (380 *Whitford*) June; (2188 *Meyer*) December; (6661 *Elmer*) November; (6160 *Leiberg*) July. In thickets and in forests along streams below 150 m., abundant. Endemic.

2. **Webera meyeri** (Elmer).

A lax shrub about 5 m. high. Branches densely hirsute pubescent. Leaves opposite, membranous, broadly oblong-lanceolate or oblanceolate, 10 to 20 cm. long, 4 to 6 cm. wide, shining above, hirsute pubescent on both surfaces with scattered hairs, the pubescence becoming dense on the midrib and lateral nerves beneath, the apex sharply acuminate, narrowed below to the acute base; nerves about 10 on each side of the midrib, ascending, somewhat prominent beneath, loosely anastomosing, the reticulations lax; petioles 1.5 to 2 cm. long, densely hirsute; bracts 1 to 1.4 cm. long, hirsute, the base broad, slenderly long caudate acuminate. Inflorescence terminal, corymbose, 2 to 3 cm. long, densely hirsute pubescent throughout, the peduncle very short, the primary branches about 1.5 cm. long, the bracts linear, about 8 mm. long. Flowers white, about 8 mm. long, subsessile, clustered at the ends of the branches. Calyx densely hirsute pubescent, 4 mm. long, 5-toothed, the teeth narrow, about as long as the tube, subtended by 2 linear, hirsute bracteoles nearly as long as the calyx. Corolla

pubescent outside, the tube short, 2 mm. long, the lobes 5, imbricate, narrowly oblong, about 8 mm. long, 2 mm. wide. Stamens 5, inserted on the throat of the corolla; filaments short, flattened, glabrous; anthers 8 mm. long, linear, sagitate at the base. Ovary 2-celled, each cell 1-ovuled; style minutely pubescent below.

(2764 *Meyer*) February, 1905. In forests at 700 m. *Ixora meyeri* Elmer in herb.

20. PSYCHOTRIA Linn.

1. **Psychotria bataanensis** Elmer, n. sp. in herb.

A shrub 1 to 2 m. high, the branches gray or brown, glabrous, the younger parts rather densely dark brown pubescent. Leaves oblong-obovate, opposite the apex rounded, strongly narrowed below to the narrowly subtruncate somewhat cordate or auriculate base, 7 to 13 cm. long, 2.5 to 6 cm. wide, brownish when dry, glabrous and somewhat shining above, pubescent or puberulent on the nerves beneath, subcoriaceous; nerves very prominent beneath, about 20 on each side of the midrib, parallel, slightly curved upwards, anastomosing near the margin, the reticulations not prominent; petioles 1.5 to 2.5 cm. long, pubescent; stipules subglabrous, rigid, acute, deciduous, about 8 mm. long. Inflorescence terminal, dense, about 1 cm. long in anthesis, 2 to 3 cm. long in infrutescence, the branches densely brown pubescent. Flowers white. Calyx pubescent, turbinate, 3 mm. long, somewhat obscurely 4-toothed. Corolla glabrous except the pilose throat, subcampanulate, the segments 4, obtuse, thick. Stamens 4; filaments about 1 mm. long, glabrous; anthers 1 mm. long, broad; style short, glabrous; fruit red, 2-celled obovoid, about 6 mm. long, 4 mm. in diameter, obscurely ridged, somewhat pubescent, clustered at the ends of the 1 to 1.5 cm. long peduncles; pyrenes one in each cell, the base pointed, the apex rounded, the ventral surface flat, the dorsal surface 3 to 5 ridged.

(3180, 3765 *Merrill*) October, January; (214 *Whitford*) May; (2078 *Borden*) November; (1508 *Ahern's collector*) July; (6980 *Elmer*) November. On exposed ridges in the mossy forest 700 to 1,100 m.

2. **Psychotria diffusa** Merrill, sp. nov.

Subscandent. Branches dark brown, glabrous, striate, shining, the younger parts with few scattered more or less crisped hairs. Leaves ovate-lanceolate, glabrous, or the younger ones with few crisped hairs on the midrib beneath, 4 to 9 cm. long, 1 to 3.5 cm. wide, long acuminate, the base acute, submembranous, somewhat shining; nerves about 6 on each side of the midrib, somewhat prominent beneath, the reticulations lax; petioles slender, about 5 mm. long; stipules broad, membranous, deciduous, 5 to 8 mm. long. Inflorescence terminal, lax, spreading, 15 cm. long or often very much shorter, the axis and branches with few crisped hairs, becoming glabrous or nearly so, the latter slender, spreading or ascending, subtended by small ovate bracts. Flowers small, greenish, fragrant. Sessile or short pediceled in clusters of threes at the ends of the ultimate branchlets, subtended by small bracteoles. Calyx glabrous, 2 mm. long, with 5 small teeth. Corolla about 1.3 mm. long, glabrous outside, tubular, cleft to about the middle into 5 acute lobes. Stamens 5, the anthers less than 0.5 mm. long. Ovary 2-celled, each cell 1-ovuled; style glabrous about 1 mm. long, slightly thickened above, the stigma slightly bilobed. Fruit narrowly obovoid, white when mature, glabrous, 3 to 4 mm. long, 2-celled, each cell 1-seeded, or by abortion 1-celled and 1-seeded; seed flattened on the ventral surface, convex on the dorsal surface, slightly rugose, not or very obscurely 2 to 3 ridged.

(152, 1187, 1208 *Whitford*) May, March; (6811 *Elmer*) November. Also No. 6258 *Elmer*, Sablan, Province of Benguet, Luzon, April, 1904, and No. 930 *Whitford*, Mount Banahao, Province of Tayabas, Luzon, October, 1904. On exposed ridges in the mossy forest above 1,100 m. Identified by Mr. Elmer in herb. as *Psychotria eclastroides* Griseb., a West Indian species.

3. **Psychotria rubiginosa** Elmer, n. sp. in herb.

A shrub 2 to 5 m. high, the branchlets rather stout, densely dark brown pubescent. Leaves oblong lanceolate to oblong or elliptical oblanceolate, 20 to 30 cm. long, 5 to 9 cm. wide, subcoriaceous, reddish brown when dry, glabrous and shining above, rather densely uniformly papillose pubescent beneath, the apex short, sharp, usually abruptly acuminate, gradually narrowed below to the acute base, the margins recurved; nerves 14 to 17 on each side of the midrib, prominent beneath, parallel, slightly curved upwards, anastomosing, the reticulations very lax, petioles stout, about 2 cm. long, glabrous above, densely pubescent beneath; stipules ovate, about 1 cm. long, coriaceous, pubescent, the apex usually with two short slender teeth. Inflorescence terminal, about 15 cm. long, the peduncle 6 to 9 cm. long, the panicle ovate in outline 7 to 8 cm. wide, the branches spreading, densely rufous pubescent, the branches subtended by short persistent bracts. Flowers white, fragrant, sessile in clusters of threes at the tips of the branchlets, each subtended by a small bracteole. Calyx glabrous or very slightly pubescent, about 2 mm. long, its rim with 5 shallow teeth. Corolla 2 to 3 mm. long, glabrous on the outside, cleft into 5 oblong obtuse segments. Stamens 5, the filaments glabrous, 1 mm. long; anthers about 1 mm. long. Style not exceeding the corolla, the stigma bifid. Fruit 2-celled, each cell 1-seeded, obovoid, nearly 1 cm. long, orange red when mature, glabrous, shining, black and somewhat wrinkled when dry; seeds flat on the ventral, convex on the dorsal surface, glabrous, not ridged.

(2778 *Meyer*) February; (243 *Whitford*) May; (6718 *Elmer*) November. On ridges and in ravines, forests 600 to 900 m.

4. **P. tacpo** (Blanco) Rolfe, Journ. Linn. Soc. Bot. 21 (1884) 312.

(2319 *Meyer*) January; (1951, 2360 *Borden*) October, January; (6008 *Leiberg*) July. In thickets below 50 m. Endemic.

5. **P. manillensis** Bartl. in DC. Prodr. 4 (1830) 522. (?)

(1480 *Ahern's collector*) July; (1771 *Borden*) August; (6758 *Elmer*) November; (479, 510 *Whitford*) July; (5008 *Leiberg*) July. In forests 100 to 400 m. Endemic.

Bartlings description is too short to warrant absolute identification, the specimens here referred to his species strongly resembling *Psychotria tacpo*, differing however in the fewer nerved leaves and slightly fimbriate-ciliate margins of the bracteoles and calyx teeth. These specimens were identified by Mr. Elmer as *Psychotria philippinensis* C. et S., but that species has axillary, not terminal, peduncles.

6. **P. sarmentosa** Blume; Hook. f. Fl. Brit. Ind. 3 (1880) 165.

(3253, 3887 *Merrill*) October, August; (135, 253 *Whitford*) May. In forests 600 to 800 m. British India and Malaya.

21. GEOPHILA D. Don.

1. **G. herbacea** (Linn.) K. Sch. *G. reniformis* Don.; Hook. f. Fl. Brit. Ind. 3 (1880) 178.

(*Whitford*). On rocks in river cañon. Widely distributed in the Tropics.

22. LASIANTHUS Blume.

1. **Lasianthus bordenii** Elmer, n. sp. in herb.

A shrub about 2 m. high, the branches rather densely pubescent with long, spreading, fulvous hairs. Leaves oblong-ovate, distichous, 2 to 2.5 cm. apart, 4 to 6 cm. long, 1 to 3 cm. wide, membranous, the apex short sharp acuminate, the base inequilateral, rather abruptly subtruncate-rounded, often more or less cordate, glabrous and shining above, paler and shining beneath, the nerves and midrib densely pubescent with long fulvous hairs, the reticulations with few

scattered hairs; nerves very prominent beneath, curved upwards, about 8 on each side of the midrib, the reticulations also rather prominent; petioles densely fulvous pilose, 2 mm. long or less; stipules densely fulvous pilose, laciniately divided into 5 to 8 linear segments about 5 mm. long. Flowers sessile, minute, 1 to 3 in each leaf axil, completely surrounded by the laciniate, pubescent bracts. Fruit light blue, fœtid, subglobose, about 5 mm. in diameter, crowned by the very short calyx teeth; pyrenes 4, triquetrous, 2 mm. long, 1 mm. thick, rounded at the apex, the base somewhat pointed.

(2088 *Borden*) November; (6997 *Elmer*) November. On exposed ridges in the mossy forest at about 1,050 m.

2. **Lasianthus obliquinervis** Merrill, sp. nov.

A shrub 2 to 5 m. high. Branches dark brown or nearly black when dry, puberulent. Leaves oblong-lanceolate to lanceolate, subcoriaceous, 10 to 16 cm. long, 2 to 4 cm. wide, glabrous and shining above, beneath pubescent on the nerves and midrib the apex sharply acute or acuminate, the base somewhat inequilateral, rather abruptly acute; nerves 5 to 6 on each side of the midrib, curved, strongly ascending, prominent beneath, the reticulations subparallel; petioles pubescent, 1 to 1.5 cm. long; stipules oblong-ovate acute or acuminate, pubescent, about 5 mm. long, caducous. Flowers white, fascicled, 3 to 5 or 6 in each axil, ebracteate. Calyx pubescent, 3 to 4 mm. long, funnel-shaped, 5 to 6 toothed, the teeth triangular, acute, about 1 mm. long. Corolla more or less pubescent, 1 cm. long, the tube about 6 mm. long, 5-lobed, the lobes oblong, acute, pubescent on both surfaces, about 4 mm. long. Stamens 5, the anthers sessile, included, about 1.5 mm. long. Style about 5 mm. long, glabrous. Fruit blue, foetid, subglobose, somewhat pubescent, 6 or 7 mm. in diameter, each with about 6 triquetrous, pyrenes about 4 mm. long.

(247 *Whitford*) May; (1584, 2086 *Borden*) August, November; (2212 *Meyer*) December; (6802 *Elmer*) November; (3296, 3763 *Merrill*) October, January; (6050, 6055, 6157 *Leiberg*) July. In forests and on exposed ridges 800 to 1,200 m., abundant. Identified by Mr. Elmer in herb. as *Lasianthus lucidus* Blume.

3. **L.** sp.

(209, 319 *Whitford*) May; (1580 *Borden*) August; (3770, 3893 *Merrill*) January, August. With the preceding. *Lasianthus lucidus* Elmer in herb., in part, non Blume.

4. **L.** sp. (?)

(6837 *Elmer*) November; (2084 *Borden*) November. In forests at 800 m. Identified by Mr. Elmer as *Lasianthus laevigatus* Blume, but the fruit with two pyrenes. Specimens in fruit only.

23. AMARACARPUS Blume.

1. **A. pubescens** Blume; Miq. Fl. Ind. Bat. 2 (1856) 304.

(2837 *Meyer*) March; (1193 *Whitford*) March; (3194 *Merrill*) October; (6975 *Elmer*) November. On exposed ridges in the mossy forest above 1,200 m. Java.

24. MYRMECODIA Jack.

1. **M. echinata** Gaud.; Beccari, Malesia 2 (1884) 113. *t. 32. f. 4–9.*

(*Merrill*) January; (1144 *Whitford*) March. Epihpytic, mossy forest on exposed ridges 900 to 1,000 m.

From the material available I am unable to separate this form from Gaudichaud's species which is known from the Islands of Aru and Rawak of the Malayan Archipelago.

25. MORINDA Linn.

1. **M. citrifolia** Linn., var. **bracteata** (Roxb.) Hook. f. Fl. Brit. Ind. 3 (1880) 156.

(96, 432 *Whitford*) April, June. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya. T., *Lino*.

2. **Morinda volubilis** (Blanco). *Coffea volubilis* Blanco Fl. Filip. ed. 1 (1837) 157; ed. 2 (1845) 111; ed. 3, 1 (1877) 200.

Scandent, reaching a height of 15 m. Branches glabrous. Leaves coriaceous, glabrous, in whorls of threes, rarely opposite, ovate to oblong, 7 to 13 cm. long, 4 to 7 cm. wide, the apex short sharp acuminate, the base acute; nerves 4 to 5 on each side of the midrib, somewhat prominent, glandular in the axils beneath, the reticulations lax; petioles 1.5 to 4 cm. long, glabrous. Inflorescence axillary, paniculate or sometimes subumbellate, 6 to 12 cm. long, the peduncles stout, angular, glabrous, the branches spreading. Flowers white, fragrant, in capitate heads of from 3 to 7 flowers each, at the tips of the 2 to 3 cm. long branches. Calyces glabrous, fleshy, united to above the middle, the rim short, entire. Corolla about 1 cm. long, glabrous throughout, tubular, usually 5-cleft but sometimes 8 or 9 cleft, the lobes thick, linear, about 6 mm. long, 1 mm. wide. Stamens 5 to 9; anthers narrowly oblong, 6 mm. long. Ovary spuriously 4-celled, each cell with a single ovule. Fruit (immature) subglobose, fleshy, 1 cm. in diameter, black when dry.

(2290 *Meyer*) December; (1763 *Borden*) August. In forests 100 to 130 m.

An apparently distinct species to which Blanco's description of *Coffea volubilis* rather closely applies, his specific name being accordingly adopted and the species redescribed under *Morinda*. Blanco's species was referred by F.-Villar to *Morinda umbellata* Linn., to which the description of *Coffea volubilis* manifestly does not apply. *Lucinaea odorata* Elmer, in herb.

CAPRIFOLIACEÆ.

1. SAMBUCUS Linn.

1. **S. javanica** Blume; Clarke in Hook. f. Fl. Brit. Ind. 3 (1880) 2.

(490 *Whitford*) July; (2917 *Borden*) March. In thickets along the river 200 to 300 m. British India to China, Japan, and Malaya.

2. VIBURNUM Linn.

1. **V. odoratissimum** Ker; Clarke l. c. 7.

(1512 *Ahern's collector*) August; (6981 *Elmer*) November. In forests above 700 m. British India to Burma and China.

2. **V. sinuatum** Merr. Govt. Lab. Publ. 35 (1906) 65.

(6904 *Elmer*) November; (2618 *Meyer*) February; (3875, 3946 *Merrill*) August, March; (120 *Whitford*) May. On exposed ridges in the mossy forests above 1,000 m. Endemic.

CAMPANULATÆ.

CUCURBITACEÆ.

1. MELOTHRIA Linn.

1. **M. mucronata** (Blume) Cogn. in DC. Monog. Phan. 3 (1881) 608.

(3086 *Merrill*) October; (2032 *Borden*) October. In thickets below 100 m. Tropical Asia and Malaya.

2. MOMORDICA Linn.

1. **M. charantia** Linn.; Cogn. l. c. 436.

(1947 *Borden*) October; (7016 *Elmer*) November. In open waste places and cultivated grounds. Tropics generally. T., *Ampalaya*.

3. TRICHOSANTHES Linn.

1. **T. cucumerina** Linn.; Cogn. l. c. 357.

(3309 *Merrill*) October; (1949 *Borden*) October. In thickets near the seashore. Tropical Asia, Malaya, and Australia.

2. **T. quinquangulata** A. Gray; Cogn. l. c. 378.

(*Merrill*). In thickets along the river below 100 m. Endemic.

Cogniaux apparently was unable definitely to locate the origin of this species, as he cites "In ins. Mangsi 'in the Sooloo Sea' (sec. Asa Gray)." Mangsi Island, or rather islands, written on modern maps "Mangsee," are two small islets in the western extremity of the Sulu or Jolo Sea, in the Balabac Strait between the Islands of Balabac and Borneo, and politically at least belong to the Philippine Archipelago.

4. LUFFA Linn.

1. **L. cylindrica** (Linn.) Roem.; Cogn. l. c. 456.

(2034 *Borden*) October; (7019 *Elmer*) November. In thickets below 100 m., widely distributed in the Philippines. Tropics generally.

5. GYNOSTEMMA Blume.

1. **G. integrifoliola** Cogn. l. c. 917.

(2425 *Meyer*) January; (6694 *Elmer*) November. In thickets below 100 m. Endemic.

COMPOSITÆ.

1. CENTRATHERUM Cass.

1. **C. fruticosum** Vid. Rev. Pl. Vacs. Filip. (1886) 159.

(*Whitford*). On exposed ridges in the mossy forest. Endemic.

2. VERNONIA Schreb.

1. **V. arborea** (Wall.) Ham.; Hook. f. Fl. Brit. Ind. 3 (1881) 239.

(3200 *Merrill*) October; (6695 *Elmer*) November. On exposed ridges in the mossy forest above 1,200 m. Tropical Asia and Malaya.

2. **V. chinensis** (Lam.) Less.; Hook. f. l. c. 235.

(*Whitford*) April. A weed in waste places below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya.

3. **V. cinerea** (Linn.) Less.; f. l. c. 233.

(*Merrill*). In thickets and open places below 100 m. With the preceding, extending to Africa and Australia.

4. **V. vidalii** Merr. Govt. Lab. Publ. 6 (1904) 6.

(1278 *Borden*) July. In thickets below 100 m. Endemic.

3. ELEPHANTOPUS Linn.

1. **E. mollis** H. B. K.; DC. Prodr. 5 (1836) 86.

(*Whitford*) April. In thickets and waste places below 100 m., widely distributed in the Philippines, introduced from tropical America.

2. **E. scaber** Linn.; Hook. f. l. c. 242.

(*Merrill*). With the preceding. Tropics generally, probably native of tropical America.

3. **E. spicatus** Juss. *Distreptus spicatus* Cass.; DC. l. c. 87.

(*Merrill*). With the preceding introduced from tropical America.

4. ADENOSTEMMA Forst.

1. **A. viscosum** Forst.; Hook. f. l. c. 242.

(2229 *Meyer*) December; (3774 *Merrill*) January. Along open trails in forests at 100 m., widely distributed in the Philippines. Tropics generally.

5. AGERATUM Linn.

1. **A. conyzoides** Linn.; Hook. f. l. c. 243.

(*Whitford*) April; (1822 *Borden*) September. In thickets and waste places below 100 m., widely distributed in the Philippines. Tropics generally, probably a native of tropical America.

6. MIKANIA Willd.

1. **M. scandens** (Linn.) Willd.; Hook. f. l. c. 244.

(2504 *Meyer*) January. In forests at 100 m. Tropical Asia and Malaya.

7. CONYZA Less.

1. **C. viscidula** Wall.; Hook. f. l. c. 258.

(1608 *Borden*) August; (*Whitford*) May. In open places and thickets below 100 m. Tropical Asia to Malaya and Australia.

8. BLUMEA DC.

1. **B. lacera** DC.; Hook. f. l. c. 263.

(465 *Whitford*) July. On recently burned ground above 1,200 m., dwarfed form. Tropical Asia, Africa, and Malaya.

2. **B. balsamifera** (Linn.) DC.; Hook. f. l. c. 270.

(36 *Whitford*) April. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya. T., *Sambong*.

9. WEDELIA Jacq.

1. **W. biflora** (Linn.) DC.; Hook. f. l. c. 306.

(2294 *Meyer*) December; (6847 *Elmer*) November; (1953, 2017 *Borden*) October; (*Whitford*) April. In thickets bordering the seashore. Tropical shores of Asia and Malaya.

10. EMILIA Cass.

1. **E. flammea** Cass.; Hook. f. l. c. 336.

(6668, 6999 *Elmer*) November; (2116 *Borden*) November; (2175 *Meyer*) December; (3944 *Merrill*) March. Along streams at 100 m., and on exposed ridges above 1,200 m., probably a native of the Philippines, now also found in tropical Asia.

2. **E. sonchifolia** (Linn.) DC.; Hook. f. l. c. 336.

(3282 *Merrill*) October; (*Whitford*) June. In thickets below 100 m., and on bluffs along the seashore. Tropical Asia and Africa.

INDEX.

THE PHILIPPINE
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AN ENUMERATION OF PHILIPPINE GRAMINEÆ WITH KEYS TO GENERA AND SPECIES.

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INTRODUCTION.

In the present paper an attempt has been made to summarize our present knowledge of Philippine *Gramineæ*, 72 genera and 226 species and varieties being recognized, all, with the exception of a few species indicated in the text, based on specimens actually examined by the author and deposited in the herbarium of the Bureau of Science. The material on which this article is based has been received within the past four and one-half years, and collected within that time, with the exception of 53 specimens of Cuming's Philippine collection (1836–1840) received from the British Museum. In addition to the above 226 species and varieties admitted, 56 others are considered in my attempt to account for all the species that have been credited to the Philippines by various authors. These are enumerated under doubtful and excluded species following the genera or tribes to which they belong, and for the most part have been credited to the Philippines through errors in localization or identification by Cavanilles, Lagasca, Presl, and F.-Villar.

The descriptions of Philippine grasses are widely scattered in botanical literature, but from the fact that the present list will undoubtedly be considerably augmented in the near future, it has not been thought advisable to include descriptions of the species in the present paper, although short descriptions of the tribes and genera, and keys to the

tribes, genera, and species have been compiled. An attempt has been made to make the paper complete so far as Philippine synonomy is concerned, to account for all the species credited to the Philippines by various authors, and to cite the most important literature references under each species.

Among the earliest species of Philippine grasses described are the few considered by Cavanilles in his "Icones et Descriptiones Plantarum," 1791–1801, and by Lagasca in his "Genera et Species Plantarum," 1816. These early Philippine species were based on material collected by members of the Malaspina expedition, but it is evident that in the case of both the above works a considerable number of plants credited to the Philippines were erroneously localized and were really from tropical America and not from this Archipelago. The next work discussing any considerable number of Philippine *Gramineæ* is Presl's "Reliquiae Haenkeanae," 1830, in which 56 species of Philippine, or supposedly Philippine, grasses are described. As was the case with Cavanilles and Lagasca, many of the species credited to the Philippines by Presl were really not from this Archipelago but from tropical America. Haenke, who collected the material on which the above work was based, was also a member of the Malaspina expedition. Many of the species proposed by Presl have been figured and discussed by Scribner,[1] who examined the types in the Bernhardi Herbarium at the Missouri Botanical Garden. Blanco, in his "Flora de Filipinas" (ed. 1, 1837; ed. 2, 1845), considers but 36 species and varieties of *Gramineæ*, and although his descriptions are vague and imperfect, I believe that, with the exception of a few species of *Bambusa*, they are correctly reduced in the following enumeration. In 1851 Llanos described 29 species of grasses in his "Fragmentos de Algunas Plantas de Filipinas," and these are much more obscure than those described by Blanco, and in my treatment of them I have, where consistent, followed F.-Villar, although in some cases F.-Villar reduced Llanos's species to plants which certainly do not extend to the Philippines, thus showing that he had a misconception of them or of those to which they were reduced, or of both. The descriptions of the Philippine species of grasses proposed before 1833 are included by Kunth in his "Enumeratio Plantarum," while those described previously to 1855 are considered by Steudel in his "Synopsis Plantarum Glumaceārum," and by Miquel, including those described for the first time by Steudel, in his "Florae Indiae Batavae" (vol. 3, 1859). In 1883 F.-Villar published his "Novissima Appendix" to the third edition of Blanco's "Flora de Filipinas," enumerating 254 species and 28 varieties of grasses, distributed into 72 genera. As this work is a compilation, it frequently happens that the same species is enumerated twice, or in some cases three or even four times under different names in the same

[1] *Rept. Missouri Bot. Gard.*, 1899, 10, 35–59, *pls. 1–54*.

or in different genera. Assuming that in most cases F.-Villar's identifications were correct, I have reduced many of his species in accordance with standard works, excluding those which he credited to the Philippines and which have never been collected in the Archipelago, and which are not to be expected in these Islands. His list was compiled from such works as Kunth's "Enumeratio Plantarum," Steudel's "Synopsis," and Miquel's "Florae Indiae Batavae," including such plants as were credited to the Philippines in those works and such others as F.-Villar thought should grow in the Philippines. Many of the admitted species are followed by the letters "v. v. sp.," meaning that he had seen living specimens. It is doubtful if F.-Villar's herbarium contained more than a very small percentage of the species enumerated in the "Novissima Appendix," but as his herbarium, complete or incomplete, has been destroyed,[2] we can not be certain as to just what plants F.-Villar had in mind, and in may cases can only surmise what they might have been. F.-Villar also perpetuated the errors of Cavanilles, Lagasca, and Presl in crediting to the Philippines a number of American species erroneously described by those authors as Philippine, the mistake persisting in the works of Kunth, Steudel, and Miquel, cited above. In 1885, Vidal enumerated 71 species of Philippine *Gramineæ* in his "Phanerogamae Çumingianae Philippinarum," and in 1886, 72 in his "Revision de Plantas Vasculares Filipinas," while about the same number is included by Ceron in his "Catálogo de las plantas del Herbario" (Manila, 1892). In 1904 Mez and Pilger mentioned 107 species and varieties in Perkins's "Fragmenta Florae Philippinae," based for most part on my earlier collections. In 1905 Usteri enumerated 71 species of Philippine grasses in his "Beiträge zur Kenntnis der Philippinen und ihrer Vegetation," based on material collected by himself for the greater part in the Island of Negros. Two papers entitled "Notes on Philippine Gramineæ" have been published by Hackel.[3]

So far as genera are concerned I have followed Hackel[4] in arrangement and nomenclature rather closely, but have retained as genera some groups treated by him as subgenera. In accordance with the action of the Vienna Botanical Congress, I have used *Rottboellia* L. f., in place of *Manisuris* Sw.; *Zoisia* Willd., for *Osterdammia* Neck.; *Leersia* Sw., for *Homalocenchrus* Mieg., and *Cynodon* Pers., in place of *Capriola* Adans. Following the spirit of this same Congress, I have retained *Setaria* Beauv., for *Chaetochloa* Scribn., and in retaining *Digitaria* as a genus, I have accepted that name in place of *Syntherisma* Walt.

I have followed Hackel's monograph closely as to generic limits in

[2] Merrill: *Bull. Bureau Agr.*, Manila (1903), 3, 34.

[3] *Publications of the Bureau of Government Laboratories*, Manila (1905), No. 35, 79–82. *Phil. Journ. Sci.* 1 (1906) Suppl., 263–269.

[4] Engl. und Prantl: *Nat. Pflanzenfam.* II. 2, 1–79.

my treatment of the *Andropogoneæ*, but it might well be argued that if *Digitaria* Scop., of the *Paniceæ* is worthy of generic rank, then, surely, other subgenera of *Panicum* such as *Echinochloa*, *Ptycophyllum*, and *Hymenachne*, and the more characteristic subgenera of *Andropogon* are also worthy of it. In this connection it is sufficient to state that if, at the present time, there existed a monograph of the *Paniceæ* or of any other tribe of *Gramineæ*, treating such tribe or tribes as Hackel does the *Andropogoneæ*, I should doubtless have followed such work or works in the sequence of genera and species. However, in the matter of a local flora, it is sometimes a decided convenience to consider some sections of large genera as distinct and of generic rank, whereas, because of intermediate forms it might prove impracticable, in a monograph covering the entire world, to regard such groups as distinct.

It has been found impossible, because of insufficient material, to treat the *Bambuseæ* at this time with any degree of completeness or satisfaction. In this tribe most of the species flower but rarely and at very long intervals, while in most cases both mature flowers and fruits are essential to work out properly the various species and their relationships. Characters presented by the culm-sheaths are of considerable importance in classification, but many collectors ignore these organs, while notes as to size and habit are apt to be short and incomplete. The scandent bamboos appear to flower at much shorter intervals than do the erect ones, apparently in some cases (*Schizophyllum acutiflorum* Munro) annually. During four and one-half years' experience in the Philippines I have seen but three species of arborescent bamboos in flower, and in two of these the flowering was apparently due to culm-injuries, and was not normal. At most, at the present time there are in our herbarium, in flower, but five species of erect bamboos, but the number of different species actually growing in the Philippines is rather large, and doubtless will approximate 15 or 20.

Economically the *Gramineæ* is the most important family of plants, and this fact applies to the Philippines as well as to other parts of the world. Rice (*Oryza sativa* Linn.) is our most important cereal, and it is grown, with many cultural forms and varieties, throughout the Philippines. Corn (*Zea mays* Linn.), introduced from America at an early date by the Spaniards, is at present the only other cereal of importance grown in the Archipelago. Of minor importance is the culture of Italian millet (*Setaria italica* Beauv.) locally known as *Dawa* or *Dura*, occasionally the true millet (*Panicum miliaceum* Linn.), locally known as *Cabog*, and sorghum (*Andropogon sorghum* Brot.) locally known as *Batad*. In the past, according to early reports, wheat (*Triticum vulgare* Vill.) was somewhat planted in northern Luzon, but its culture in the Archipelago has now been discontinued. Of great commercial importance to the Philippines, is the culture of sugar cane (*Saccharum officinarum* Linn.).

Practically the only forage grass which is planted in the Philippines is *Leersia hexandra* Sw., locally known as *Zacate* or *Barit*. Large areas in the vicinity of Manila are adapted to the cultivation of this grass, which is used entirely as green forage. Land for the culture of this crop is prepared in the form of rice paddies, standing water being essential. I have found no record of the culture of this grass for forage in other parts of the world, although it is distributed throughout the Tropics, its culture apparently having been developed in Manila to meet local conditions. Bermuda grass (*Cynodon dactylon* Pers.), locally known as *Grama*, is utilized somewhat for green forage, and also some strictly wild grasses such as *Panicum stagninum* Retz., locally known as *Balili*. Rice straw and corn are to a certain extent employed for forage, and teosinte (*Euchlaena luxurians* Schrad.), a recent importation, appears to have considerable value for this purpose. Grasses useful for grazing comprise many different species, especially of the *Andropogoneæ* and *Paniceæ*. The most important lawn grass, and the one best adapted to local conditions, is *Cynodon dactylon*, but sometimes in Manila *Zoisia pungens* is utilized.

Imperata cylindrica var. *koenigii* Benth., and *I. exaltata* Brongn., locally known as *Cogón*, are extensively used for thatching roofs, and these two species, together with *Saccharum spontaneum* Linn., locally known as *Talahib*, because of their gregarious habit of growth and the great areas occupied by them, may prove to be of considerable value as a material for paper manufacture.[5] In the highlands of northern Luzon, the stout stems of *Miscanthus sinensis* Anders., are employed by the natives for making walls, and even the floors or houses, and in the absence of *Imperata*, the leaves are used for thatch. The roots of *Andropogon squarrosus* Linn. f., locally known as *Mora* or *Raiz Mora*, are commonly sold in Manila, and because of their pleasant perfume are utilized for various purposes. *Andropogon schoenanthus* Linn., from which lemon-grass oil is obtained, is rarely cultivated. The flexible panicles of *Phragmites vulgaris* Lam., locally known as *Tambó* are made into dust brooms and extensively sold in Manila and in other towns in the Archipelago. The hard fruits of *Coix lachryma-jobi* Linn., are used for beads and necklaces, and the mature seeds of the variety *ma-yuen* are locally used as food. The roots of a few species of grasses are used by the natives in the practice of medicine.

The uses of bamboo are almost too numerous to mention, the chief among these in the Philippines being in the construction of houses, bamboo providing posts, floors, walls, and even roofs; in the building of fences, temporary bridges, and scaffolds; for water pipes, rafts, floats to transport heavy timbers down streams, and for the manufacture of furniture; for masts and outriggers on boats; for baskets, water buckets,

[5] Richmond: *Phil. Journ. Sci.* (1906), 1, 457–460.

cups, and even temporary cooking utensils; for fish traps, corrals, and wiers; for carrying poles, walking sticks, musical instruments, pipes, and pipestems; fire-making apparatus, blowguns, arrows, and spear handles; for rope, coarse and fine hats etc. The young shoots of some species are used for food. Good drinking water is frequently found in the hollow internodes, especially in the climbing species (*Dinochloa* and *Schizophyllum*), and various parts of some species are used by the natives in the practice of medicine. It is very probable that eventually the more abundant species will be found to have considerable value as a material for making paper.

About 17 of the 225 species and varieties enumerated in the present paper have been introduced into the Islands either because of their economic value or accidentally as weeds. The most important of these introduced species are the cultivated ones, *Euchlaena luxurians* Schrad., *Zea mays* Linn., *Saccharum officinarum* Linn., *Andropogon sorghum* Brot., *Setaria italica* Beauv., *Oryza sativa* Linn., and *Triticum vulgare* Vill. *Bambusa blumeana* Schultes, the most common building bamboo in the Philippines, is apparently cultivated only, and not a native species. *Cenchrus echinatus* Linn., *Paspalum conjugatum* Berg., and *Chloris barbata* Sw., have been introduced as weeds, probably all from tropical America.

About 46 species and varieties are endemic, including one monotypic genus, *Garnotiella philippinensis* Stapf. Thirty-two species are cosmopolitan in the Tropics of the world, a few of them extending into the temperate regions. Twenty-nine represent northern or Asiatic types, the most characteristic of which are *Pollinia quadrinerris* Hack., *P. imberbis* var. *willdenowiana* forma *monostachya* Hack., *P. nuda* Hack., *Ophiurus monostachyus* Presl, *Saccharum arundinaceum* Retz., *Ischaemum angustifolium* Hack., *Eremochloa ciliaris* Merr., *Arthraxon microphyllus* Hochst., *A. ciliaris*, varieties, *Arundinella setosa* Trin., *A. agrostoides* Trin., *Digitaria pedicellaris* Merr., *Isachne debilis* Rendle, *Panicum villosum* Lam., *Anthoxanthum luzoniense* Merr., *Aristida cumingiana* Trin. & Rupr., *Agrostis elmeri* Merr., *Calamagrostis arundinacea nipponica* Hack., *C. filifolia* Merr., *Eriachne triseta* Nees, *Coelachne hackelii* Merr., *Eragrostis japonica* Trin., *Poa luzoniensis* Merr., *Bromus pauciflorus* Hack., and *Brachypodium silvaticum* Beauv.; of these, *Anthoxanthum*, *Agrostis*, *Calamagrostis*, *Poa*, *Bromus*, and *Brachypodium* are distinctly boreal.

About 12 represent Australian types, of which the following are known only from Australia and the Philippines: *Pollinia irritans* Hack., *Andropogon fragilis* Hack., *A. baileyi* F. Muell., *Microlaena stipoides* R. Br., and *Andropogon filipendulus* var. *lachnatherus* Hack., *Andropogon sericeus* and *Rottboellia ophiuroides* Benth. are known only from Australia, New Guinea, and the Philippines. *Perotis rara* R. Br., *Panicum caudiglume* Hack., *P. mindanaense* Merr., *Ischaemum arundinaceum* var.

radicans Hack., and *Aristida stipoides* R. Br., var. *tenuisetulosa* Pilger are also identical with Australian species or have affinities with Australian types.

Characteristic Malayan species are *Coelorhachis biaurita* Hack., *Isachne beneckei* Hack., *Panicum auritum* Presl, *Oplismenus undulatifolius* var. *imbecillis* Hack., *Pennisetum macrostachyum* Trin., *Leptaspis urceolata* R. Br., and *Dinochloa scandens* O. Kuntze, these species being for most part confined to the Malayan region, while no less than 100 other species are common to the Philippines and Malaya, but also extend to other regions.

Pollinis tenuis Trin., and *Ischaemum intermedium* are known only from the Philippines and Polynesia, but many other characteristic species extend from other places through the Philippines to that region.

Twenty-six species extend from Africa to southern Asia and Malaya and the Philippines, 8 of which reach Polynesia and 10 Australia. Forty species are encountered from southern Asia and Malaya, 6 of them being found also in Polynesia and 19 in Australia.

On the whole, the Philippine *Gramineæ* are strongly Malayan or Indo-Malayan, with a decided northern element in the highlands of northern Luzon, and a rather characteristic Australian one, which, strangely, is from the same northern region of the Archipelago, rather than from the southern islands, although when more extensive collections have been made in the interior of Mindanao, doubtless most of these Australian types, which at present are known in the Philippines only from northern Luzon, will be found in Mindanao.

I acknowledge, with great pleasure, the valuable assistance of Dr. E. Hackel, of Graz, Austria, in the preparation of this paper, as he has verified very many of my own identifications, corrected others, compared my material with type or authentic specimens, identified many species, and supplied me with copious notes on synonomy. Without this assistance it would have been impossible for me to have issued this paper in its present form, nor would the finished work have been nearly as authentic.

GRAMINEÆ.

CHARACTERS OF THE ORDER.

Erect, decumbent or creeping herbs, annual or perennial, or in the tribe *Bambuseæ* erect or scandent shrubs or trees. Culms (stems) terete or compressed, jointed; internodes usually hollow, sometimes solid. Leaves simple, usually long and narrow, entire, parallel-veined, the sheathing portion below distinct from the blade and split down one side, bearing at the juncture of the blade with the sheath a membranous or cartilaginous appendage (ligule), the ligule rarely wanting, sometimes reduced to a row of hairs. Inflorescence spicate, racemose, capitate or

paniculate, consisting of spikelets composed of two to many 2-ranked imbricated bracts (glumes), the two lowest normally empty, one or both of these sometimes wanting or very much reduced. One or more of the upper glumes except sometimes the terminal ones contains in the axil a flower which is usually inclosed by the bract like palea. Flowers perfect or staminate, sometimes dioecious or monoecious, subtended by 1 to 3 minute hyaline scales (lodicules). Stamens 1 to 6, usually 3; anthers 2-celled, versatile. Ovary 1-celled, 1-ovuled; styles 1 to 3, commonly 2; stigmas hairy or plumose. Fruit a seed-like grain (caryopsis).

Genera about 335; species about 3,500, widely distributed in all parts of the world, the greater number of species being found in the Tropics but the greater number of individuals being found in temperate regions.

KEY TO THE TRIBES AND GENERA.

1. Spikelets one, rarely two-flowered, lower flower when present imperfect, falling from the pedicel entire or with certain joints of the rhachis at maturity. Rhachilla not produced beyond the flowers.
   2. Spikelets cylindrical or somewhat dorsally compressed; empty glumes manifest; hilum punctiform.
      3. Flowering glumes and palea hyaline, much more delicate in structure than the thick-membranous to cartilaginous empty glumes.
         4. Spikelets unisexual on separate inflorescences or on different parts of the same inflorescence ..... I. MAYDEÆ
         4. Spikelets in pairs, one sessile, one pedicellate in the same inflorescence, the former perfect, the latter staminate or empty, rarely perfect ..... II. ANDROPOGONEÆ
      3. Flowering glumes, at least of the perfect flower, similar in texture to the empty glumes or frequently thicker, never hyaline and thin.
         4. Flowering glume and palea membranous.
            5. Inflorescence spicate; spikelets falling singly or in groups, the first glume usually larger than the rest.. III. ZOISIEÆ
            5. Inflorescence paniculate; spikelets deciduous singly from the ultimate branchlets of the inflorescence, the first glume usually smaller or narrower than the rest..... IV. TRISTEGINEÆ
         4. Flowering glume and palea chartaceous, cartilaginous, or coriaceous, very different in color and appearance from the empty glumes ..... V. PANICEÆ
   2. Spikelets much compressed laterally; empty glumes none or rudimentary; hilum linear ..... VI. ORYZEÆ
1. Spikelets one to many flowered, the empty glumes persistent, the rachilla generally articulated above the empty glumes and produced beyond the upper glume, the upper glumes frequently empty.
   2 Stems herbaceous; leaf-blades sessile, not articulated with the sheath.
      3. Spikelets pedicellate in panicles, spike-like panicles or racemes.
         1. Spikelets one-flowered.
            5. Empty glumes four; palea one-nerved ..... VII. PHALARIDEÆ
            5. Empty glumes two; palea two-nerved VIII. AGROSTIDEÆ

4. Spikelets two to many flowered.
5. Flowering glumes usually shorter than the empty ones, usually with a bent awn on the back, rarely awned from the apex ..... IX. AVENEÆ
5. Flowering glumes generally longer than the empty ones, unawned, or with a straight awn from the apex.. XI. FESTUCEÆ
3. Spikelets in two rows.
4. Spikelets crowded on one side of the continuous rhachis, forming one-sided spikes or racemes ..... X. CHLORIDEÆ
4. Spikelets in two opposite rows of the often articulate rhachis, forming equilateral spikes ..... XII. HORDEÆ
2. Stems woody; leaf-blade with a petiole-like base which is articulated with the sheath ..... XIII. BAMBUSEÆ

Tribe I. **MAYDEÆ.**

1. Staminate spikes numerous in terminal panicles; pistillate spikes in the axils of the leaves subtended by large membranous bracts at the base.
2. Pistillate spikes of each leaf-axil free, articulated.... (1) *Euchlaena*
2. Pistillate spikes of each leaf-axil grown together into a continuous, compound, and much thickened axis ..... (2) *Zea*
1. Staminate spikes solitary at the ends of the branchlets; pistillate below, one to two, each of them reduced to a single spikelet entirely inclosed by the ovoid or spherical, ivory-like sheath of the subtending bract..... (4) *Coix*
1. Staminate and pistillate spikelets in the same spike, the lowest glume of the pistillate spikelets indurated.... (3) *Chionachne*

Tribe II. **ANDROPOGONEÆ.**

1. Spikelets homogamous, hermaphrodite; joints of the rhachis not much thickened nor excavated for the reception of the spikelet.
2. Axis of the racemes continuous.
3. Spikelets solitary, disposed in several slender unilateral racemes ..... (5) *Dimeria*
3. Spikelets in pairs, rarely in threes, upon each joint of the rhachis, paniculate.
4. Racemes in a narrow, usually spike-like panicle; spikelets awnless..... (6) *Imperata*
4. Racemes in a board panicle; spikelets usually awned ..... (7) *Miscanthus*
2. Axis of the racemes articulate.
3. Racemes solitary, terminal.
4. Spikelets in pairs at each joint of the rhachis ..... (11) *Pogonatherum*
4. Spikelets in threes at each joint of the rhachis ..... (10) *Polytrias*
3. Racemes two to many, digitate or approximate on a shortened main axis.
4. Spikelets one, rarely two-flowered; when two flowered the first empty glume with a median longitudinal furrow ..... (9) *Pollinia*
4. Spikelets two-flowered, the first empty glume without a longitudinal furrow.. (15) *Ischaemum*
3. Racemes in a much-branched panicle upon an elongated main axis, the lateral racemes sessile ..... (8) *Saccharum*

1. Spikelets heterogamous or rarely homogamous, the joints of the axis of the raceme (false spike) appressed or grown to the pedicels of the primary spikelets, forming a hollow or excavation for the reception of the secondary spikelets; fertile glumes always awnless.
   2. Spikelets 2-nate; first empty glume flat ..... (12) *Rottboellia*
   2. Spikelets 2-nate; first empty glume globose ..... (13) *Manisuris*
   2. Spikelets solitary; first empty glume convex ..... (14) *Ophiurus*

1. Spikelets heterogamous, the sessile hermaphrodite, rarely pistillate, the pedicellate staminate, empty or wanting, very rarely all hermaphrodite or all pedicellate; joints of the racemes not strongly thickened, nor with excavations for the reception of the spikelets.
   2. Sessile spikelets 2-flowered.
      3. Racemes reduced to the terminal joint with three spikelets, and enclosed by a sheathing leaf or bract ..... (17) *Apluda*
      3. Racemes with many joints.
         4. Spikes rarely solitary; spikelets 2-flowered, awned ..... (15) *Ischaemum*
         4. Spikes solitary; spikelets 1-flowered, the first glume pectinate ..... (16) *Eremochloa*
   2. Sessile spikelets 1-flowered.
      3. A false whorl of four or more staminate or empty spikelets at the base of each raceme; racemes usually subtended by a sheathing leaf ..... (20) *Themeda*
      3. No distinct whorl of staminate or empty spikelets at the base of the racemes, or where an imperfect one occurs, the racemes in pairs, subtended by a leaf-sheath.
         4. Fertile glume awned from the back or base; leaves cordate at the base.. (18) *Arthraxon*
         4. Fertile glumes awned from the apex or from a more or less deep cleft, or awnless; leaves not cordate at the base ..... (19) *Andropogon*

Tribe III. ZOISIEÆ.

1. Spike slender; spikelets narrow; first and second glumes awned ..... (21) *Perotis*
1. Spike rigid; spikelets appressed to the rhachis, not awned.. (22) *Zoisia*

Tribe IV. TRISTEGINEÆ.

1. Flowering glumes of the hermaphrodite flowers awned; awns usually geniculate and twisted below; slender grasses ..... (23) *Arundinella*
1. Flowering glumes awnless; spikelets minute; very coarse grasses ..... (24) *Thysanolaena*

Tribe V. PANICEÆ.

1. Spikelets all perfect.
   2. Spikelets without any special covering or involucre consisting of spines or bristles.
      3. Empty glumes two; perfect flower one in each spikelet.
         4. Lower empty glume with a thickened ring-like callus ..... (27) *Eriochloa*
         4. Lower empty glume without a ring-like and thickened callus; spikelets in one-sided racemes or spikes.
            5. Spikelets ovate or orbicular, obtuse, rarely acute ..... (25) *Paspalum*
            5. Spikelets lanceolate, acute or acuminate ..... (26) *Digitaria*

3. Empty glumes two; perfect flowers two in each spikelet ..... (28) *Isachne*
3. Empty glumes three; perfect flower one in each spikelet.
4. Glumes unawned; spikelets panicled or spicate ..... (29) *Panicum*
4. Glumes unawned; spikelets of *Panicum*, but the flowering glume narrowed into a short stipe or with two appendages or pits at the base..... (30) *Ichnanthus*
4. Empty glumes or flowering glumes awned or awn-pointed.
5. Flowering glumes unawned; empty glumes awned or awn-pointed.
6. Prostrate or ascending grasses; racemes or clusters of few spikelets; empty glumes glabrous or pubescent.. (31) *Oplismenus*
6. Erect grasses; racemes of many spikelets; empty glumes often muricate-hispid ..... (29) *Panicum* § *Echinochloa*
5. Flowering glume awned; nerves of the second empty glume broadly fimbriate; palea of the third glume deeply cleft.. (33) *Axonopus*
2. Spikelets subtended by an involucre, consisting of from one to many bristles or spines which are sometimes grown together.
3. Involucre of two spine-bearing valves..... (34) *Cenchrus*
3. Involucre of numerous bristles.
4. Spikelets fasciculate; involucral bristles falling with the spikelet..... (35) *Pennisetum*
4. Spikelets usually solitary; involucral bristles persistent after the fall of the spikelet ..... (32) *Setaria*
3. Involucre of solitary bristles.
4. Inflorescence in open panicles; prostrate aquatic grasses ..... (35) *Chamaeraphis*
4. Inflorescence in dense cylindrical spikes or spike-like panicles; erect grasses ..... (32) *Setaria*
1. Spikelets monoecious or dioecious.
2. Monoecious; slender prostrate grasses; inflorescence a terminal spike, the two lower spikelets perfect, the four to six upper ones staminate.. (37) *Thuarea*
2. Dioecious; very coarse prostrate grasses; pistillate flowers collected into large globose heads with very long spines; staminate flowers in umbellately disposed racemes ..... (38) *Spinifex*

Tribe VI. ORYZEÆ.

1. Spikelets unisexual; fruiting glumes inflated; leaves broad.. (39) *Leptaspis*
1. Spikelets perfect; fruiting glumes not inflated.
2. Empty glumes two, short but distinct; spikelets awned or awnless..... (40) *Oryza*
2. Empty glumes wanting; spikelets awnless..... (41) *Leersia*

Tribe VII. PHALARIDEÆ.

1. First and second glumes minute, the third and fourth longer than the flowering glume..... (42) *Microlaena*
1. First and second empty glumes equaling or exceeding the third and fourth ..... (43) *Anthoxanthum*

Tribe VIII. AGROSTIDEÆ.

1. Flowering glume awnless.
   2. Panicles strict; pericarp free; grain not permanently enclosed in the flowering glume and palea.. (45) *Sporobolus*
   2. Panicles very lax; pericarp adherent; grain enclosed in the flowering glume and palea..... (48) *Agrostis*
1. Flowering glume awned.
   2. Flowering glume indurated, much firmer in texture than the empty glumes, 3-awned..... (44) *Aristida*
   2. Flowering glume usually hyaline and more delicate than the empty glumes, 1-awned.
      3. Flowering glume awned from the apex or from the cleft; spikelets articulate on their pedicels.
         4. Spikelets geminate, lanceolate or linear-lanceolate; first and second glumes 3-nerved; flowering glume faintly 1 to 3 nerved, awned from the apex ..... (46) *Garnotia*
         4. Spikelets solitary; first and second glumes nerveless; flowering glume lobed at the apex and bearing a long awn in the cleft..... (47) *Garnotiella*
      3. Flowering glume awned from the back near the base; spikelets inarticulate; rhachilla produced and penicellate..... (49) *Calamagrostis*

Tribe IX. AVENEÆ.

1. Spikelets small, 2-flowered; rhachilla not produced.
   2. Flowering glumes long ciliate-fringed on the back or margins; emtpy glumes broad, many nerved; spikelets awned ..... (50) *Eriachne*
   2. Flowering glumes naked; spikelets unawned..... (51) *Coelachne*
1. Spikelets large, 2 or more flowered, rhachilla produced beyond the upper flower..... (52) *Avena*

Tribe X. CHLORIDEÆ.

1. Spikes or spiciform branches digitate or approximate.
   2. Spikelets 1-flowered, the upper imperfect flower wanting ..... (53) *Cynodon*
   2. Spikelets two or more flowered, the upper flower imperfect, the flowering glume awned..... (54) *Chloris*
   2. Spikelets with three to six perfect flowers.
      3. Spikes with terminal spikelets..... (55) *Eleusine*
      3. Spikes with the rhachis extending beyond the spikelets in a manifest point..... (56) *Dactyloctenium*
1. Spikes or spiciform branches panicled, filiform; spikelets minute, alternate ..... (57) *Leptochloa*

Tribe XI. FESTUCEÆ.

1. Spikelets in spiciform branches of a simple panicle.
   2. Flowering glumes 1 to 3-nerved; spikelets many flowered ..... (60) *Diplachne*
   2. Flowering glumes 7 to 9-nerved; spikelets 1 to several flowered.
      3. Spikelets 1-flowered; upper glumes convolute, with setiform tips..... (63) *Lophatherum*
      3. Spikelets more than 1-flowered; fruiting glumes with reflexed submarginal bristles.. (62) *Centotheca*

1. Spikelets in open compound panicles, the branches not spiciform.
  2. Coarse erect grasses; flowering glume or rhachilla long-penicellate.
    3. Rhachilla short-hairy; flowering glumes penicellate ..... (59) *Neyraudia*
    3. Rhachilla penicellate; flowering glumes glabrous ..... (58) *Phragmites*
  2. Usually slender grasses; rhachilla and flowering glumes glabrous or hairy; if hairy, the hairs much shorter than the glumes.
    3. Flowering glumes glabrous, 3-nerved..... (61) *Eragrostis*
    3. Flowering glumes glabrous or pubescent on the nerves, 5 to many nerved.
      4. Flowering glumes 5-nerved, pilose on the nerves, not awned ..... (64) *Poa*
      4. Flowering glumes mucronate or awned, rounded dorsally, 5-nerved; top of the ovary villous; inflorescence paniculate ..... (65) *Bromus*
      4. Flowering glumes many, awned or mucronate, 7 to 9 nerved; inflorescence spicate ..... (66) *Brachypodium*

Tribe XII. **HORDEÆ.**

1. Glumes with their backs turned to the hollow surface of the rhachis; maratime grasses ..... (67) *Monerma*
1. Glumes with their sides turned to the hollowed surface of the rhachis; cultivated grasses ..... (68) *Triticum*

Tribe XIII. **BAMBUSEÆ.**

1. Fruit a true caryopsis with a delicate pericarp.
  2. Filaments free; palea of the upper flower 2-keeled.. (69) *Bambusa*
  2. Filaments united into a tube; all the paleas 2-keeled ..... (70) *Gigantochloa*
1. Fruit a nut with a thick free pericarp.
  2. Spikelets very small, ovate ..... (72) *Dinochloa*
  2. Spikelets elongated, linear or linear-lanceolate..... (71) *Schizostachyum*

Tribe I. **MAYDEÆ.**

The staminate spikelets occupying the upper portion of the inflorescence or of its divisions, the pistillate below. Grain ellipsoid or roundish, unfurrowed. Culms tall, with pith.

(1) **EUCHLAENA** Schrad.

Staminate spikelets in a terminal panicle, two at each joint of the rhachis, one sessile, one pedicellate; glumes membranous. Pistillate spikelets in 2-ranked spikes, the spikes fasciculate in the leaf-axils, the axis jointed. Tall annuals with very broad leaves.

Species 1 or 2, Mexican, 1 introduced into the Philippines. *Teosinte.*

(1) **Euchlaena luxurians** Schrad. Ind. Sem. Hort. Gott. (1832) ex Linnaea **8,** Litterbl. 25; Fournier in Bull. Soc. Bot. Belg. **15**: 467; Gram. Mex. 69; Curtiss' Bot. Mag. *t.* 6414.

Luzon, Province of Bataan, Lamao (*Whitford*), April, 1904.

Cultivated only; introduced from America in the year 1903; a native of Mexico.

(2) ZEA Linn.

Habit, foliage, staminate florescence and arrangement of the pistillate spikes as in the preceeding genus, but the pistillate spikes grown together into a spongy, continuous body, the seeds being borne in 4 to 11 double rows.

Species 1, with many cultural varieties and forms; a native of tropical America and now cultivated in most tropical and temperate countries. *Corn* or *Indian Corn*.

(1) **Zea mays** Linn. Sp. Pl. (1753) 871; Blanco Fl. Filip. ed. 1 (1837) 686; ed. 2 (1845) 476; ed. 3, 3 (1879) 90; Miq. Fl. Ind. Bat. 3 (1859) 477; F.-Vill. Nov. App. (1883) 314; Merr. in Govt. Lab. Publ. 6 (1904) 28; Usteri Beitr. Kenn. Philip. Veg. (1905) 133.

Extensively cultivated throughout the Philippines, one of the first American plants introduced into the Philippines by the Spaniards, several forms and varieties being cultivated in the Archipelago. Sp.-Fil., *Maiz*.

(3) CHIONACHNE R. Br.

Culm much branched, branches terminated by spikes that are subtended by a sheathing leaf. Spikes with 1 to 5 pistillate spikelets and many staminate spikelets. Similar to *Coix*, but the fruit capsule is formed by the empty glume.

Species 4, British India to the Malayan Archipelago and Australia, 1 endemic species in the Philippines.

(1) **Chionachne biaurita** Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 263.

Luzon, Province of Benguet, Bued River (4282 *Merrill*), October, 1905. On fresh talus slopes at about 1,000 m.

Endemic.

(*Chionachne barbata* R. Br.=*Polytoca barbata* Stapf, a British Indian and Javan grass, is reported from the Philippines by F.-Villar, Nov. App. (1883), 314, but the record has never been verified.)

(4) COIX Linn.

Culm branched, branches ending in one or two short, ivory-like nearly globose, very hard capsules with an opening at the top, and surrounding the pistillate spikelets, the staminate inflorescence projecting out of the orifices of the capsules.

Species 3 or 4, southern Asia and Malaya, 1 in the Philippines. *Tear Grass* or *Job's Tears*.

(1) **Coix lachryma-jobi** Linn. Sp. Pl. (1753) 972; Hook. f. Fl. Brit. Ind. 7 (1897) 100; Pilger in Perk. Frag. Fl. Philip. (1904) 137; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 345; Usteri Beitr. Kenn. Philip. Veg. (1905) 132, err. typ. "*lachrymae-ioris*." *Coix lachryma* Linn. Syst. ed. 10, 1261; Blanco Fl. Filip. ed. 1 (1837) 688; ed. 2 (1845) 478; ed. 3, 3 (1879) 92; Miq. Fl. Ind. Bat. 3 (1859) 476; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 288; F.-Vill. Nov. App. (1883) 314. *Coix agrestis* Lour.; F. Vill. l. c.

Philippines (448 *Cuming*) 1836–40. Luzon, Manila (64 *Merrill*), May, 1902; Province of Benguet, Baguio (5761 *Elmer*) March, 1904; (39, 136 *Topping*)

January, 1903: Province of Rizal, Bosoboso (1853 *Merrill*) April, 1903: Province of Batangas, Lipa (112 *Mararc*) December, 1895: Province of Tayabas, (Infanta) Binangonan (832 *Whitford*) September, 1904. MINDORO, Baco River (263 *McGregor*) April, 1905. PALAWAN, Tanabag (323 *Bermejos*) January, 1906. BALABAC (437 *Mangubat*) March, 1906. MINDANAO, Davao (653 *Copeland*) March, 1904: Lake Lanao, Camp Keithley (52 *Clemens*) January, 1906.

Widely distributed in the Philippines; warmer parts of the world. T., *Tigbi, Cudlasan;* V., *Adlay;* B., *Cueldasan;* Ig., *Agda.*

Var. **ma-yuen** (Roman.) Stapf. in Hook. f. Fl. Brit. Ind. **7** (1897) 100. *Coix ma-yuen* Roman. in Bull. Soc. Acclim. Paris III. **8** (1881) 442.

LUZON, Province of Rizal, Montalban (3394 *Ahern's collector*) November, 1905. JOLO, Mount Dajo (5326 *Merrill*) October, 1906.

British India to Cochin China and Borneo. T., *Ylas.*

Tribe II. **ANDROPOGONEÆ.**

Spikelets in spike-like racemes, two, rarely only one, at each joint of the usually articulate rhachis, one sessile and one pedicellate. Spikelets generally 1-flowered, with three empty glumes, the first empty glume always more indurated than the flowering glume, the latter usually hyaline and bearing a bent or twisted awn.

(5) **DIMERIA** R. Br.

Spikelets 1-flowered, linear, laterally compressed: first empty glume keeled. Flowering glumes awned. Spikes digitate. Very slender grasses.

Species 12, British India to South China, Malaya and north Australia; one in the Philippines.

(1) **Dimeria orinthopoda** Trin. Fund. Agrost. (1820) 167. *t. 14*, var. **tenera** (Trin.) Hack. in DC. Monog. Phan. **6** (1889) 81. *Dimeria tenera* Trin. in Mém. Acad. St-Pétersb. VI. **2** (1833) 335. F.-Vill. Nov. App. (1883) 315. *D. orinthopoda* Merr. Philip. Journ. Sci. **1** (1906) Suppl. 25.

LUZON, Province of Bataan, Lamao River (3283, 3773 *Merrill*) October, 1903, January, 1904: Province of Rizal, Caloocan (3676 *Merrill*) November, 1903; Antipolo (15 *Foxworthy*) January, 1906.

British India to Japan, Malaya, other varieties extending to tropical Australia.

(F.-Villar enumerates *Haplachne pilosissima* Presl, and *Andropogon chloridiformis* Gaudich., as distinct species, but without really crediting them to the Philippines. Both are synonyms of *Dimeria pilosissima* Trin., a Marianne Island species.)

(6) **IMPERATA** Cyr.

Spikelets 1-flowered, densely clothed with long silky hairs. Empty glumes membranous, narrow, the two outer with long hairs. Flowering glume small. Stamens 1 to 2. Panicles narrow, usually spike-like.

Species 5, tropical and subtropical regions of the World; two in the Philippines.

1. Panicle narrow, spiciform, the branches short, appressed; first glume 5 to 9 nerved; stamens 2 ..... (1) *I. cylindrica*
1. Panicle thyrsiform, branches usually elongated, sometimes spreading; first glume 3 to 5 nerved; stamens 1 ..... (2) *I. exaltata*

(1) **Imperata cylindrica** (Linn.) Beauv. Agrost. (1812) Expl. Planch. 5. *t.* 5. *f.* 1. var. **koenigii** (Retz.) Benth.; Pilger in Perk. Frag. Fl. Philip. (1904) 137. *Imperata arundinacea* Cyr.; Miq. Fl. Ind. Bat. 3 (1859) 514; F.-Vill. Nov. App. (1883) 316.- *I. arundinacea* var. *koenigii* Hack. in DC. Monog. Phan. 6 (1889) 84; Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 289. *Saccharum spicatum* Presl Rel. Haenk 1 (1830) 346; Scribn. Rept. Mo. Bot. Gard. 10 (1899) 52. *pl. 1;* Miq. Fl. Ind. Bat. 3 (1859) 513; Kunth. Enum. 1 (1833) 476; F.-Vil. Nov. App. (1883) 317.

Luzon, Province of Benguet, Baguio (5753 *Elmer*) March, 1904; Manila (85 *Merrill*) May, 1902; Province of Pampanga, Bacolor (32 *Parker*) May, 1904. Mindoro, Baco River (123 *McGregor*) April, 1905. Sibuyan (27 *McGregor*) July, 1904. Bohol (1218 *McGregor*) June, 1906. Mindanao, Davao (184 *DeVore & Hoover*) April, 1903; (537 *Copeland*) March, 1904; Lake Lanao, Camp Keithley (145 *Clemens*) February, 1906.

Abundant and widely distributed in the Philippines, the species being distributed through the warmer parts of the World, the variety *koenigii*, extending from tropical Africa to southern Asia, Japan, Malaya, Australia, New Caledonia, and the Fiji Islands. T., *Cogón.*

(2) **Imperata exaltata** Brongn. Voy. Coqu. Bot. (1829) 101, excl. syn.; Hack. in DC. Monog. Phan. 6 (1889) 98; Pilger in Perk. Frag. Fl. Philip. (1904) 137; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 26. *Imperata ramosa* Anders.; Rolfe, in Journ. Bot. 23 (1885) 216; Vidal, Phan. Cuming. Philip. (1885) 158; Vidal, Rev. Pl. Vasc. Filip. (1886) 289. *Saccharum negrosense* Steud. Syn. 1 (1855) 407. *Saccharum confertum* Presl Rel. Haenk. 1 (1830) 364; Kunth. Enum. 1 (1833) 476; F.-Vill. Nov. App. (1883) 317. *Saccharum alopecuros* Nees; Miq. Fl. Ind. Bat. 3 (1859) 513; F.-Vill. Nov. App. (1883) 317.

Philippines (1801 *Cuming*) 1836-40. Luzon, Province of Rizal, Bosoboso (3279 *Ahern's collector*) August, 1905; Province of Tayabas, Atimonan (122 *Gregory*) August, 1904; (665 *Whitford*) August, 1904. Palawan, E-wi-ig River (701 *Merrill*) February, 1903.

Common and widely distributed in the Philippines, Malayan Peninsula and Archipelago to New Hebrides. T., *Cogón.*

Imperata exaltata Brongn. subsp. **merrillii** Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 264.

Luzon, Province of Benguet, Mount Tonglon (4813 *Merrill*) November, 1905. Endemic.

(7) MISCANTHUS Anders.

Distinguished from *Imperata* by its broad panicles, three stamens and the flowering glumes more or less bifid and usually awned between the teeth or lobes. Tall coarse grasses.

Species 7 or 8, southern and eastern Asia to Malaya and Polynesia; two in the Philippines.

1. Racemes not fastigiate, the lower ones semiverticellate shorter than the common rhachis, laxly flowered . . . . . (1) *M. japonicus*
1. Racemes corymbose-fastigiate, the lower ones exceeding the common rhachis, densely flowered . . . . . (2) *M. sinensis*

(1) **Miscanthus japonicus** (Thunb.) Anders. Oefv. Vet. Akad. Forhandl. Stockh. (1855) 166; Hack. in DC. Monog. Phan. 6 (1889) 107; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 317; Koord. Meded.'s Lands Plant. 19 (1898) 274. *Saccharum praegrande* Steud. Syn. 1 (1855) 408. *Miscanthus luzonensis* Anders. l. c. 166; Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 289; Rolfe in Journ. Bot. 23 (1885) 216.

PHILIPPINES (787 *Cuming*) 1836-40. MINDANAO, Lake Lanao, Camp Keithley (*Clemens*) March, 1906. SAMAR, Borongan (5220 *Merrill*) October, 1906.

Japan and China to Malaya.

(2) **Micanthus sinensis** Anders. l. c. 166; Rendle l. c. 348. Hack. l. c. 105. *Eulalia japonica* Trin.; Miq. Fl. Ind. Bat. 3 (1859) 518; F.-Vill. Nov. App. (1883) 316. *Miscanthus japonicus* Pilger in Perk. Frag. Fl. Philip. (1904) 137; Merr. Philip. Journ. Sci. 1 (1906) Suppl. 26, non Anders.

LUZON, District of Lepanto, Mount Data (4492 *Merrill*) November, 1905; Province of Benguet, Panai (4734 *Merrill*) November, 1905; Baguio to Ambuklao (4353 *Merrill*) October, 1905; Mount Santo Tomas (6271 *Elmer*) May, 1904; Province of Pampanga, Mount Arayat (4214, 3923 *Merrill*) September, 1905, October, 1904; Province of Bataan, Mount Mariveles (3198 *Merrill*) October, 1903; (1341 *Whitford*) September, 1905; Province of Tayabas, Mount Banajao (946 *Whitford*) October, 1904; Province of Principe, Baler (1125 *Merrill*) September, 1902.

Japan and China to Cochin China, Borneo and Celebes.

(8) SACCHARUM Linn.

Panicles usually expanded, the branches many jointed. Spikelets slender, the somewhat hardened first and second empty glumes with long hairs. Tall grasses, the small spikelets surrounded by long silky hairs.

Species about 12, mostly in the tropics of the Old World, three in America; three species in the Philippines, one cultivated only.

1. Stem silky below the panicle ..... (2) *S. spontaneum*
1. Stem glabrous below the panicle.
   2. Joints of the racemes and pedicels glabrous; cultivated only ..... (1) *S. officinarum*
   2. Joints of the racemes and pedicels long-pilose; spontaneous ..... (3) *S. arundinaceum*

(1) **Saccharum officinarum** Linn. Sp. Pl. ed. 1, (1753) 54. Blanco, Fl. Filip. ed. 1, (1837) 42; ed. 2, (1845) 29; ed. 3, 3 (1877) 55; Miq. Fl. Ind. Bat. 3 (1859) 507; Hack. in DC. Monog. Phan. 6 (1889) 111; Hook. f. Fl. Brit. Ind. 7 (1897) 118; F.-Vill. Nov. App. (1883) 317. *S. violaceum* F.-Vill. l. c. 317, non Tussac.

Extensively cultivated throughout the Philippines, native country unknown. Sugar Cane. T., *Tuba;* V., *Quilala;* Cag., *Agbo;* Sp.-Fil., *Caña dulce.*

(2) **Saccharum spontaneum** Linn. Mant. 2 (1771) 183, subsp. **indicum** Hack. in DC. Monog. Phan. 6 (1889) 113; Pilger in Perk. Frag. Fl. Philip. (1904) 137. *S. spontaneum* Linn.; Miq. Fl. Ind. Bat. 3 (1859) 512; Rolfe in Journ. Bot. 23 (1885) 216; Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 289; Ceron Cat. Pl. Herb. (1892) 182; Usteri Beitr. Kenn. Philip. Veg. (1905) 133; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 26. *Saccharum koenigii* Blanco, Fl. Filip. ed. 1 (1837) 44; ed. 2, (1845) 30; ed. 3, 3 (1877) 56, saltem pro parte.

PHILIPPINES (634 *Cuming.*). LUZON, Manila (31 *McGregor*) October, 1904; (93 *Merrill*) May, 1902; Province of Union, Banang (5653 *Elmer*) February, 1904; Province of Benguet, Bued River (4312 *Merrill*) November, 1905; Province of Bataan, Lamao (1935 *Borden*) October, 1904. MINDORO, Calapan (896 *Merrill*) April, 1903. NEGROS, Gimagaan River (1633 *Whitford*) May, 1906. MINDANAO, Lake Lanao, Camp Keithley (97, 263 *Clemens*) January, February, 1906.

British India to southern China, Malaya, east Australia to Polynesia. Abundant and widely distributed in the Philippines. T., *Talâhib.*

Var. **luzonicum** Hack. in DC. Monog. Phan. 6 (1889) 116.

Luzon, (*Chamisso*) in herb. berol., fide Hackel.

Endemic.

(3) **Saccharum arundinaceum** Retz. Obs. 6: 14; Hack. in DC. Monog. Phan. 8 (1889) 117; Hook. f. Fl. Brit. Ind. 7 (1897) 119; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 349. *Erianthus* sp. Pilger in Perk. Frag. Fl. Philip. (1904) 137.

Mindoro, Baco River (1794 *Merrill*) April, 1903. Mindanao, Province of Surigao, Catel (5448 *Merrill*) October, 1906; Lake Lanao, Camp Keithley (97a *Clemens*) January, 1906.

India and Ceylon to southern China.

(9) POLLINIA Trin.

Racemes usually digitate, seldom arranged in panicles. First and second empty glumes chartaceous or membranous, the third hyaline. Flowering glumes awned from the apex or from the cleft; awns twisted or geniculate, rarely wanting.

Species about 36, tropical and subtropical regions of the Old World; 9 in the Philippines.

1. Spikelets clothed with silky hairs. (Subgenus Eulalia.)
   2. Second glume awned.
      3. Awn 1 to 2 cm. long, short ciliate or nearly glabrous on the twisted portion ..... (1) *P. articulata*
      3. Awn 3 to 5 cm. long, long ciliate-barbate on the twisted portion ..... (2) *P. irritans*
   2. Second glume muticous or mucronulate, not awned.
      3. Hairs of the inflorescence white.
         4. First glume of the sessile spikelet 4-nerved ..... (3) *P. quadrinervis*
         4. First glume nerveless ..... (4) *P. argentea*
      3. Hairs of the inflorescence ferruginous.
         4. Culms pubescent below the inflorescence; spikelets 4–5 mm. long; awn of the fourth glume 12–15 mm. long; hairs of the inflorescence ferruginous ..... (5) *P. cumingii*
         4. Culms glabrous below the inflorescence; spikelets 3.5 mm. long; awn of the fourth glume 6 mm. long; hairs of the inflorescence cinereous-fulvous ..... (6) *P. maritima*

1. Spikelets usually hairy only on the callus, rarely also on the keels. (Subgenus Leptatherum.)
   2. Racemes exceeding 3 cm. in length; stamens 3.
      3. Third glume wanting, the fourth minute ..... (10) *P.* sp.
      3. Third glume present.
         4. Articulations of the racemes pilose ..... (7) *P. imberbis*
         4. Articulations of the racemes glabrous or obscurely ciliate ..... (8) *P. nuda*
   2. Racemes less than 3 cm. long; stamens 1 ..... (9) *P. tenuis*

(1) **Pollinia articulata** Trin. in Mém. Acad. St. Pétersb. IV. 4 (1836) 90, subsp. **fragilis** var. **setifolia** Hack. in DC. Monog. Phan. 6 (1889) 154; Pilger in Perk. Frag. Fl. Philip. (1904) 138. *Pollinia setifolia* Nees in Hook. Kew Gard. Misc. 2 (1850) 88; Miq. Fl. Ind. Bat. 3 (1859) 531; F.-Vill. Nov. App. (1883) 315; Vidal Rev. Pl. Vasc. Filip. (1886) 290; Phan. Cuming. Philip. (1885) 158; Ceron. Cat. Pl. Herb. (1892) 182. *Pollinia articulata* F.-Vill. l. c. 315, non Trin. *Andropogon koretrostachys* Trin. Mém. Acad. St. Pétersb. VI. 2

(1833) 273; Miq. Fl. Ind. Bat. 3 (1859) 484; F.-Vill. Nov. App. (1883) 316. *A. asthenostachys* Steud. Syn. 1 (1855) 381; Miq. Fl. Ind. Bat. 3 (1859) 485. *Eulalia contorta* O. Ktz. Rev. Gen. Pl. (1891) 775.

Luzon, Province of Nueva Vizcaya, Quiangan (317 *Merrill*) June, 1902.

Southern China, the species and other varieties extending from British India to Malaya and Australia.

(2) **Pollinia irritans** (R. Br.) Hack. in DC. Monog. Phan. 6 (1889) 155; Philip. Journ. Sci. 1 (1906) Suppl. 265. *Saccharum irritans* R. Br. Prodr. (1810) 203. *Erianthus irritans* Kunth Rev. Gram. 1 (1829) 160; Enum. 1 (1833) 479. *Eulalia irritans* O. Ktz. Rev. Gen. Pl. (1891) 775.

Luzon, Province of Benguet, Ambuklao to Daklan (4388 *Merrill*) October, 1905.

Australia (Queensland).

(3) **Pollinia quadrinervis** Hack. in DC. Monog. Phan. 6 (1889) 158; Govt. Lab. Publ. 35 (1905) 79; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 356. *Eulalia quadrinervis* O. Ktz. Rev. Gen. Pl. (1891) 775.

Luzon, Province of Benguet, Baguio (5783 *Elmer*) March, 1904; Bagnio to Ambuklao (4354 *Merrill*) October, 1905; District of Lepanto, Mount Data (4560 *Merrill*) November, 1905.

China, Japan, and north India.

(4) **Pollinia argentea** (Brongn.) Trin. in Mém. Acad. St. Pétersb. VI. 4 (1836) 90; Hack. in DC. Monog. Phan. 6 (1889) 162; Hook. f. Fl. Brit. Ind. 7 (1897) 111. Pilger in Perk. Frag. Fl. Philip. (1904) 138. *Eulalia argentea* Brongn. Voy. Coq. Bot. (1829) 92. *Eulalia tristachya* O. Kuntze Rev. Gen. Pl. (1891) 775.

Luzon, Manila (10 *F. Lamson-Scribner*), June, 1902; Province of Benguet, Twin Peaks (6474 *Elmer*) June, 1904; Province of Nueva Vizcaya, Bagabag (108 *Merrill*) June, 1902. Semerara (4152 *Merrill*) June, 1905.

British India to Malaya and Australia.

Pollinia argentea Trin. var. **lagopus** Hack. in Govt. Lab. Publ. 35 (1905) 79; Philip. Journ. Sci. 1 (1906) Suppl. 265. *Pollinia speciosa* Pilger in Perk. Frag. Fl. Philip. (1904) 138, non Hack.

Culion (472 *Merrill*) December, 1902. Luzon, Province of Pampanga, Mount Arayat (3902, 4222 *Merrill*) October, 1904, September 1905; Province of Benguet, Baguio to Ambuklao (4365 *Merrill*) October, 1905; District of Lepanto, Mount Data (4535 *Merrill*) November, 1905.

Endemic, the species and other varieties extending from British India to Malaya and Australia.

(5) **Pollinia cumingii** Nees in Hook. Kew Journ. 2 (1850) 98; Steud. Syn. 1 (1855) 373; Hack. in DC. Monog. Phan. 6 (1889) 167; Miq. Fl. Ind. Bat. 3 (1859) 522; Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 290; Pilger in Perk. Frag. Fl. Philip. (1904) 138; Hook. f. Fl. Brit. Ind. 7 (1897) 114; Rendle in Forbes & Hemsl. Journ. Linn. Soc. 36 (1904) 355. *Pollinia aurea* F.-Vill. Nov. App. (1883) 315, non Benth. *Eulalia fulva* O. Ktz. Rev. Gen. Pl. (1891) 775.

Philippines (1538 *Cuming.*) Luzon, Province of Nueva Ecija, Carranglang (260 *Merrill*) May, 1902; Province of Benguet, Bued River (4293 *Merrill*) November, 1905.

China, northern India to Malaya and New Guinea.

(6) **Pollinia maritima** Merrill, sp. nov.

Glabra; culmis ascendentibus, 50–80 cm. altis, glaberrimis, apice nudis; foliis 5–7 cm. longis, 4–5 mm. latis, glaberrimis, plus minus involutis; racemis 3–5, articulis pedicellis spiculisque villis cinereo-fulvis vestitis, 5–7 cm. longis, subgracilibus; spiculis sessilibus oblongis, 3.5 mm. longis, gluma tertia carentibus, quartia hyalina, angusta, circiter 1 mm. longa, apice in lacinias duas cuspidatas fissa; arista ad 6 mm. longa; staminibus 3.

An erect or ascending rigid glabrous perennial grass from rather long creeping rootstocks. Culms glabrous, 50 to 80 cm. tall, rather slender; nodes many. Sheaths rather loose, glabrous, crowded and imbricate below, much exceeding the internodes, ligule very short, minutely ciliate; blades smooth, glabrous, rather rigid, 5 to 7 cm. long, 4 to 5 mm. wide, somewhat involute, the base contracted to the petiole-like sheath, the apex acuminate. Racemes 3 to 5, approximate at the end of the glabrous culm, usually exserted, 5 to 7 cm. long, the rhachis, pedicels, and spikelets cinerous-fulvous with rather short villous hairs. Sessile spikelets oblong, 3.5 mm. long, the first and second glumes subequal, truncate, ciliate at the apex, the backs in the lower ¾ and margins villous, the second obovate, truncate, 3-toothed; third glume wanting; fourth hyaline, narrow, about 1 mm. long, the apex cleft and bearing a slender nearly straight awn about 6 mm. long. Stamens 3; anthers oblong, about 3 mm. long. Pedicellate spikelets similar to the sessile ones, the pedicels about 3 mm. long.

Lumbacan (near Balabac) (5277 *Merrill*) October 7, 1906. On sandy beach associated with *Spinifex squarrosus* Linn.

Evidently related to *Pollinia cumingii* Nees, differing from that species in its smaller spikelets, differently colored shorter, less dense pubescence of the inflorescence, rigid habit, shorter leaves, much shorter awns, and in the culm being quite glabrous below the inflorescence.

(7) **Pollinia imberbis** Nees, var. *β.* **willdenowiana** Hack., forma **monostachya** (Franch. et Savat.) Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 265. *Pollinia japonica* var. *monostachya* Franch. et Savat.

Luzon, Province of Benguet, Pauai (4707 *Merrill*) November, 1905.

The species and varieties extending from northern India to Japan, China, and Java, the form from Japan and the Philippines.

(8) **Pollinia nuda** Trin. in Mém. Acad. St. Pétersb. VI. 4 (1833) 307; Hack. in DC. Monog. Phan. 6 (1889) 178; Philip. Journ. Sci. 1 (1906) Suppl. 265; Hook. f. Fl. Brit. Ind. 7 (1897) 117; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 356. *Eulalia nuda* O. Ktz. Rev. Gen. Pl. (1891) 775.

Luzon, Province of Benguet, Mount Tonglon (4842 *Merrill*) November, 1905; Pauai (4727 *Merrill*) November, 1905. Samar. Catubig River (5212 *Merrill*) October, 1906. Balut (5426 *Merrill*) October, 1906.

Japan to China and northern India; a variety in south Africa.

(9) **Pollinia tenuis** Trin. in Mém. Acad. St. Pétersb. VI. 2 (1833) 307; Hack. in DC. Monog. Phan. 6 (1889) 181; F.-Vill. Nov. App. (1883) 315; Miq. Fl. Ind. Bat. 3 (1859) 521. *Pleuroplitis producta* Griseb. in Ledeb. Fl. Ross. 4:

478. *Andropogon productus* Regel in Bull. Acad. St. Pétersb. 5 (1866) 760. *t. 2. ff. 16–24. Eulalia tenuis* O. Ktz. Rev. Gen. Pl. (1891) 775.

Luzon, Province of Benguet, Bued River (4310 *Merrill*) November, 1905; Ambuklao to Daklan (4382 *Merrill*) October, 1905; Province of Bataan, Lamao River (3286 *Merrill*) October, 1903.

Caroline Islands (Ualan).

(10) **Pollinia** sp. near *P. monantha* Nees.

Luzon, Province of Benguet, Baguio (6524 *Elmer*) June, 1904.

(10) POLYTRIAS Hack.

A low postrate grass with shining red-brown hairy racemes, each joint of the rhachis bearing two sessile and one pedicellate spikelets. Flowering glume with a terminal awn.

A monotypic genus, Java and Singapore, apparently introduced into the Philippines.

(1) **Polytrias amaurea** (Büse) O. Kuntze Rev. Gen. Pl. (1891) 788. *Andropogon amaurus* Büse in Miq. Pl. Jungh. (1854) 360. *Polytrias praemorsa* Hack. in DC. Monog. Phan. 6 (1889) 189; Merr. in Govt. Lab. Publ. 6 (1904) 7; Pilger in Perk. Frag. Fl. Philip. (1904) 138. *Pollinia praemorsa* Nees in Steud. Syn. 1 (1855) 409; Miq. Fl. Ind. Bat. 3 (1859) 520.

Luzon, Manila (386 *Merrill*) December, 1902.

Java, Singapore.

(11) POGONATHERUM Beauv.

Spikelets very small, the second empty glume and the flowering glume with long delicate awns. Delicate grasses, with solitary spicate inflorescence.

Species two, British India to Japan and Malaya; one in the Philippines.

(1) **Pogonatherum saccharoideum** Beauv. Agrost. (1812) 9. *t. 11 f. 7*; Hack. in DC. Monog. Phan. 6 (1889) 192; Hook. f. Fl. Brit. Ind. 7 (1897) 141; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1906) 357.

Luzon, Province of Benguet, Baguio (5915 *Elmer*) March, 1904.

India, China, and Malaya.

Var. **monandrum** (Roxb.) Hack. in DC. Monog. Phan. 6 (1889) 193; Rendle in Forbes & Hemsl. in Journ. Linn. Soc. Bot. 36 (1906) 357; Pilger in Perk. Frag. Fl. Philip. (1904) 138. *P. saccharoideum* F.-Vill. Nov. App. (1883) 316; Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 290; Ceron Cat. Pl. Herb. (1892) 182; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 26. *P. crinitum* Trin.; Miq. Fl. Ind. Bat. 3 (1859) 516; Usteri, Beitr. Kenn. Philip. Veg. (1905) 133. *Pogonopsis tenera* Presl Rel. Haenk. 1 (1830) 133. *t. 46;* Scribn. Rept. Mo. Bot. Gard. 10 (1899) 52. *pl. 2. Andropogon monandrus* Roxb. Fl. Ind. ed. Carey, 1: 260.

Luzon, Province of Benguet, Suyoc to Pauai (4721 *Merrill*) November, 1905; Province of Union, Bauang (5589 *Elmer*) February, 1904; Province of Rizal, Montalban (*Merrill*) March, 1906; Province of Bataan, Lamao River (621 *Borden*) April, 1904; (10 *Whitford*) April, 1904; (6696 *Elmer*) November, 1904; Dinalupijan (1544 *Merrill*) February, 1903; Province of Nueva Ecija (269 *Merrill*) May, 1902. Mindoro, Baco River (252 *McGregor*) April, 1905. Palawan (708 *Merrill*) February, 1903; (716 *Foxworthy*) March, 1906. Mindanao, Lake Lanao, Camp Keithley (146 *Clemens*) February, 1906; District of Davao, Mount Apo (362 *DeVore & Hoover*) May, 1903.

Widely distributed in the Philippines. India to Japan and Malaya.

(12) ROTTBOELLIA L. f.

False spikes cylindrical or slightly compressed; first glume coriaceous, covering the excavation in the rhachis-joint. Spikelets awnless. Coarse erect grasses.

Species about 30, tropics of both hemispheres; three in the Philippines.

1. Pedicel of the first spikelet connate with the joint of the rhachis; sheaths tuberculate-hispid ..... (1) *R. exaltata*
1. Pedicels free; sheaths glabrous.
   2. First glume coriaceous, the margins below with 5 to 7 upturned mucros or tubercles ..... (2) *R. glandulosa*
   2. First glume chartaceous, the margins below smooth ..... (3) *R. ophiuroides*

Subgenus COELORHACHIS.

(1) **Rottboellia exaltata** Linn. f. Suppl. (1790) 114; Nees. in Nov. Act. Nat. Cur. 19 (1843) Suppl. 1: 173; Miq. Fl. Ind. Bat. 3 (1859) 407; Hack. in DC. Monog. Phan. 6 (1889) 293; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 290; F.-Vill. Nov. App. (1883) 314; Hook. f. Fl. Brit. Ind. 7 (1897) 156; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1906) 362; Pilger in Perk. Frag. Fl. Philip. (1904) 138. *Rottboellia setosa* Presl Rel. Haenk. 1 (1830) 329; Kunth Enum. 1 (1833) 466. *Aegilops fluviatilis* Blanco. Fl. Filip. ed. 1 (1837) 47; ed. 2 (1845) 32; ed. 3. 1 (1877) 59. *Rottboellia denudata* Steud. Syn. 1 (1855) 362; Miq. Fl. Ind. Bat. 3 (1859) 408; F.-Vill. Nov. App. (1883) 314. *R. coelorhachis* F.-Vill. Nov. App. (1883) 314. probabiliter! non Forst. *Manisuris exaltata* O. Kuntze Rev. Gen. Pl. (1891) 779.

PHILIPPINES (562 *Cuming*) 1836–40. LUZON. Province of Nueva Vizcaya. Dupax (212 *Merrill*) May, 1902; Province of Union (6 *Fenix*) October, 1905; (5688 *Elmer*) February, 1904; Province of Pampanga (4234 *Merrill*) September, 1905. MINDORO. Calapan (989 *Merrill*) April, 1903. MINDANAO. Lake Lanao (633 *Clemens*) July, 1906.

Tropical Asia, Africa, Malaya, Australia, and America.

(2) **Rottboellia glandulosa** Trin. in Mém. Acad. St. Pétersb. VI. 2 (1833) 250; Pilger in Perk. Frag. Fl. Philip. (1904) 138; Hook. f. Fl. Brit. Ind. 7 (1897) 157; Miq. Fl. Ind. Bat. 3 (1859) 408; Hack. in DC. Monog. Phan. 6 (1889) 302. *Ophiurus muricatulus* Steud. in Zoll. Verz. Ind. Archip. (1854) 57 et Synopsis 1 (1855) 360. *Coelorhachis muricata* Brongn. in Voy. Coqu. Bot. 1 (1829) 65. *t. 14. Rottboellia muricata* Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 290; Ceron. Cat. Pl. Herb. (1892) 183; F.-Vill. Nov. App. (1883) 314, non Retz. *Manisuris glandulosa* O. Kuntze Rev. Gen. Pl. (1891) 780.

CULION (505 *Merrill*) December, 1902. PANAY (*Copeland*) January, 1904.

Burma to Java and the Philippines.

(3) **Rottboellia ophiuroides** Benth. Fl. Austral. 7 (1878) 514; Hack. in DC. Monog. Phan. 6 (1889) 303; K. Schum. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 169. *Ischaemum rottboelloides* R. Br. Prodr. (1810) 205. *Andropogon rottboelloides* Steud. Synopsis 1 (1855) 382. *Manisuris rottboelloides* O. Kuntze Rev. Gen. Pl. (1891) 779.

LUZON. Province of Benguet, Bagnio (5823 *Elmer*) March, 1904; Panai to Bagnio (1691 *Merrill*) November, 1905; Province of Nueva Vizcaya, Bagabag (121 *Merrill*) June, 1902; Province of Tarlac, Concepcion (3629 *Merrill*) November, 1903.

Australia and New Guinea.

Var. **intermedia** Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 265.

Luzon, Province of Bengnet, Bugias (4667 *Merrill*) October, 1903; Twin Peaks (6393 *Elmer*) May, 1904.

(*Rottboellia myurus* L. is reported from the Philippines by Ceron, Cat. Pl. Herb. (1892) 181, but the identification was evidently erroneous.)

(13) MANISURIS Sw.

A rather slender much branched annual, the leaves cordate at the base. Sessile spikelets 1-flowered, hollow-globose, pitted externally; pedicellate spikelets flat, staminate or neuter, their pedicels grown to the rhachis.

A monotypic genus; a weed in all tropical countries.

(1) **Manisuris granularis** Linn. f. Nov. Gram. Gen. (1779) 37. *f. 4–7;* Miq. Fl. Ind. Bat. 3 (1859) 409; F.-Vill. Nov. App. (1883) 314; Hack. in DC. Monog. Phan. 6 (1889) 314; Hook. f. Fl. Brit. Ind. 7 (1897) 159; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 363; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 26. *Haekelochloa granularis* O. Kuntze Rev. Gen. (1891) 776.

Luzon, Province of Bataan, Lamao River (3094 *Merrill*) October, 1903; Province of Laguna, Los Baños (*Hallier*) December, 1903; District of Lepanto, Cervantes (4470 *Merrill*) November, 1905; Province of Rizal, Morong (1406 *Ramos*) August, 1906. Mindanao, Lake Lanao, Camp Keithley (*Clemens*) April, 1906; Davao (*Copeland*) March, 1904. Palmas (5357 *Merrill*) October, 1906.

Tropics of the World.

(14) OPHIURUS Gaertn. f.

Annual or perennial. Spikes solitary or fascicled; lateral spikelets absent or rudimentary and their pedicels grown to the rhachis; sessile spikelets 1-flowered.

Species two, tropical Asia, Africa, and Malaya, both in the Philippines.

1. Spikes 5 to 12, corymbose-fasciculate; spikelets 2-flowered ..... (1) *O. exaltatus*
1. Spikes solitary; spikelets 1-flowered ..... (2) *O. monostachyus*

(1) **Ophiurus exaltatus** (Linn.) O. Kuntze Rev. Gen. Pl. (1891) 780. *Aegilops exaltata* Linn. Mant. 2 (1771) app. 575. *Ophiurus corymbosus* Gaertn. f. Fruct. 3 (1805–07) 4. *t. 181. f. a.;* F.-Vill. Nov. App. (1883) 314; Hook. f. Fl. Brit. Ind. 7 (1897) 160; Pilger in Perk. Frag. Fl. Philip. (1904) 138. *Rottboellia corymbosa* Linn. f. Suppl. (1781) 114.

Luzon, Province of Nueva Vizcaya, Bagabag (121 *Merrill*, in part) in herb. Berol., fide Pilger l. c.

British India and north Australia.

(2) **Ophiurus monostachyus** Presl Rel. Haenk. 1 (1830) 330; Kunth Enum. 1 (1833) 464; Miq. Fl. Ind. Bat. 3 (1859) 405; F.-Vill. Nov. App. (1883) 314; Vidal Rev. Pl. Vasc. Filip. (1886) 290; Phan. Cuming. Philip. (1885) 158; Hack. in DC. Monog. Phan. 6 (1889) 318; Rendle in Forbes & Hemsl. Journ. Linn. Soc. 36 (1904) 362. *O. undatus* Nees in Hook. Kew Gard. Misc. 2 (1850) 100. *O. undulatus* Miq. Fl. Ind. Bat. 3 (1859) 405.

Philippines (1339 *Cuming*). Luzon, Manila (3 *Scribner*) June, 1902. Mindanao, Lake Lanao, Camp Keithley (156 *Clemens*) February, 1906.

Hongkong, Formosa, and Tonkin.

(15) ISCHAEMUM Linn.

Racemes two to many, digitate. Spikelets broad, the pedicellate like the sessile but frequently unawned, rarely staminate or empty. First empty glume coriaceous or membranous, obtuse, often 2-toothed. Flowering glume awned from the apex or from the notch. Mostly low grasses with rather broad leaves.

Species about 40, tropics of both hemispheres, 7 in the Philippines.

1. Articulations and pedicels 3-angled; inflorescence glabrous or slightly ciliate or pilose, the hairs white.
   2. First glume of the sessile spikelet transversely rugose.
      3. First glume nearly flat, with 2 to 4 marginal nodules or low transverse ridges; perennial ..... (1) *I. aristatum*
      3. First glume strongly convex, closely transversely ridged; annual ..... (2) *I. rugosum*
   2. First glume of the sessile spikelet not transversely rugose.
      3. Spikes two.
         4. Fourth glume of the sessile spikelet unawned; a maritime grass..... (3) *I. muticum*
         4. Fourth glume of the sessile spikelet awned.
            5. Culms erect ..... (4) *I. merrillii*
            5. Culms much elongated, prostrate ..... (5) *I. arundinaceum radicans*
      3. Spikes five to six..... (6) *I. intermedium*
1. Articulations and pedicels 2-angled; inflorescence densely ferruginous-villous ..... (7) *I. angustifolium*

(1) **Ischaemum aristatum** Linn. Sp. Pl. (1853) 1049, var. **gibbum** (Trin.) Hack. in DC. Monog. Phan. 6 (1889) 204; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *Ischaemum gibbum* Trin. in Mém. Acad. St. Pétersb. VI. 2 (1833) 295; Miq. Fl. Ind. Bat. 3 (1859) 498; F.-Vill. Nov. App. (1883) 315. *Andropogon gibbum* Stend. Syn. 1 (1855) 376.

LUZON, Province of Isabela, Echague (135 *Merrill*) June, 1902; Province of Nueva Viscaya, Dupax (253 *Merrill*) May, 1902; Manila (69 *McGregor*) October, 1904; (*Scribner*) June, 1902; (*Merrill*) January, 1906. CULION (469, 677 *Merrill*) December, February, 1902–03.

Endemic, i. e., the variety, the species India, China, and Malaya.

(2) **Ischaemum rugosum** Salisb. Ic. (1791) 1. *I. I.* var. **distachum** (Cav.) *I. rugosum* var. *segetum* (Trin.) Hack. in DC. Monog. Phan. 6 (1889) 208; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *Colladoa distachya* Cav. Icon. 5 (1799) 37. *I. 460. Ischaemum colladoa* R. Br. Prodr. (1810) 205; Kunth. Enum. 1 (1833) 513; Miq. Fl. Ind. Bat. 3 (1859) 498. *Ischaemum segetum* Trin. in Mém. Acad. St. Pétersb. VI. 2 (1833) 294. *Andropogon segetum* Stend. Synopsis 1 (1855) 376. *Andropogon ramosus* Blanco, Fl. Filip. ed. 1 (1837) 37; ed. 2 (1845) 25, ed. 3, 1 (1877) 47, non Forsk. *I. ciliare* F.-Vill. Nov. App. (1883) 315, non Retz. *I. rugosum* Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 290; Rolfe in Journ. Bot. 23 (1885) 216.

PHILIPPINES (565 *Cuming*). LUZON, Province of Bataan, Dinalupijan (1550 *Merrill*) February, 1903; Province of Zambales, Subic (*Hallier*) December, 1903. Sp.-Fil. *Trigo, Tinitrigo.*

India, China, and Malaya.

(3) **Ischaemum muticum** Linn. Sp. Pl. (1753) 1049; Miq. Fl. Ind. Bat. 3 (1859) 496; F.-Vill. Nov. App. (1883) 315; Hook. f. Fl. Brit. Ind. 7 (1897)

132; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *I. glabratum* Presl Rel. Haenk. 1 (1830) 328; Kunth Enum. 1 (1833) 513; Miq. Fl. Ind. Bat. 3 (1859) 498; F.-Vill. Nov. App. (1883) 315. *Andropogon muticus, repens, polymorphus* et *relictus* Steud. Synopsis 1 (1855) 374, 375, 377.

Mindoro, Caguray (931 *Merrill*) April, 1903; Bulalacao (915 *Merrill*) April, 1903. Negros, Gimagon River (*Copeland*) January, 1904. Mindanao, Zamboanga (*Hallier*) February, 1904. Palmas (5365 *Merrill*) October, 1906.

British India to Malaya and Australia.

(4) **Ischaemum merrillii** Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 266.

Luzon, District of Lepanto, Balili (4622 *Merrill*) November, 1905.

Endemic.

(5) **Ischaemum arundinaceum** F. Muell. var. **radicans** Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 266.

Luzon, Province of Benguet, Baguio (4274 *Merrill*) October, 1905.

Endemic, i. e., the variety; the species known only from north Australia.

(6) **Ischaemum intermedium** Brongn. in Duperr. Voy. Coqu. Bot. (1829) 73; Hack. in DC. Monog. Phan. 6 (1889) 234; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *Andropogon medius* Steud. Synopsis 1 (1855) 382. *A. paniceus* Steud. l. c. 375.

Luzon, Manila (68 *Merrill*) May, 1902. Samar, Tubig (5222 *Merrill*) October, 1906; Catubig River (5213 *Merrill*) October, 1906.

Caroline Islands.

(7) **Ischaemum angustifolium** (Trin.) Hack. ex Oliver in Hook. Icon. Pl. (1888) *t. 1773;* DC. Monog. Phan. 6 (1889) 241; Hook. f. Fl. Brit. Ind. 7 (1897) 129; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 364. *Spodiopogon angustifolius* Trin. in Mém. Acad. St. Pétersb. VI. 2 (1833) 300; Sp. Gram. *t. 336;* Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 290; Ceron Cat. Pl. Herb. (1892) 182. *Spodiopogon laniger* Nees in Steud. Synopsis 1 (1855) 373. *S. notopogon* Nees l. c. *Andropogon notopogon, obrallatus* et *involutus* Steud. ll. cc. *Ischaemum notopogon* Nees in Miq. Fl. Ind. Bat. 3 (1859) 500; F.-Vill. Nov. App. (1883) 315.

Philippines (1002 *Cuming*). Luzon, Province of Nueva Vizcaya, Quiangan (117 *Merrill*) June, 1902.

India to China, Formosa, and the Philippines.

EXCLUDED SPECIES.

Ischaemum minus Presl Rel. Haenk. 1 (1830) 329; Kunth Enum. 1 (1833) 514; Miq. Fl. Ind. Bat. 3 (1859) 498; F.-Vill. Nov. App. (1883) 315=*Ischaemum urvilleanum* Kunth! a South American species. Erroneously credited to the Philippines by Presl.

Ischaemum timorense Kunth. and I. polystachyum Presl, both credited to the Philippines by F.-Villar Nov. App. (1883) 315. No specimens of Villar's plants extant; undoubtedly erroneous identifications.

(16) EREMOCHLOA Buse.

Low, slender grasses. Racemes solitary, densely flowered, unilateral. Spikelets broad, awnless, the margins of the glumes pectinate.

Species 8, eastern and southern Asia to Malaya and Australia; 1 in the Philippines.

(1) **Eremochloa ciliaris** (Linn.) *Vardus ciliaris* Linn. Sp. Pl. (1753) 53. *Eremochloa leersioides* Hack. in DC. Monog. Phan. 6 (1889) 264; Hook. f. Fl.

Brit. Ind. 7 (1897) 140; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 363; Pilger in Perk. Frag. Fl. Philip. (1904) 139; Merr. in Govt. Lab. Publ. 8 (1904) 6. *Ischaemum leersioides* Munro in Proc. Amer. Acad. 4: 363; Benth Fl. Hongk. (1861) 425.

Luzon, Province of Isabela, Echague (138 *Merrill*) June, 1902.

Southern China to Pegu and Tonkin.

(17) APLUDA Linn.

A leafy, rather slender, tall, subscandent grass; much branched. Racemes fascicled, enclosed in the sheaths, the fascicles in false panicles interspersed with numerous leaves. Callus of the sessile spikelets spherical, the other two spikelets, one staminate and one rudimentary, upon broad flat pedicels.

Species one with many varieties, British India to southern China, Malaya, Australia, and Polynesia.

(1) **Apluda mutica** Linn. Sp. Pl. (1753) 82; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 379; Nees in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 192; F-Vill. Nov. App. (1883) 318; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 292. *Apluda varia* Hack. in DC. Monog. Phan. **6** (1889) 196, subsp. *mutica*, var. *humilis* (Presl) Hack. l. c. 198; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *Calamina humilis* Presl Rel. Haenk. **1** (1830) 344. *Calamina mutica* R. et S. Syst. **2** (1817) 810. *Apluda cumingii* Büse Pl. Reinw. 105; F-Vill. Nov. App. (1883) 318; Miq. Fl. Ind. Bat. **3** (1859) 501. *Apluda ? humilis* Kunth Enum. **1** (1833) 517; F.-Vill. l. c. 318.

Philippines (635 *Cuming*). Luzon, Province of Benguet, Baguio (6295 *Elmer*) May, 1904; (134 *Topping*) January, 1903; Province of Nueva Viscaya, Quiaugan (110 *Merrill*) June, 1902; Manila (629 *Merrill*) December, 1902 Culion (685 *Merrill*) February, 1903. Mindanao, Lake Lanao, Camp Keithley (15 *Clemens*) December, 1905; District of Davao (102 *DeVore & Hoover*) April, 1903; (370 *Copeland*) March, 1904; Province of Zamboanga (*Hallier*) February, 1904.

India, China, Malaya, Australia, and Polynesia.

Var. **aristata** (Linn.) Rendle in Forbes & Hemsl Journ. Linn. Soc. Bot. **36** (1904) 279. *Apluda aristata* Linn. Amoen. Acad. **4** (1759) 303; F.-Vill. Nov. App. (1883) 318; Usteri Beitr. Kenn. Philip. Veg. (1905) 132. *Apluda varia* subsp. *aristata* Hack. in DC. Monog. Phan. **6** (1889) 199.

Philippines, fide F.-Villar et Usteri ll. cc.

India, China, and Malaya.

Forma **intermedia** (Hack.). *Apluda varia mutica intermedia* Hack. in DC. Monog. Phan. **6** (1889) 198.

Luzon, Manila (Robertus in herb. berol.), fide Hack. l. c.

(18) ARTHRAXON Beauv.

Slender small grasses, the racemes usually digitate, spike-like. Spikelets awned.

Species 9, tropical and subtropical regions of the Old World, 2 in the Philippines.

1. Spikes few, two to four, densely pilose with long white hairs . . . (1) *A. microphyllus*
1. Spikes many, sometimes few, glabrous or the rhachis slightly ciliate, never densely pilose . . . (2) *A. ciliaris*

(1) **Arthraxon microphyllus** (Trin.) Hochst. in Flora **39** (1856) 189; Hack. in DC. Monog. Phan. **6** (1889) 351; Philip. Journ. Sci. **1** (1906) Suppl. 265; Hook. f Fl. Brit. Ind. **7** (1897) 147. *Andropogon microphyllus* Trin. Mém. Acad. St. Pétersb. VI. **2** (1833) 275.

Luzon, District of Lepanto, Mount Data (4485 *Merrill*) November, 1905; Province of Benguet, Baguio to Ambuklao (4363 *Merrill*) October, 1905; Suyoc to Panai (4719 *Merrill*) November, 1905.

British India to Ceylon and Tonkin.

(2) **Arthraxon ciliaris** Beauv. Agrost. (1812) 111. *t. 11. f. 6.* subsp. **langsdorffii** (Trin.) Hack. in DC. Monog. Phan. **6** (1889) 354; Philip. Journ. Sci. **1** (1906) Suppl. 265; Rendle in Forbes & Hemsl Journ. Linn. Soc. Bot. **36** (1904) 360; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *Arthraxon ciliare* F.-Vill. Nov. App. (1883) 315.

Luzon, Province of Nueva Viscaya, Quiangan (102 *Merrill*) June, 1902; District of Lepanto, Balili (4628 *Merrill*) November, 1905. Mindanao, Lake Lanao, Camp Keithley (100 *Clemens*) January, 1906.

China and Japan.

Subsp. **nudus** (Nees) Hack. in DC. Monog. Phan. **6** (1889) 356; Philip. Journ. Sci. **1** (1906) Suppl. 266.

Luzon, Province of Benguet, Kabayan (4427 *Merrill*) October, 1905.

British India.

Subsp. **quartinianus** (A. Rich.) Hack. in DC. Monog. Phan. **6** (1889) 365; Philip. Journ. Sci. **1** (1906) Suppl. 266.

Luzon, Province of Benguet (4272, 4677, 4704 *Merrill*) October-November, 1905.

(19) ANDROPOGON Linn.

Racemes solitary or in pairs, digitate or panicled. Rhachis and callus of the first empty glume usually hairy. Spikelets usually narrow, the pedicellate ones staminate, empty or reduced to the pedicel, its flowering glume awnless, but the first glume occasionally awned.

A polymorphous genus of about 200 species in all tropical and temperate regions; 18 in the Philippines.

1. Sessile spikelets of the lowest pairs in each raceme like those above as regards sex, form, and awns. (Series A. *Isozygi.*)
   2. Racemes slender, solitary, usually smooth, terminal, the thickened joints of the rhachis with a cup or tooth-like appendage at the apex. Flowering glume often cleft nearly to the base, awned from the cleft; second empty glume awnless. Slender grasses. (Subgenus Schizachyrium.)
      3. Leaves obtuse; 1 to 3 cm. long; articulations and pedicels glabrous; awn of the sessile spikelet 8 to 12 mm. long ..... (1) *A. brevifolius*
      3. Leaves acute, 4 to 6 cm. long; pedicels frequently ciliate; awn of the sessile spikelet 16 to 18 cm. long ..... (2) *A. fragilis*
   2. Like subgenus *Schizachyrium*, but the spikelets laterally compressed, the second empty glume awned, the flowering glume slightly notched at the apex. (Subgenus Diectomis.)
      3. A rather coarse erect grass, the awns of the sessile spikelets 3 to 4 cm. long ..... (3) *A. fastigiatus*

2. Racemes digitate or panicled, all pedicellate. Rhachis joints and pedicels with a median longitudinal translucent line. Flowering glume pedicel-like, tapering into an awn. (Subgenus Amphilophis.)
   3. Spikes with many pairs of spikelets ..... (4) A. *intermedius*
   3. Spikes one to three, rarely four pairs of spikelets, the rhachis and branches capillary..... (5) A. *micranthus*
2. Racemes in panicles, frequently with few fertile spikelets. Rhachis joints without a translucent line. Empty glume usually broadly lanceolate, finally indurated and shining; second glume awnless; third glume hyaline, 2-nerved; fourth entire or 2-fid, awned, rarely unawned. (Subgenus Sorghum.)
   3. Very coarse erect grasses.
      4. Annual; spikelets awned or awnless; cultivated only ..... (7) A. *sorghum*
      4. Perennial; spikelets awnless..... (6) A. *halepensis*
   3. Slender grasses.
      4. Awns 2.5 to 3 cm. long..... (9) A. *baileyi*
      4. Awns 1.5 cm. long or less, or wanting.
         5. Spikelets awnless ..... (8) A. *serratus nitidus*
         5. Spikelets awned.
            6. Spikelets 4 to 5 mm. long, brown, shining, clothed with brown hairs..... (8) A. *serratus genuinus*
            6. Spikelets about 2 mm. long, pale or green; panicles very delicate ..... (10) A. *leptos*
2. Racemes very many, in whorls upon slender pedicels; these are arranged above one another, forming a panicle. Sessile spikelets laterally or dorsally compressed, awned or not distinguished from the next (*Chrysopogon*) by the absence of a beard or rigid hairs on the tips of the branchlets. (Subgenus Vetiveria.)
   3. A stout erect tufted grass with aromatic roots, with many-jointed spikes and muricate glumes ..... (11) A. *squarrosus*
2. Racemes whorled, pedicellate on the capillary branches of an erect panicle, usually reduced to one or two terminal joints. Spikelets somewhat laterally compressed. (Subgenus Chrysopogon.)
   3. Stem creeping, the flowering branches erect, the callus long, acicular ..... (12) A. *aciculatus*

1. Sessile spikelet of the lowest pair or of several of the lower pairs in each raceme, differing from the upper pairs in sex or awns, or empty. (Series B. *Heterozygi.*)
2. Racemes usually three to many, digitate, all pedicellate or all sessile, not subtended by a leaf-sheath. Flowering glume usually stalk-like. (Subgenus Dichanthium.)
   3. A slender erect grass with digitate, densely villous racemes ..... (13) A. *sericeus*
2. Racemes solitary or terminal upon the culm or its branches. Spikelets imbricated, the first to fifth pairs homogamous. Awns large, those of all the spikelets with a pointed callus. (Subgenus Heteropogon.)
   3. First glume flat dorsally ..... (15) A. *contortus*
   3. First glume deeply channeled dorsally..... (14) A. *triticeus*
2. Racemes in pairs, terminal upon the culm or its branches, one sessile, always with 1 to 2 basal homogamous pairs of staminate spikelets, the other short pedicelled, with or without homogamous pairs, both together subtended by a sheathing leaf, frequently arranged in a false panicle interrupted by leaves. (Subgenus Cymbopogon.)

3. Column of awn of the fourth glume glabrous; aromatic grasses.
   4. First glume of the sessile spikelet dorsally flat with a deep narrow longitudinal cleft in the center below, the keels narrowly winged from or above the middle ..... (17) *A. schoenanthus*
   4. First glume of the sessile spikelet dorsally flat or with shallow depressions or concave toward the base winged or wing-margined ..... (16) *A. nardus*
3. Column of awn of the fourth glume hirsute; plants inodorous ..... (18) *A. filipendulus*

Subgenus Schizachyrium.

(1) **Andropogon brevifolius** Sw. Prodr. (1788) 26; Hack. in DC. Monog. Phan. 6 (1889) 363; Rolfe in Journ. Bot. 23 (1885) 216; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; Hook. f. Fl. Brit. Ind. 7 (1897) 165; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 370; Pilger in Perk. Frag. Fl. Philip. (1904) 139; Merr. Philip. Journ. Sci. 1 (1906) Suppl. 26.

Luzon. Province of Nueva Viscaya, Quiangan (103 *Merrill*) June, 1902; Province of Bataan, Lamao (6785 *Elmer*) November, 1904; (3306 *Merrill*) October, 1903. Mindanao, Lake Lanao, Camp Keithley (155 *Clemens*) February, 1906.

Tropics of the world.

(2) **Andropogon fragilis** R. Br. Prodr. (1810) 202; Benth. Fl. Austral. 7 (1878) 535. *Andropogon brevifolius* Sw., var. *fragilis* Hack. in DC. Monog. Phan. 6 (1889) 364.

Mindanao, Lake Lanao, Camp Keithley (95 *Clemens*) January, 1906.

Northern Australia and Queensland.

Var. **luzoniensis** Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 267.

Luzon, Province of Benguet, Ambuklao to Daklan (4386 *Merrill*) October, 1905; District of Lepanto, Cervantes to Mancayan (4466 *Merrill*) November, 1905.

Endemic.

Subgenus Diectomis.

(3) **Andropogon fastigiatus** Sw. Prodr. (1788) 26; Hack. in DC. Monog. Phan. 6 (1889) 393; Hook. f. Fl. Brit. Ind. 7 (1897) 167; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 371; Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 267.

Luzon, District of Lepanto, Cervantes to Balili (4461 *Merrill*) November, 1905.

Tropics of both hemispheres.

Subgenus Amphilophis.

(4) **Andropogon intermedius** R. Br. Prodr. (1810) 202; Benth. Fl. Austral. 7 (1887) 531; Hack. in DC. Monog. Phan. 6 (1889) 485; Usteri Beitr. Kenn. Philip. Veg. (1905) 132; Hook. f. Fl. Brit. Ind. 7 (1897) 175; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 373.

Semerara (4142 *Merrill*) July, 1905. "Somewhat intermediate between the type and the variety *haenkei*," Hackel.

China and Australia varieties extending to British India, Caucasas, tropical and south Africa, and Polynesia.

Var. **haenkei** (Presl) Hack. in DC. Monog. Phan. 6 (1889) 486; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *A. haenkei* Presl Rel. Haenk. 1 (1830) 340; Kunth Enum. 1 (1833) 501; Miq. Fl. Ind. Bat. 3 (1859) 489; F.-Vill. Nov.

App. (1883) 316. *Andropogon leptanthus* Steud. Syn. 1 (1855) 391; Miq. Fl. Ind. Bat. 3 (1859) 489; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; Ceron Cat. Pl. Herb. (1892) 183; F.-Vill. Nov. App. (1883) 316. *Rhaphis stricta* Nees in Hook. Kew Journ. 2 (1850) 95.

Philippines (1400 *Cuming*). Luzon, Province of Nueva Viscaya, Dupax (313 *Merrill*) May, 1902; near Quiangan (*Merrill*) June, 1902; Province of Union, Bauang (5735 *Elmer*) February, 1904; Province of Rizal, Morong (1426 *Ramos*) August, 1906. Mindanao, Province of Surigao, Caraga (5456 *Merrill*) October, 1906.

Southern China and Ceylon.

(5) **Andropogon micranthus** Kunth Rev. Gram. 1 (1835) 165; Enum. 1 (1833) 504; Hack. in DC. Monog. Phan. 6 (1899) 488 (var. *genuinus*); Hook. f. Fl. Brit. Ind. 7 (1897) 178; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 374; Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Andropogon alternans* Presl Rel. Haenk. 1 (1830) 342. *A. parvispica* Steud. Syn. 1 (1855) 397. *Chrysopogon violascens* Trin. in Mém. Acad. St. Pétersb. VI. 2 (1833) 319. *C. villosulus* Vid. Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; Ceron Cat. Pl. Herb. (1892) 133.

Philippines (980, 1397 *Cuming*). Luzon, Province of Benguet (6593 *Elmer*) June, 1904; (4434, 4703 *Merrill*) October-November, 1905; Province of Nueva Viscaya, Bagabag (118 *Merrill*) June, 1902.

British India to Japan, Malaya, and Australia.

Var. **spicigerus** (Benth.) Hack. in DC. Monog. Phan. 6 (1889) 489. Philip. Journ. Sci. 1 (1906) Suppl. 267. *Chrysopogon parviflorus* var. *spicigerus* Benth. Fl. Austral. 7 (1878) 538.

Luzon, Province of Benguet, Mount Tonglon (4836 *Merrill*) November, 1905; Baguio (4854 *Curran*) August, 1906.

China, Australia, and New Caledonia.

Subgenus Sorghum.

(6) **Andropogon halepensis** (Linn.) Brot. Fl. Lusit. 1 (1804) 89, var. **propinquus** (Kunth). *Andropogon propinquus* Kunth Enum. 1 (1833) 502. *A. affinis* Presl Rel. Haenk. 1 (1830) 343, non R. Br. *A. sorghum* subsp. *halepensis* Hack., var. *propinquus* Hack. in DC. Monog. Phan. 6 (1889) 503; Pilger in Perk. Frag. Fl. Philip. (1904) 140; Usteri Beitr. Kenn. Philip. Veg. (1905) 132. *Sorghum halepanse* Pers. Syn. 1 (1804) 101; F.-Vill. Nov. App. (1883) 317; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291. *Andropogon halepensis* Usteri Beitr. Kenn. Philip. Veg. (1905) 132.

Luzon, Province of Cagayan, Tuguegarao (185 *Bolster*) October, 1905; Province of Rizal, Morong (1374 *Ramos*) August, 1906; Province of Laguna, Los Baños (*Hallier*) December, 1903; Province of Tayabas, Atimonan (46 *Gregory*) August, 1904; Province of Nueva Viscaya, Dupax (259 *Merrill*) May, 1902; Province of Pampanga, Arayat (1468 *Merrill*) March, 1903. Mindoro, Baco River (122 *McGregor*) April, 1905. Balabac (490 *Mangubat*) March, 1906. Mindanao, District of Davao (466 *Copeland*) March, 1904; (281 *DeVore & Hoover*) April, 1903; Lake Lanao, Camp Keithley (398 *Clemens*) March, 1906. Palmas (5362 *Merrill*) October, 1906.

Ceylon, Moluccas, and Amboina, i. e., the variety; the species widely distributed in tropical and warm regions of the world.

(7) **Andropogon sorghum** (Linn.) Brot. Fl. Lusit. 1 (1804) 88; Kunth Enum. 1 (1833) 581; Hack. in DC. Monog. Phan. 6 (1889) 500; Hook. f. Fl. Brit. Ind. 7 (1897) 183. *A. sorghum* Brot., subsp. *satirus* Hack., var. *saccharatus* Hack. in DC. Monog. Phan. 6 (1889) 505; Pilger in Perk. Frag. Fl. Philip.

(1904) 140. *Sorghum vulgare* Pers. Syn. 1 (1804) 101; Miq. Fl. Ind. Bat. 3 (1859) 502. *S. saccharatum* Pers. l. c. 101; F.-Vill. Nov. App. (1883) 317; Vidal Rev. Pl. Vasc. Filip. (1886) 291; Ceron Cat. Pl. Herb. (1892) 291. *Andropogon sorghum* var. *saccharatum* Usteri Beitr. Kenn. Philip. Veg. (1905) 132. *Holcus saccharatus* Linn. Sp. Pl. (1753) 1047; Blanco Fl. Filip. ed. 1 (1837) 47; ed. 2 (1845) 32; ed. 3, 1 (1877) 58; Naves l. c. *t. 436*. *H. sorghum* Linn. l. c.

Culion (492 *Merrill*) December, 1902. Luzon, Province of Pangasinan, Rosales (47 *Alberto*) May, 1904; Province of Zambales, Subic (*Hallier*) December, 1903. T., V., B., *Batad*.

Generally cultivated in tropical and temperate regions; not spontaneous in the Philippines. Sorghum.

(8) **Andropogon serratus** Thunb. Fl. Jap. (1784) 41; Hack. in DC. Monog. Phan. 6 (1889) 521 (var. *genuinus*). *Sorghum fulvum* Beauv. Agrost. (1812) 164; F.-Vill. Nov. App. (1883) 317; Rendle in Forbes & Hemsl. Journ. Linn. Soc. 36 (1904) 367.

Luzon, Province of Benguet (5958 *Elmer*) March, 1904; (4297 *Merrill*) November, 1905.

Japan to China, Malaya, and Australia.

Var. **nitidus** (Vahl) Hack. in DC. Monog. Phan. 6 (1889) 522; Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Sorghum nitidum* Pers. Syn. 1 (1805) 101. *Holcus nitidus* Vahl Symb. 2 (1791) 102. *Andropogon fuscus* Presl Rel. Haenk. 1 (1830) 342; Kunth Enum. 1 (1833) 503. *Sorghum fuscum* Miq. Fl. Ind. Bat. 3 (1859) 503; F.-Vill. Nov. App. (1883) 317; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; Ceron Cat. Pl. Herb. (1892) 184. *Andropogon pedicellatus* Steud. Syn. 1 (1855) 394; Miq. Fl. Ind. Bat. 3 (1859) 488; F.-Vill. Nov. App. (1883) 316.

Philippines (1395 *Cuming*). Luzon, Province of Benguet, Twin Peaks (6471 *Elmer*) June, 1904; Province of Pangasinan, Humingan (263 *Merrill*) May, 1902. Semerara (4143 *Merrill*) July, 1905. Mindoro, Calapan (889 *Merrill*) April, 1903. Mindanao, Davao (183 *DeVore & Hoover*) April, 1903; Lake Lanao (597 *Clemens*) June, 1906.

India to China, Formosa, and Malaya.

Var. **nitidus** Hack. forma **hirsuta** Pilger in Perk. Frag. Fl., Philip. (1904) 140.

Luzon, Province of Isabela, Echague (137 *Merrill*) June, 1902.

(9) **Andropogon baileyi** F. Muell. in Victorian Naturalist 7 (1891) 16; Philip. Journ. Sci. 1 (1906) Suppl. 267. *Sorghum laxiflorum* Bailey Rep. Exp. Bellend. Ker's Range 25, non *Andropogon laxiflorus* Steud.

Luzon, Province of Benguet, Ambuklao to Daklan (4399 *Merrill*) October, 1905. Palmas (5360 *Merrill*) October, 1906.

Australia.

(10) **Andropogon leptos** Steud. Synopsis 1 (1855) 397; Hack. in DC. Monog. Phan. 6 (1889) 537; Philip. Journ. Sci. 1 (1906) Suppl. 268. *Chrysopogon tener* Nees in Steud. l. c.

Luzon, Province of Benguet, Bued River (4322 *Merrill*) November, 1905.

Distribution unknown, probably southern Asia or Malaya. The type of the species is from "Andor," no other data being given.

Subgenus Vetiveria.

(11) **Andropogon squarrosus** Linn. f. Suppl. 433; Hack. in DC. Monog. Phan. 6 (1889) 542; Hook. f. Fl. Brit. Ind. 7 (1897) 186. *Andropogon muricatus* Retz. Obs. 3: 43; 5: 20; F.-Vill. Nov. App. (1883) 316. *Andropogon festucoides*

Presl Rel. Haenk. 1 (1830) 340; Miq. Fl. Ind. Bat. 3 (1859) 489; Kunth Enum. 1 (1833) 500; F.-Vill. Nov. App. (1883) 316. *Andropogon nardus* Blanco Fl. Filip. ed. 1 (1837) 39; ed. 2 (1845) 27; ed. 3, 1 (1877) 51, non Linn. *Andropogon anius* Llanos Frag. Pl. Filip. (1859) 21, ex descr.

Luzon. Manila (*Scribner*) August, 1902. Province of Pampanga, Arayat (4231 *Merrill*) September, 1905; Calumpit (4240 *Merrill*) September, 1905.

British India, tropical Africa, and Malaya; cultivated in tropical America.

Subgenus Chrysopogon.

(12) **Andropogon aciculatus** Retz. Obs. 5 (1779-91) 22; Hack. in DC. Monog. Phan. 6 (1889) 562; Blanco Fl. Filip. ed. 2 (1845) 26; Pilger in Perk. Frag. Fl. Philip. (1904) 139; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 26. *Chrysopogon aciculatus* Trin. Fund. Agrost. (1820) 188; Miq. Fl. Ind. Bat. 3 (1859) 490; Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; F.-Vill. Nov. App. (1883) 316. *Andropogon subulatus* Presl Rel. Haenk. 1 (1830) 341; Kunth Enum. 1 (1833) 505. *Chrysopogon subulatus* Miq. Fl. Ind. Bat. 3 (1859) 491. *Rhaphis trivalvis* Lour. Fl. Cochinch. (1790) 553; Blanco Fl. Filip. ed. 1 (1837) 45.

Philippines (555 *Cuming*). Luzon, Manila (367 *Merrill*) July, 1902; (11 *Scribner*) June, 1902; Province of Benguet (6591 *Elmer*) June, 1904; Province of Pangasinan, Rosales (272 *Merrill*) May, 1902; Province of Bataan, Lamao (801 *Borden*) May, 1904; (385 *Whitford*) June, 1904; Province of Pampanga, Bacolor (43 *Parker*) May, 1904. Sibuyan (17 *McGregor*) July, 1904. Palawan (4186 *Curran*) May, 1906. Mindanao, Davao (225 *DeVore & Hoover*) April, 1903; (549 *Copeland*) March, 1904. Sp.-Fil., *Amores secos.*

Mauritius, tropical Asia, Malaya, Australia, and Polynesia.

Subgenus Dichanthium.

(13) **Andropogon sericeus** R. Br. Prodr. (1810) 201; Hack. in DC. Monog. Phan. 6 (1889) 575; Rolfe in Journ. Bot. 23 (1885) 216; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Andropogon tenuiculus* Steud. Synopsis 1 (1855) 371. *Heteropogon tenuiculus* Miq. Fl. Ind. Bat. 3 (1859) 494; F.-Vill. Nov. App. (1883) 315.

Philippines (1398 *Cuming*). Luzon, Province of Nueva Ecija, Carranglang (266 *Merrill*) May, 1902.

Philippines to New Guinea, Australia, and New Caledonia.

Subgenus Heteropogon.

(14) **Andropogon triticeus** R. Br. Prodr. (1810) 201; Hack. in DC. Monog. Phan. 6 (1889) 588; Hook. f. Fl. Brit. Ind. 7 (1897) 200. *Andropogon ischyranthus* Steud. Synopsis 1 (1855) 367. *A. lianthcrus* Steud. l. c. *Heteropogon ischyranthus* Miq. Fl. Ind. Bat. 3 (1859) 493; F.-Vill. Nov. App. (1883) 315. *Heteropogon insignis* Thwaites Enum. Pl. Zeyl. 437; F.-Vill. l. c. 315.

Philippines (1603 *Cuming*).

British India to Malaya and Australia.

(15) **Andropogon contortus** Linn. Sp. Pl. (1753) 1045; Hack. in DC. Monog. Phan. 6 (1889) 585; Hook. f. Fl. Brit. Ind. 7 (1897) 199; Usteri Beitr. Kenn. Philip. Veg. (1905) 132; Pilger in Perk. Frag. Fl. Philip. (1904) 139; Blanco Fl. Filip. ed. 1 (1837) 38; ed. 2 (1845) 26; ed. 3, 1 (1877) 49. *Heteropogon contortus* Beauv. ex R. et S. Syst. 2 (1817) 836; Miq. Fl. Ind. Bat. 3 (1859) 493; F.-Vill. Nov. App. (1883) 315; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 366. *Heteropogon polystachyus* F.-Vill. Nov. App. (1883) 315, non Schult.

Luzon, Manila (90 *Merrill*) May, 1902; (63 *McGregor*) October, 1904: Province of Nueva Ecija, Humingan (289 *Merrill*) May, 1902: Province of Union, Bauang (5699 *Elmer*) February, 1904: Province of Rizal, Caloocan (3677 *Merrill*) November, 1903.

Nos. 90 and 289 *Merrill* were referred by Pilger l. c. to the subvariety *hispidissimus* Hack., which has been found in the Philippines (1615 *Cuming*). The two numbers are, however, referable to the subvar. *typicus* Hack.

Generally distributed in the warmer parts of the World.

Subgenus Cymbopogon.

(16) **Andropogon nardus** Linn. Sp. Pl. (1753) 1046 var. **hamatulus** (Nees) Hack. in DC. Monog. Phan. **6** (1889) 606; Pilger in Perk. Frag. Fl. Philip. (1904) 140; *A. hamatulus* Nees in Hook. et Arn. Bot. Beechy's Voy. (1841) 244; Steud. Syn. **1** (1855) 388 "*hamulatus*." *A. nardus* Rolfe in Journ. Bot. **23** (1885) 216; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291. *Cymbopogon nardus* Rendle, var. *hamatulus* Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 244. *Anthistiria tortilis* Presl Rel. Haenk. **1** (1830) 347; F.-Vill. Nov. App. (1883) 317.

Philippines (1000 *Cuming*). Luzon, Province of Nueva Ecija, Carranglang (244 *Merrill*) May, 1902. Cagayan de Sulu (5307 *Merrill*) October, 1906.

Formosa and southern China, i. e., variety. The species and other varieties in tropical Asia, Africa, Malaya, and America.

(17) **Andropogon schoenanthus** Linn. Sp. Pl. (1753) 1046; Blanco, Fl. Filip. ed. 1 (1873) 39; ed. 2 (1845) 27; ed. 3, **1** (1877) 50; Hack. in DC. Monog. Phan. **6** (1889) 609; Hook. f. Fl. Brit. Ind. **7** (1897) 204; F.-Vill. Nov. App. (1883) 316. *Cymbopogon schoenanthus* Spreng. Pl. Min. Cogn. Pug. **2** (1815) 14; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 377.

Mindoro, Calapan (*Merrill*) December, 1906.

This species is not a native of the Philippines and is only occasionally cultivated for local use, and not on a commercial scale. I have previously doubted the correctness of Blanco's identification,[6] his description being very imperfect. I have not seen flowering specimens from the Philippines. Well-informed natives state that the species rarely flowers. T., *Salaŭ, Tanglad.* V., *Baliyoco.* Sp.-Fil., *Paja de meca.* The source of Lemon-grass oil of commerce.

Tropical Asia to China and tropical Africa.

(18) **Andropogon filipendulus** Hochstett. in Flora **29** (1846) 115. var. **lachnatherus** (Benth.) Hack. in DC. Monog. Phan. **6** (1889) 635; Philip. Journ. Sci. **1** (1906) Suppl. 267. *Andropogon lachnatherus* Benth. Fl. Austral. **7** (1878) 534.

Luzon, Province of Benguet (4398 *Merrill*) October-November, 1905; (6392 *Elmer*) May, 1904.

Queensland and New South Wales, i. e., the variety; the species and other varieties in British India, Ceylon, and tropical Africa.

Forma **bispiculata** Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 267.

Luzon, Province of Benguet, Bued River (4298 *Merrill*) November, 1904.

Endemic.

EXCLUDED SPECIES.

Andropogon eriostachyus Presl Rel. Haenk. **1** (1830) 339; Kunth Enum. **1** (1833) 496; Miq. Fl. Ind. Bat. **3** (1859) 487; F.-Vill. Nov. App. (1883) 316=*Andropogon ternatus* Nees, var. *eriostachyus* (Presl) Hack. in DC. Monog.

[6] *Publications of the Bureau of Government Laboratories* (1905) **27**: 92.

Phan. 6 (1889) 425. Erroneously credited to the Philippines by Presl, but a tropical American species.

Heteropogon tenellus Schult.: F.-Vill. Nov. App. (1883) 316=*Andropogon tenellus* Roxb.=*Andropogon caricosus* Linn.

A species of British India and Malaya. F.-Villar's record of the plant having been found in the Philippines has never been verified, his identification undoubtedly having been erroneous.

(20) THEMEDA Forsk.

Coarse or slender grasses, the racemes united into the false panicles, the lower spikelets of each raceme unawned, staminate forming a false whorl about the 1 to 3 middle perfect spikelets which are long-awned, the fascicles included in a foliaceous bract.

Species nine in the warmer countries of the Old World; two in the Philippines.

1. Involucrant spikelets inserted on a level, all sessile; glumes three. A slender grass ..... (1) *T. triandra*
1. Involucrant bristles in superposed pairs; glumes three or four. A very coarse erect grass ..... (2) *T. gigantea*

(1) **Themeda triandra** Forsk. Fl. Aeg.-Arab. (1775) 178; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 377; *Themeda forskalii* Hack. in DC. Monog. Phan. 6 (1889) 659; Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Anthistiria ciliata* F.-Vill. Nov. App. (1883) 317, non Linn. *A. depauperata* Anderss. Nov. Act. Upsal. III. 2 (1856) 243; F.-Vill. Nov. App. (1883) 317. *Anthistiria imberbis* Retz. Obs. 3: 11; Hook. f. Fl. Brit. Ind. 7 (1897) 211.

Luzon, Province of Cagayan (168 *Bolster*) August, 1905: Province of Rizal, Bosoboso (1109 *Ramos*) July, 1906: Province of Nueva Ecija, Carranglang (265 *Merrill*) May, 1902: Province of Benguet (5764 *Elmer*) March, 1904; (4433 *Merrill*) October, 1905; (4928 *Curran*) August, 1906. Semerara (4158 *Merrill*) June, 1905. Busuanga (3551 *Curran*) December, 1905. Mindanao, Zamboanga (*Hollier*) February, 1904.

The above numbers are all referable to the variety *imberbis* Hack. in DC. Monog. Phan. 6 (1889) 661. Variety *vulgaris* Hack., has also been found in the Philippines, fide Hack. l. c. (No. 1637, 1873 *Cuming*).

Warmer parts of the Old World.

(2) **Themeda gigantea** (Cav.) Hack. var. **genuina** Hack. in DC. Monog. Phan. 6 (1889) 670; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 377; Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Anthistiria gigantea* Cav. Icon. 5 (1799) 36. *t. 458;* Hook. f. Fl. Brit. Ind. 7 (1897) 377; Blanco Fl. Filip. ed. 1 (1837) 49; ed. 2 (1845) 33; ed. 3. 1 (1877) 62; F.-Vill. Nov. App. (1883) 317; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 292; Ceron Cat. Pl. Herb. (1892) 184. *Perobachne secunda* Presl Rel. Haenk. 1 (1830) 348. *t. 48;* Kunth Enum. 1 (1833) 485; Miq. Fl. Ind. Bat. 3 (1859) 507; F.-Vill. Nov. App. (1883) 317. *Androscepia gigantea* Brongn. in Duperr. Voy. Coqu. Bot. (1829) 78; Kunth Enum. 1 (1833) 484; Miq. Fl. Ind. Bat. 3 (1859) 506. *Calamina gigantea* R. et S. Syst. 2 (1817) 810, non Beauv.

Luzon, Province of Cagayan (135 *Bolster*) July, 1905: Province of Benguet, Twin Peaks (6429 *Elmer*), June, 1904: Province of Rizal, Tanay (2314 *Merrill*) May, 1903; Bosoboso (961 *Ramos*) June, 1906: Province of Zambales, Subic (2086 *Merrill*) April, 1903: Province of Nueva Ecija, San Jose (294 *Merrill*) May, 1902. Semerara (4156 *Merrill*) June, 1905. Cuyo (442 *Merrill*) December, 1902.

Endemic, i. e., the var. *genuina;* other varieties extending from British India to China and Malaya.

Var. **vulpina** (Anderss.) Hack. in DC. Monog. Phan. 6 (1889) 673; Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Anthistiria vulpina* Anderss. Nov. Act. Upsal. III. 2 (1856) 423. *Anthistiria arundinacea* Rolfe in Journ. Bot. 23 (1885) 216; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 292; Ceron Cat. Pl. Herb. (1892) 184.

PHILIPPINES (1272 *Cuming*). LUZON, Province of Pangasinan, Rosales (262 *Merrill*) May, 1902.

Philippines and British India.

Subsp. **intermedia** Hack. var. **dubia** Hack. in DC. Monog. Phan. 6 (1889) 675.

PHILIPPINES (1609 *Cuming*) fide Hackel l. c.

Endemic.

Tribe III. ZOISIEÆ.

Spikelets solitary or in groups, usually 1-flowered, the flowering glume always awnless, membranous, the empty glumes firmer, frequently awned. Rhachis continuous. Otherwise as in Andropogoneæ. Low grasses.

(21) PEROTIS Ait.

Spikelets narrow, delicate, the empty glumes very long-awned, usually standing at right angles to the axis of the long usually slender spikes.

Species three, Tropics of the Old World, two in the Philippines.

1. Leaves flat, 4 to 5 mm. wide; empty glumes including the awns less than 1 cm. long ..... (1) *P. indica*
1. Leaves narrow, 1 to 2 mm. wide; short, stiff; empty glumes including the awns about 2 cm. long ..... (2) *P. rara*

(1) **Perotis indica** (Linn.) O. Kuntze Rev. Gen. Pl. (1891) 787. *Anthoxanthum indicum* Linn. Sp. Pl. (1753) 28. *Perotis latifolia* Ait. Hort. Kew. 1 (1789) 85; Hook. f. Fl. Brit. Ind. 7 (1897) 98; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 343; Vidal Phan. Cuming. Philip. (1885) 158; F.-Vill. Nov. App. (1883) 313. *P. glabrata* Steud. Syn. 1 (1855) 186; Miq. Fl. Ind. Bat. 3 (1859) 313; F.-Vill. Nov. App. (1883) 313. Presl Rel. Haenk. 1 (1830) 228.

PHILIPPINES (1399 *Cuming*).

Tropical Asia, Africa, and Malaya.

(2) **Perotis rara** R. Br. Prodr. (1810) 172; Benth. Fl. Austral. 7 (1878) 509; F.-Vill. Nov. App. (1883) 314; Miq. Fl. Ind. Bat. 3 (1859) 479; *Xystidium maritimum* Trin. Fund. Agrost. (1820) 102. *t. 2.* ? *X. barbatum* Presl Rel. Haenk. 1 (1830) 228; Scribn. Rept. Mo. Bot. Gard. 10 (1899) 55.

LUZON. District of Lepanto, Suyoc to Cervantes (4447 *Merrill*) November, 1905.

Australia.

This species is reduced by some authors to the preceding, but judging from the material available it is sufficiently distinct. I am not sure of the correctness of the reference of *Xystidium maritimum* Trin., to the present species, as I have not been able to consult Trinius's Fundamenta Agrostographiae, where the species is described. Bentham[7] states that the Philippine form (*Xystidium maritimum*) appears to be intermediate between *P. latifolia*=*P. indica*, and *P. rara*.

[7] Fl. Austral. 7 (1878) 509.

(22) ZOISIA Willd. (*Zoysia* Auct.)

Spikes slender. Spikelets closely appressed; empty glume one compressed, keeled, coriaceous, surrounding the flowering glume and palea. Creeping maritime grasses with erect flowering stems and rigid leaves.

Species two or three, southern and eastern Asia to the Mascarene Islands, Australia, and New Zealand; one in the Philippines.

(1) **Zoisia pungens** Willd. in Ges. Naturf. Fr. N. Schrift. 3 (1801) 441; Miq. Fl. Ind. Bat. 3 (1859) 859; F.-Vill. Nov. App. (1883) 313; Hook. f. Fl. Brit. Ind. 7 (1897) 99; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 344; Pilger in Perk. Frag. Fl. Philip. (1904) 140; Merr. Philip. Journ. Sci. 1 (1906) Suppl. 26. *Agrostis matrella* Linn. Mant. 2: 185. *Osterdammia matrella* O. Kuntze Rev. Gen. Pl. (1891) 781.

Luzon, Manila (27 *Merrill*) April, 1902; Province of Bataan, Lamao (1303 *Whitford*) June, 1905. Panay, Iloilo (*Copeland*) January, 1904.

Tropical Asia, Malaya, Australia, and the Mascarene Islands.

(*Lappago racemosa* Honck.=*Tragus racemosus* Scop., has been reported from the Philippines by F.-Villar, Nov. App. (1883) 313, but his record has never been verified. The species is to be expected in the Philippines. Tropics of both hemispheres.)

Tribe IV. TRISTEGINEÆ.

Spikelets all perfect, 1 to 2-flowered, in panicled racemes, the rhachis continuous. Empty glumes three, the third sometimes with a staminate flower. Intermediate between *Andropogoneæ* and *Paniceæ*.

(23) ARUNDINELLA Raddi.

Spikelets pedicellate, usually in pairs on the panicle branches, the pedicels of unequal length. First empty glume shorter than the others, the second frequently awned, the third awnless, usually enclosing a staminate flower.

Species about 25, mostly in the tropical regions of the Old World, a few in South America and Mexico; three in the Philippines.

1. Fourth glume with three awns, the lateral ones short, capillary.... (1) *A. setosa*
1. Fourth glume with a single awn.
   2. Spikelets about 2.5 mm. long; a slender softly pubescent annual ..... (2) *A. agrostoides*
   2. Spikelets 4 to 5 mm. long; perennial..... (2) *A. nepalensis*

(1) **Arundinella setosa** Trin. Diss. 2 (1824) 63; Gram. Pan. (1826) 245; Hook. f. Fl. Brit. Ind. 7 (1897) 70; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 342; F.-Vill. Nov. App. (1883) 318; Merr. Philip. Journ. Sci. 1 (1906) Suppl. 179. *Arundinella stricta* Nees in Hook. Kew. Journ. 2 (1850) 102; Miq. Fl. Ind. Bat. 3 (1859) 520. *A. setosa* Trin. var. *stricta* Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Danthonia luzoniensis* Steud. Syn. 1 (1855) 245; Miq. Fl. Ind. Bat. 3 (1859) 427; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 282; Ceron Cat. Pl. Herb. (1892) 184; F.-Vill. (1883) 319. *Arundinella nervosa* F.-Vill. Nov. App. (1883) 318? non Nees.

PHILIPPINES (1415 *Cuming*). LUZON, Province of Benguet (4702, 4271 *Merrill*) October-November, 1905; (5762 *Elmer*) March, 1904: Province of Isabela, Echague (129 *Merrill*) June, 1902.

India and Ceylon to China, Formosa, and Luzon.

(2) **Arundinella agrostoides** Trin. Sp. Gram. Ic. (1836) 23. *t. 265;* Hook. f. Fl. Brit. Ind. 7 (1897) 71; Miq. Fl. Ind. Bat. 3 (1859) 520; F.-Vill. Nov. App. (1883) 318.

PHILIPPINES, fide Hooker f. et Miquel.

British India.

Var. **ciliata** (Roxb.) Hook. f. Fl. Brit. Ind. 7 (1897) 71; Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 268. *Holcus ciliatus* Roxb. Fl. Ind. 1 (1820) 318. *Arundinella ciliata* Nees in Wight Cat. No. 1668.

LUZON, Province of Benguet, Baguio (4328 *Merrill*) October, 1905.

British India.

(3) **Arundinella nepalensis** Trin. Diss. 2 (1824) 62; Sp. Gram. Ic. (1836) *t. 268;* F.-Vill. Nov. App. (1883) 318; Vidal Rev. Pl. Vasc. Filip. (1886) 289; Ceron Cat. Pl. Herb. (1892) 181; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 341. *Arundinella brasiliensis* Hook. f. Fl. Brit. Ind. 7 (1897) 73, in part. *Arundinella miliacea* Nees in Hook. Kew. Journ. 2 (1850) 102; Vidal Phan. Cuming. Philip. (1885) 158.

PHILIPPINES (667 *Cuming*). LUZON, Province of Laguna, Pagsanjan (*Copeland*) February, 1906: Province of Rizal, Tanay (2262 *Merrill*) May, 1903; Montalban (*Merrill*) March, 1906; Bosoboso (30 *Foxworthy*) January, 1906. PALAWAN (856 *Foxworthy*) May, 1906.

India, China, Malaya, and Australia.

Rendle is of the opinion that the Asiatic form is distinct from the American form, the former having larger spikelets than the latter. Hooker reduced the Asiatic form to *Arundinella barsiliensis* Raddi, and if he is correct, then the oldest name for the species is *Arundinella hispida* (Willd.) O. Kuntze (*Andropogon hispidus* Willd. Sp. Pl. 4 (1805) 908). *Andropogon hispidus* Willd., being also a South American plant, Trinius' name is here retained for the species. Hackel in lit. has indicated No. 30 *Foxworthy* as a distinct undescribed species, but the plant is apparently identical with all the other specimens above cited, with the possible exception of No. 856 *Foxworthy*.

(24) THYSONALAENA Nees.

A tall coarse grass with very large panicles and innumerable minute spikelets racemosely disposed. Spikelets as in *Panicum* but the flowering glume is delicate and fringed with hairs.

A monotypic genus of tropical Asia and Malaya, the "Tiger Grass" of British India.

(1) **Thysanolaena maxima** (Roxb.) O. Kuntze Rev. Gen. Pl. (1891) 794; Schum. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 175; Pilger in Perk. Frag. Fl. Philip. (1904) 141. *Agrostis maxima* Roxb. Fl. Ind. 1 (1820) 319. *Thysanolaena agrostis* Nees in Edinb. New Phil. Journ. 18 (1835) 180; Hook. f. Fl. Brit. Ind. 7 (1897) 61. *T. acarifera* Arn. et Nees in Nov. Act. Nat. Cur. 19 (1843) Suppl. 1: 181; Vidal Rev. Pl. Vasc. Filip. (1886) 289; Ceron Cat. Pl. Herb. (1892) 182. *Myriachaeta arundinacea* Zoll. et. Mor. Syst. Verz. Zoll. 101. *Panicum acariferum* Trin. Sp. Gram. Ic. *t.* 87.

LUZON, Province of Benguet, Baguio (5949 *Elmer*) March, 1904: Province of Bataan, Lamao (1126 *Whitford*) March, 1905: Province of Rizal, Montalban

(5050 *Merrill*) March, 1906. MINDORO, Baco River (203 *McGregor*) April, 1905; (1795 *Merrill*) April, 1903. NEGROS, Gimagaan River (1667 *Whitford*) May, 1906. MINDANAO, Province of Misamis, Mataline Falls (3922 *Hutchinson*) March, 1906.

British India and Malaya to New Guinea.

Tribe V. PANICEÆ.

Spikelets one or sometimes two flowered, the second flower staminate, very rarely perfect, in the axil of the third glume, arranged in spikes, racemes, or panicles, the axis usually continuous. Flowering glume and palea of the perfect flower always firmer in texture than the empty glumes, unawned, the empty glumes rarely awned.

(25) PASPALUM Linn.

Spikelets 1-flowered, usually obtuse, in two to four ranked racemes or spikes, these two to many, digitate or disposed in panicles, seldom solitary. Flowering glume and palea cartilaginous; empty glumes two.

Species about 175 in the tropical and subtropical regions of both hemispheres but most abundant in America; four in the Philippines.

1. Spikes geminate at the ends of the culms.
   2. Leaves broad, flat; spikelets suborbicular, 3 mm. long, the hyaline margins of the second glume ciliate ..... (3) *P. conjugatum*
   2. Leaves distichous, narrow; spikelets ovate-oblong, about 3 mm. long, glabrous ..... (4) *P. distichum*
1. Spikes alternate on an elongated rhachis.
   2. Spikelets mostly 4-ranked ..... (2) *P. longifolium*
   2. Spikelets 2-ranked ..... (1) *P. scrobiculatum*

(1) **Paspalum scrobiculatum** Linn. Mant. (1767) 29; Miq. Fl. Ind. Bat. **3** (1859) 431; Kunth Enum. **1** (1833) 53; F.-Vill. Nov. App. (1883) 310; Vidal Phan. Cuming. Philip. (1885) 156; Rev. Pl. Vasc. Filip. (1886) 286; Ceron Cat. Pl. Herb. (1892) 179; Hook. f. Fl. Brit. Ind. **7** (1897) 10; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 320; Mez in Perk. Frag. Fl. Philip. (1904) 141; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 26. *Paspalum cartilagineum* Presl Rel. Haenk. **1** (1830) 216; Miq. Fl. Ind. Bat. **3** (1859) 432; F.-Vill. Nov. App. (1883) 310; Schum. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 175; Scribn. Rept. Mo. Bot. Gard. **10** (1899) 49. *Paspalum villosum* Blanco Fl. Filip. ed. 1 (1837) 40; ed. 2 (1845) 28; ed. 3, **1** (1877) 53 ? non Thunb. *Paspalum sumatrense* Roth; F.-Vill. Nov. App. (1883) 310. *Paspalum kora* Willd. Sp. Pl. **1** (1797) 332; Presl Rel. Haenk. **1** (1830) 216. *Paspalum thunbergii* Kunth ex Steud. Syn. **1** (1855) 28; Mez in Perk. Frag. Fl. Philip. (1904) 141.

LUZON, Manila (8 *Merrill*) April, 1902; (6 *Scribner*) June, 1902; Province of Benguet (4793 *Merrill*) November, 1905; (5759 *Elmer*) March, 1904; (4844 *Curran*) August, 1906; District of Lepanto, Balili (4629 *Merrill*) November, 1905; Province of Nueva Ecija, Carranglang (235 *Merrill*) May, 1902; Province of Bataan, (3140 *Merrill*) October, 1903. CULION (479 *Merrill*) December, 1902. BALABAC (469 *Mangubat*) March, 1906. BASILAN (48 *DeVore & Hoover*) April, 1903. MINDANAO, Lake Lanao, Camp Keithley (*Clemens*) December, 1905.

Tropical and warm countries of the world.

Schumann and Lauterbach retain *Paspalum cartilagineum* Presl, as a distinct

species, but I have followed Scribner, who has examined Haenke's specimen on which the species is based, in reducing *Paspalum cartilagineum* Presl to *P. scrobiculatum* Linn., as I can detect no characters in the description of the former by which it can be satisfactorily distinguished from the latter. I can also see no reason for retaining *Paspalum thunbergii* Kunth as a distinct species, assuming that Mez was correct in his identification of some of the specimens referred to that species in Perk. Frag. Fl. Philip. (1904) 141.

Var. **auriculatum** (Presl) *Paspalum auriculatum* Presl Rel. Haenk. 1 (1830) 217; Kunth Enum. 1 (1833) 54; Miq. Fl. Ind. Bat. 3 (1859) 432; F.-Vill. Nov. App. (1883) 217.

Palawan (Paragua) Point Separation (820 *Merrill*) February, 1903; Iwahig (843 *Foxworthy*) May, 1906. Palmas (5361 *Merrill*) October, 1906.

A much more robust form than the species with larger spikelets, possibly the same as the species described by Forster as *Paspalum orbiculare*. (*P. scrobiculatum* Linn. var. γ Kunth Enum. 1 (1833) 53.)

Var **philippinense** var. nov.

Vaginae longe-piloso-ciliatae; spiculae ovatae, acutae, 2.3 mm. longae, bi vel triseriales; glumae 3-nervae, acutae vel leviter acuminatae, pubescentes. Ceteroquin ut *P. scrobiculatum* Linn. *Paspalum thunbergii* Mez in Perk. Frag. Fl. Philip. (1904) 141, pro parte.

Culion (478 *Merrill*) December, 1902. Luzon, Province of Nueva Viscaya, Bayombong (140a *Merrill*) June, 1902: Province of Rizal, Morong (1449 *Ramos*) August, 1906.

Endemic.

(2) **Paspalum longifolium** Roxb. Hort. Beng. (1814) 7; Schum. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 176; Mez in Perk. Frag. Fl. Philip. (1904) 141; Ustri Beitr. Kenn. Philip. Veg. (1905) 133. *Paspalum flexuosum* Klein in Presl Rel. Haenk. 1 (1830) 215; Kunth Enum. 1 (1833) 54; Miq. Fl. Ind. Bat. 3 (1859) 433; F.-Vill. Nov. App. (1883) 310.

Luzon, Province of Nueva Viscaya, Bayombong (140 *Merrill*) June, 1902. Mindoro, Calapan (941 *Mangubat*) June, 1906. Bohol (1250 *McGregor*) June, 1906. Mindanao, Davao (101 *DeVore & Hoover*) April, 1903; (371 *Copeland*) March, 1904: Lake Lanao, Camp Keithley (399 *Clemens*) March, 1906.

British India to Malaya, New Guinea, and Polynesia.

Hooker f.,[8] reduces this species to *Paspalum scrobiculatum* Linn., and perhaps correctly so. I have referred the form with 2-ranked spikelets to *Paspalum scrobiculatum* Linn., and the form with 4-ranked spikelets to *Paspalum longifolium* Roxb.

(3) **Paspalum conjugatum** Berg. in Act. Helvet. 7 (1772) 129. *t. 8;* Trin. Gram. Pan. 25; Sp. Gram. Ic. *t. 102;* Kunth Enum. 1 (1833) 51; Hook. f. Fl. Brit. Ind. 7 (1897) 11; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 319; Merr. in Govt. Lab. Publ. 6 (1904) 28; Mez in Perk. Frag. Fl. Philip. (1904) 141.

Luzon, Manila (34 *Merrill*) May, 1902; (61 *McGregor*) October, 1904: Province of Principe, Baler (1137 *Merrill*) September, 1902: Province of Tayabas, Sariaya (573 *Whitford*) August, 1904. Basilan (49, 50 *DeVore & Hoover*) April, 1903. Mindanao, Lake Lanao, Camp Keithley (147 *Clemens*) February, 1906: District of Davao (180 *DeVore & Hoover*) April, 1903; (575 *Copeland*) March, 1904.

Widely distributed in the Tropics, probably a native of the New World.

[8] Fl. Brit. Ind. 7 (1897) 11.

(4) **Paspalum distichum** Linn. Amoen. Acad. 5 (1760) 391; Hook. f. Fl. Brit. Ind. 7 (1897) 12; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 319; Usteri Beitr. Kenn. Philip. Veg. (1905) 133; F.-Vill. Nov. App. (1883) 310. *Paspalum longiflorum* Retz.; Presl Rel. Haenk. 1 (1830) 208. *Paspalum digitaria* Poir. in Lam. Encycl. 4: 316.

LUZON, Province of Pampanga, San Esteban (4253 *Merrill*) September, 1905. SAMAR, Oras (5229 *Merrill*) October, 1906.

Tropical and warm countries generally.

EXCLUDED SPECIES.

PASPALUM ELEGANS Flügge; F.-Vill. Nov. App. (1883) 310, an American species, Villar's identification undoubtedly being erroneous.

PASPALUM CHRYSOTRICHUM Presl Rel. Haenk. 1 (1830) 211; Kunth Enum. 1 (1833) 64; Miq. Fl. Ind. Bat. 3 (1859) 431; F.-Vill. Nov. App. (1883) 310.

"Habitat in Luzonia" Presl. Probably erroneously localized and a native of tropical America, not the Philippines. From the description it appears to be a synonym of *Paspalum aureum* H. B. K., an American species.

PASPALUM BORYANUM Presl Rel. Haenk. 1 (1830) 209; Kunth Enum. 1 (1833) 52; Miq. Fl. Ind. Bat. 3 (1859) 432; F.-Vill. Nov. App. (1883) 310.

"Hab. ad Sorsogon" Presl. Although credited to Luzon by Presl, this may be an American species. It is possibly referable to *Digitaria*.

(26) DIGITARIA Scop.

Spikes usually digitately arranged at the summit of the culms. Spikelets narrow, acute or acuminate, in twos or threes on one side of a flat, winged, or triangular rhachis; glumes three or four, the three outer ones membranous, the first often minute or wanting.

Species about 25, widely distributed in tropical and temperate regions, by some authors referred to *Paspalum*, by others to *Panicum;* five species in the Philippines.

1. Spikelets about 3 mm. long.
   2. Spikes many, 10 to 20, scattered or whorled along a somewhat elongated axis ..... (2) *D. consanguinea*
   2. Spikes few, 2 to 6, digitate or approximate at the apex of the culm ..... (1) *D. sanguinalis*
1. Spikelets about 1.5 mm. long.
   2. Spikes digitate or approximate at the ends of the culms.
      3. Spikes usually two or three, less than 5 cm. long; culms short, erect from a prostrate creeping base ..... (3) *D. longiflora*
      3. Spikes 3 to 10, frequently 10 cm. long; culms elongated, erect, the base scarcely prostrate or creeping ..... (4) *D. violascens*
   2. Spikes alternate, scattered along the somewhat elongated common rhachis ..... (5) *D. pedicellaris*

(1) **Digitaria sanguinalis** (Linn.) Scop. Fl. Carn. ed. 2, 1 (1772) 52; Miq. Fl. Ind. Bat. 3 (1859) 437; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 325. *D. inaequalis* Spreng. Syst. 1 (1825) 271. *D. biformis* Willd. Enum. (1809) 92. *D. radicosa* Miq. Fl. Ind. Bat. 3 (1859) 437. *Panicum sanguinale* Linn. Sp. Pl. (1753) 57. *P. didactylum* Kunth; Hack. in Govt. Lab. Publ. 35 (1905) 80. *P. radicosum* Presl Rel. Haenk. 1 (1830) 297; Kunth Enum. 1 (1833) 81; F.-Vill. Nov. App. (1883) 311, ex deser. *Paspalum sanguinale* Lam. Tabl. Encycl. 1 (1791) 176; Hook. f. Fl. Brit. Ind. 7 (1897) 13. *Paspalum inaequale* Link in Kunth Enum. 1 (1833) 48 ex deser. *Panicum*

horizontale Mey. Prim. Fl. Esseq. (1818) 54. *Syntherisma sanguinalis* Dulac Fl. Hautes Pyr. (1867) 77.

Luzon, Province of Benguet, Bued River (4290 *Merrill*) November, 1905; Baguio (5855 *Elmer*) March, 1904: Province of Nueva Viscaya, Bayombong (303 bis *Merrill*) May, 1902: Province of Union, Bauang (5634, 5678 *Elmer*) February, 1904: Province of Zambales, Iba (330 *Merrill*) June, 1902: Manila (89, 40 *Merrill*) May, 1902. Palawan (4172 *Curran*) May, 1906.

Widely distributed in temperate and tropical regions of the world; exceedingly variable.

(2) **Digitaria consanguinea** Gaudich. in Freyc. Voy. Bot. (1826) 410. *Panicum consanguineum* Kunth Enum. 1 (1833) 46. *Panicum sanguinale* Rolfe in Journ. Bot. 23 (1885) 216; Vidal Rev. Pl. Vasc. Philip. (1886) 286; Phan. Cuming. Philip. (1885) 157, non Linn. *Panicum microbachne* Presl Rel. Haenk. 1 (1830) 298; Kunth Enum. 1 (1833) 81. *Paspalum fasciculatum* Llanos Frag. Pl. Filip. (1851) 23, ex descr.

Philippines (561 *Cuming*). Luzon, Province of Nueva Viscaya, Quiangan (104 *Merrill*) June, 1902: Province of Union, Bauang (5592 *Elmer*) February, 1904: Province of Pampanga, Arayat (4230 *Merrill*) September, 1905: Province of Isabela, Echague (128 *Merrill*) June, 1902. Mindoro, Baco River (211 *McGregor*) April, 1905. Culion (483 *Merrill*) December, 1902. Balabac (441 *Mangubat*) March, 1906. Mindanao, Davao (253, 291, 305 *DeVore & Hoover*) May, 1903.

Malaya, Polynesia.

(3) **Digitaria longiflora** (Gmel.) Pers. Syn. 1 (1805) 85; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 324. *Panicum longiflorum* Gmel. Syst. (1788) 158. *Panicum parvulum* Trin. in Mém. Acad. St. Pétersb. VI. 3 (1835) 205; Mez in Perk. Frag. Fl. Philip. (1904) 142. *Paspalum longiflorum* Retz. Obs. 4: 15; Hook. f. Fl. Brit. Ind. 7 (1897) 17. *Paspalum brevifolium* Fluegge Monog. (1810) 150; F.-Vill. Nov. App. (1833) 310: *Paspalum fuscescens* Presl Rel. Haenk. 1 1830) 213, ex descr. *Syntherisma fuscescens* Scribn. Rept. Mo. Bot. Gard. 10 (1899) 49. *pl. 10.*

Luzon, Province of Zambales, Iba (331 *Merrill*) June, 1904: Province of Nueva Ecija, Carranglang (249 *Merrill*) May, 1902: Province of Bataan, Lamao (3268 *Merrill*) October, 1903: Province of Principe, Baler (1129 *Merrill*) September, 1902. Basilan (12 *DeVore & Hoover*) April, 1902. Mindanao, Lake Lanao, Camp Keithley (93, 152 *Clemens*) January, February, 1906.

Japan to India and Malaya.

Regarding *Paspalum fuscescens* Presl, the type locality is first given "Hab. in regione montana Peruviae," but on page 350 of the same work this is corrected to "Hab. ad Monte-Rey, Californiae." As it is known that a considerable number of Presl's Philippine plants were erroneously labeled as having been collected in and about Monterey, California, it seems probable that the type of *Paspalum fuscescens* was a Philippine and not American plant, and although Scribner considers it a valid species, it seems to me to be referable to *Digitaria longiflora* Pers.

(4) **Digitaria violascens** Link. Hort. Berol. 1 (1827) 229. *Panicum violascens* Kunth Rev. Gram. 1 (1829) 33; Enum. 1 (1833) 84. *Paspalum fuscum* Presl Rel. Haenk. 1 (1830) 214, ex descr.; F.-Vill. Nov. App. (1883) 310. *Syntherisma fusca* Scribn. Rept. Mo. Bot. Gard. 10 (1899) 49. *pl. 11.*

Luzon, Province of Benguet, Pauai to Baguio (4788 *Merrill*) November, 1905. Semerara (4148 *Merrill*) June, 1905. Mindanao, Lake Lanao, Camp Keithley (*Clemens*) December, 1905: District of Davao (397 *Copeland*) March, 1904.

Tropical American, Malaya and southern Asia.

Regarding *Paspalum fuscum* Presl, the place of origin of the type specimen is quite uncertain, Presl stating: "Hab. in Luzonia ? in Peruviae montanis huanoccensibus? Mexico?" Scribner, who has examined Haenke's specimen on which the species was based, considers it a good species and transfers it to *Syntherisma*. Judging from Presl's description and Scribner's figure, the latter based on the type, I should refer *Paspalum fuscum* to *Digitaria violascens* Link.

(5) **Digitaria pedicellaris** (Trin.) *Paspalum pedicellare* Trin. ex Steud. Nomen. ed. 2 (1840) 272; Hook. f. Fl. Brit. Ind. 7 (1897) 19. *Panicum pedicellare* Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 268. *Panicum puberulum* Mez in Perk. Frag. Fl. Philip. (1904) 143, non Kunth?

Luzon, Province of Nueva Viscaya, Bagabag (105 *Merrill*) June, 1902: Province of Bataan, Lamao (3164 *Merrill*) October, 1903: Province of Pampanga, Mount Arayat (4225 *Merrill*) September, 1905.

British India.

I can not distinguish the specimen determined by Mez as *Panicum puberulum* from those determined by Hackel as *P. pedicellare*, the specimens agreeing more closely with the description of the latter. Hooker f., cites the older name *Panicum granulare* Trin., as a synonym, but the description of that species available does not closely apply to our material.

DOUBTFUL AND EXCLUDED SPECIES.

Panicum elytroblepharum Steud.: F.-Vill. Nov. App. (1883) 311. Credited to the Philippines by F.-Villar, but the record not verified=*Digitaria barbata* Willd. (*Paspalum heteranthum* Hook. f.). A species of the Malayan Peninsula, Java, and China.

Panicum stipatum Presl. Rel. Haenk. 1 (1830) 297; F.-Vill. Nov. App. (1883) 311. "Hab. in Mexico, Luzon?" Presl.=*Digitaria setosa* Desv. (*Syntherisma setosa* Nash) teste Scribn. Rept. Mo. Bot. Gard. 10 (1899) 48. *pl. 22.* An American species.

Paspalum filiforme Sw.; Presl Rel. Haenk. 1 (1830) 214 F.-Vill. Nov. App. (1883) 310=*Digitaria filiformis* Delile (*Syntherisma filiforme* Nash), teste Scribn. Rept. Mo. Bot. Gard. 10 (1899) 49. "Hab. in Luzonia ? Mexico" Presl. An American species.

Paspalum molle Presl Rel. Haenk. 1 (1830) 213. *Paspalum mollicomum* Kunth Enum. 1 (1883) 310; Miq. Fl. Ind. Bat. 3 (1859) 433; F.-Vill. Nov. App. (1833) 310. *Syntherisma molle* Scribn. Rept. Mo. Bot. Gard. 10 (1899) 50. "Hab. in Luzonia" Presl. Considered by Scribner to be a valid species, but from the description it seems probable that this was an American, and not a Philippine plant, and is possibly referable to *Digitaria serotina* Mich.

(27) ERIOCHLOA Kunth.

Spikelets in racemes and these again arranged in simple or compound racemes. Spikelets as in *Paspalum*, but the callus annulate. Flowering glume mucronate or short awned.

Species five, tropical and subtropical regions of both hemispheres; one in the Philippines.

(1) **Eriochloa ramosa** (Retz.) O. Kuntze, Rev. Gen. Pl. (1891) 775; Hack. in Bull. Acad. Int. Bot. 16 (1906) 19. *Millium ramosum* Retz. Obs. 6 (1791) 22. *Paspalus annulatus* Flügge Monog. (1810) 133. *Eriochloa annulata* Kunth Rev. Gram. 1 (1829) 30; Enum. 1 (1833) 73; F.-Vill. Nov. App. (1883) 311; Mez in Perk. Frag. Fl. Philip. (1904) 141; Usteri Beitr. Kenn. Philip. Veg.

(1905) 132. *Eriochloa punctata* F.-Vill. Nov. App. (1883) 310, non Hamilt. *Helopus laevis* Trin. in Spreng. Neue Entd. 2 (1821) 49; Miq. Fl. Ind. Bat. 3 (1859) 434. *Piptatherum annulatum* Presl Rel. Haenk. 1 (1828) 221. *Spermachiton involutum* Llanos Frag. Pl. Filip. (1851) 25. *Milium zonatum* Llanos l. c. 24? *Eriochloa polystachya* Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 230, non H. B. K.

Luzon, Manila (7 *Merrill*) April, 1902: Province of Tayabas, Atimonan (136 *Gregory*) August, 1904; (695 *Whitford*) August, 1904. Palawan (4182 *Curran*) May, 1906.

Tropics of the Old World.

Var. **involucrata** Hackel, n. var. in herb.

Pilis pedicellorum densis, spiculam plus minus involucrantibus.

Mindoro, Puerto Galera (3333 *Merrill*) October, 1903. Bohol (1247 *McGregor*) June, 1906.

(28) ISACHNE R. Br.

Spikelets in panicles, two-flowered, both perfect, the fruiting glumes with the grain falling out of the persistent empty ones. Mostly low grasses.

Species about 25, in the warmer parts of both hemispheres; 6 in the Philippines.

1. Empty glumes glabrous or nearly so.
   2. Spikelets 1.5 mm. long or less; panicles small, rather dense..... (1) *I. minutula*
   2. Spikelets 2 mm. long; panicles often large, diffuse..... (3) *I. beneckei*
1. Empty glumes hispid.
   2. Spikelets 2 mm. long..... (5) *I. pauciflora*
   2. Spikelets less than 2 mm. long.
      3. Panicles spreading, lax..... (4) *I. debilis*
      3. Panicles reduced to few, 3 to 10 spikelets, scarcely spreading..... (2) *I. myosotis*

(1) **Isachne minutula** (Gaudich.) Kunth Rev. Gram. 2 (1829) *t. 117*; Enum. 1 (1833) 137; Nees in Nov. Act Nat. Cur. 19 (1843) Suppl. 1: 172; Miq. Fl. Ind. Bat. 3 (1859) 460; F.-Vill. Nov. App. (1883) 321; K. Schum. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 180; Mez in Perk. Frag. Fl. Philip. (1904) 141; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 27. *I. pulchella* Mez in Perk. Frag. Fl. Philip. (1904) 141, pro parte. *Panicum minutulum* Gaudich. in Freycin. Voy. Bot. (1826) 410. *Panicum macilentum* Presl Rel. Haenk. 1 (1830) 116; Kunth Enum. 1 (1833) 116; F.-Vill. Nov. App. (1883) 312, ex descr.

Luzon, Manila (*Merrill*) January, 1906: Province of Benguet (4389 *Merrill*) October, 1905: Province of Bataan, Lamao (*Whitford*) September, 1905: Province of Rizal, Morong (1390 *Ramos*) August, 1906: Province of Nueva Viscaya, Quiangan (101 *Merrill*) June, 1902. Culion (462, 467 *Merrill*) December, 1902. Basilan (44 *DeVore & Hoover*) April, 1903; (*Hallier*) January, 1904. Mindanao, Davao (583 *Copeland*) March, 1904. Bucas (5275 *Merrill*) October, 1906.

British India to Malaya and Polynesia; also in South America.

(2) **Isachne myosotis** Nees in Hook. Kew Journ. 2 (1850) 98; Miq. Fl. Ind. Bat. 3 (1859) 462; F.-Vill. Nov. App. (1883) 321; Vidal Phan. Cuming. Philip. (1885) 156; Rev. Pl. Vasc. Filip. (1886) 268; Ceron Cat. Pl. Herb. (1892) 179. *Panicum myosotis* Steud. Syn. 1 (1855) 96.

Luzon, Province of Benguet, Pauai (4709 *Merrill*) November, 1905: District of Lepanto, Balili (4626 *Merrill*) November, 1905. Mindoro, Mount Halcon

(4405 *Merrill*) June, 1906. MINDANAO. Zamboanga, San Ramon (1620 *Copeland*) February, 1905.

Endemic.

I have referred the above specimens to this species with some doubt, as I have not seen No. 946 *Cuming*, on which the species is based. Hackel[9] has referred them to *I. monticola* Büse.

(3) **Isachne beneckei** Hack. in Oesterr. Bot. Zeitschr. **51** (1901) 459; Govt. Lab. Publ. **35** (1905) 79; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 27.

LUZON, Province of Pampanga, Mount Arayat (5019 *Merrill*) February, 1906: Province of Bataan, Mount Mariveles (464 *Whitford*) July, 1904; (3201 *Merrill*) October, 1903: Province of Benguet (4680 *Merrill*) November, 1905: District of Lepanto, Mount Data (4522, 4523, 4544, 4619 *Merrill*) November, 1905.

This is probably the form credited to the Philippines by F.-Villar, Nov. App. (1883) 321, as *Isachne australis* R. Br.

Java.

Var. **magna** n. var.

Culmus erectus, simplex, circiter 1 metralis; paniculae magnae, 15 ad 20 cm. longae, multiflorae; foliis lineari-lanceolatis, 10 ad 18 cm. longis.

LUZON, District of Lepanto, Mount Data (4541 *Merrill*) November, 1905. No. 4372 *Merrill* from Benguet appears to be intermediate between this variety and the species, but nearer the former.

Distinguished from the species by its erect or subercct, simple, much elongated culms, large panicle, and numerous spikelets.

Forma **depauperata** Hackel, n. var. in herb.

Culmus procumbens, ramosus, inferne radicans; folia ovata vel ovato-lanceolata, 1 ad 2 cm. longa; paniculae 1 ad 2 cm. longae, laxae, pauciflorae.

LUZON, District of Lepanto, Mount Data (4489, 4545 *Merrill*) November, 1905.

Distinguished from the species by its more prostrate habit, slender stems, smaller leaves, and small, very few-flowered panicles.

(4) **Isachne debilis** Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 322; Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 268. *I. monticola* Hack. in Govt. Lab. Publ. **35** (1905) 79; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 27, non Büse. *I. pulchella* Mez in Perk. Frag. Fl. Filip. (1904) 141, pro parte, non Roth.; F.-Vill. Nov. App. (1883) 321. ?

LUZON, Province of Bataan, Mount Mariveles (264 *Whitford*) May, 1904; (3245 *Merrill*) October, 1903: Province of Nueva Ecija, Caraballo Sur Mountains (211 *Merrill*) May, 1902: Province of Benguet, Kabayan (4431 *Merrill*) October, 1905; Bagnio (5821 *Elmer*) March, 1904: Province of Laguna, Mount Maquiling (5135 *Merrill*) March, 1906.

Formosa.

Var. **incrassata** Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 268.

MINDANAO. District of Davao, Mount Apo (358 *DeVore & Hoover*) May, 1903.

(5) **Isachne pauciflora** Hack. in Govt. Lab. Publ. **35** (1905) 80.

LUZON, Province of Benguet, Bagnio (6486 *Elmer*) June, 1904; Bued River (4294 *Merrill*) November, 1905.

Endemic.

[9] *Phil. Journ. Science* **1** (1906) *Suppl.* 268.

(29) PANICUM Linn.

Spikelets in spikes, racemes, or panicles, 1 to 2-flowered. First empty glume usually smaller than the second and the latter as large as and similar to the third which often encloses a staminate flower. Flowering glume and palea indurated, awnless or very short awned.

Species about 350 in the tropical and temperate regions of the world; 30 in the Philippines.

1. Spikelets terete or dorsally compressed.
   2. Branchlets of the panicle not produced beyond the terminal spikelets into awn-like bristles.
      3. Spikelets 1 to 2-seriate, close-set on the underside of the flat rhachis of a simple spike, the spikes alternally arranged in a simple raceme. (§ PASPALOIDEÆ.)
         4. Spikes shorter than the internodes ..... (1) *P. flavidum*
         4. Spikes exceeding the internodes.
            5. Tip of spikes excurrent beyond the upper spikelets, setiform; second glume one half as long as the flowering glume ..... (2) *P. punctatum*
            5. Tip of spikes not produced; second glume nearly as long as the flowering glume ..... (3) *P. paspaloides*
      3. Spikelets 3–4-seriate, crowded on the under surface of a simple or branched spike, ovoid, the empty glumes usually muricate and the second and third cuspidate or rigidly awned. (§ ECHINOCHLOA.)
         4. Awn of the third glume very short or almost wanting.
            5. A coarse erect grass ..... (5) *P. crus-galli muticum*
            5. A slender low grass, the culms usually prostrate, at least below ..... (4) *P. colonum*
         4. Awn of the third glume elongated, mostly many times longer than the spikelet.
            5. Erect; panicles purplish; spikelets 2 to 3 mm. long ..... (5) *P. crus-galli*
            5. Prostrate, aquatic; panicles green; spikelets 4 to 5 mm. long ..... (6) *P. stagninum*
      3. Spikelets irregularly 1–2-seriate on slender or spiciform branches of a simple raceme, solitary or geminate, distant or crowded, not confined to one side of the rhachis. (§ BRACHIARIA.)
         4. Spikelets silky-villous ..... (9) *P. villosum*
         4. Spikelets glabrous.
            5. First glume as long as the spikelet ..... (7) *P. ambiguum*
            5. First glume two thirds as long as the spikelet or less.
               6. Spikelets 1.5 to 3 mm. long.
                  7. Spikes about 2 cm. long; spikelets 1.5 mm. long ..... (8) *P. prostratum*
                  7. Spikes 3 to 4 cm. long; spikelets 3 mm. long ..... (10) *P. remotum*
               6. Spikelets 4 mm. long; tips of the empty glumes thickened keeled-apiculate ..... (11) *P. crassiapiculatum*
      3. Spikelets small, crowded in spiciform or narrow cylindrical panicles (except *P. auritum*), the flowering glume slightly indurated, narrow, usually much shorter than the third glume. (§ HYMENACHNE.)

4. Panicle somewhat open, the branches elongated, ascending ..... (13) *P. auritum*
4. Panicles dense, cylindrical.
5. Spikelets 4 to 5 mm. long, the outer glumes strongly acuminate; aquatic (12) *P. amplexicaule*
5. Spikelets 3 mm. long or less; empty glumes acute or only slightly acuminate.
6. Panicles dense, cylindrical, about 5 mm. thick; spikelets 3 mm. long ..... (14) *P. indicum*
6. Panicles slender, caudiform, about 3 mm. thick; spikelets 1.5 mm. long ..... (15) *P. myosuroides*

3. Spikelets small, in pairs or fascicles on the filiform branches of a lax simple panicle, the first and second glumes much shorter than the third and fourth. (§ BREVIGLUME.)
4. Panicle branches solitary or fascicled, elongated, filiform; spikelets in scattered fascicles ..... (16) *P. nodosum*

3. Spikelets solitary, rarely binate, sessiled or pedicelled on the slender branches of a decompound open panicle. (§ EFFUSAE.)
4. First glume equaling the spikelet or nearly so.
5. Spikelets obtuse, 1.5 to 2 mm. long.
6. Plant 30 to 40 cm. high; leaves ovate-lanceolate to broadly lanceolate, the base cordate and amplexicaul; spikelets 1.5 mm. long ..... (17) *P. brevifolium*
6. Plant 1.5 to 2 m. high, subscandent leaves lanceolate; spikelets 2 mm. long ..... (25) *P. luxurians*
5. Spikelets strongly acuminate, 2 to 3.5 mm. long.
6. Spikelets 3 to 3.5 mm. long; leaves about 20 cm. long, tuberculate-pilose ..... (27) *P. caudiglume*
6. Spikelets 2 to 2.5 mm. long; leaves 5 cm. long or less, glabrous or nearly so ..... (28) *P. mindanaense*
4. First glume much shorter than the spikelet.
5. Annual erect leafy grasses.
6. Glabrous ..... (20) *P. humile*
6. More or less pubescent or pilose.
7. Spikelets 2 mm. long.
8. Sheaths strongly tuberculate-hispid; leaves and panicles 20 cm. long or more ..... (21) *P. caesium*
8. Sheaths slightly pilose to subglabrous; leaves and panicles 15 cm. long or less ..... (22) *P. luzoniense*
7. Spikelets 3 to 4 mm. long.
8. Spikelets turgid, ovate-oblong, acute or cuspidate-acuminate; panicles thyrsiform; cultivated .. (18) *P. miliaceum*

8. Spikelets lanceolate, strongly acuminate; panicles effuse; branches elongated, stiff, filiform ..... (19) *P. trypheron*

5. Perennial.

6. First glume very small, suborbicular, nerveless.

7. Spikelets ovate to ovate-lanceolate, acute; stem creepiug, stoloniferous; leaves usually convolute, glaucous ..... (23) *P. repens*

7. Spikelets lanceolate, acuminate; stem thick; frequently floating; leaves flat ..... (24) *P. proliferum*

6. First glume 3 to 5-nerved..... (26) *P. sarmentosum*

2. Panicle branches produced beyond the terminal spikelet into a rigid scabrous awn-like bristle equaling or exceeding the spikelet. (§ PTYCOPHYLLUM.)

3. Panicle decompound; leaves broad, ample, plicate.. (29) *P. palmaefolium*

1. Spikelets strongly laterally compressed.

2. Spikelets minute, panicled; flowering glume semilunar. (§ GIBBOSAE.)

3. Panicles densely flowered; spikelets crowded..... (30) *P. pilipes*

3. Panicles diffuse; spikelets scattered, solitary.

4. Panicles 25 to 40 cm. long, very diffuse..... (31) *P. patens*

4. Panicles 10 to 15 cm. long, rather narrow.. (32) *P. carinatum*

4. Panicles less than 10 cm. long, often reduced to very few branches..... (33) *P. warburgii*

2. Spikelets about 4 mm. long, distant, subsessile on a slender, simple or sparingly divided rhachis. (§ PSEUDECHINOLAENA.)

3. Empty glumes of the upper spikelets with hooked glands ..... (34) *P. uncinatum*

Sect. PASPALOIDEAE.

(1) **Panicum flavidum** Retz. Obs. 4 (1779-91) 15; Kunth Rev. Gram. 1 (1829) 211. *t. 17;* Enum. 1 (1833) 60: Hook. f. Fl. Brit. Ind. 7 (1897) 29; F.-Vill. Nov. App. (1883) 311; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 286; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 27; Mez in Perk. Frag. Fl. Philip. (1904) 142; *Panicum floridum* Usteri Beitr. Kenn. Philip. Veg. (1905) 133. *P. brizoides* Jacq.; Miq. Fl. Ind. Bat. 3 (1859) 445.

PHILIPPINES (560 *Cuming*). LUZON, Manila (68 *McGregor*) October, 1904; (21, 265 *Merrill*) April, July, 1902: Province of Bataan, Lamao (6145 *Leiberg*) July, 1904; Dinalupijan (1526 *Merrill*) January, 1903: Province of Pampanga, Bacolor (35 *Parker*) May, 1904: Province of Tayabas, Atimonan (126 *Gregory*) August, 1904. CEBU (*Barrow*) 1904. PALAWAN (4176, 4185 *Curran*) May, 1906. BASILAN (47 *DeVore & Hoover*) April, 1903. BOHOL (1249 *McGregor*) June, 1906.

Tropical Asia, Africa, and Malaya.

(2) **Panicum punctatum** Burm. Fl. Ind. (1768) 26; Hook. f. Fl. Brit. Ind. 7 (1897) 29. *Panicum fluitans* Retz. Obs. 3 (1779-91) 8 (not 5: 18, teste Hook. f.); Miq. Fl. Ind. Bat. 3 (1859) 455; Rolfe in Journ. Bot. 23 (1885) 216; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Ceron Cat. Pl. Herb. (1892) 180. *Paspalum pluriraecmosum* Steud. Syn. 1 (1855) 27; Miq. Fl. Ind. Bat. 3 (1859) 431; F.-Vill. Nov. App. (1883) 310.

Philippines (532 *Cuming*) 1836–40. Luzon, Manila (*Merrill*) September, 1906.

British India to Malaya, Mauritius, tropical and north Africa.

(3) **Panicum paspaloides** Pers. Syn. 1 (1805) 81 (*paspalodes*); Kunth Enum. 1 (1833) 77; Steud. Syn. 1 (1855) 60; Hook. f. Fl. Brit. Ind. 7 (1897) 30; F.-Vill. Nov. App. (1883) 311. *P. brizaeforme* Presl Rel. Haenk. 1 (1830) 302; Kunth Enum. 1 (1833) 78; Miq. Fl. Ind. Bat. 3 (1859) 445; F.-Vill. Nov. App. (1883) 311; Scribn. in Rept. Mo. Bot. Gard. 10 (1899) 46. *pl. 16.*

Luzon (*Haenke*) fide *Presl.*

Tropical Asia, Africa, and America.

Sect. Echinochloa.

(4) **Panicum colonum** Linn. Syst. ed. 10, 870; Steud. Syn. 1 (1855) 46; F.-Vill. Nov. App. (1883) 311; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 286; Hook. f. Fl. Brit. Ind. 7 (1897) 32; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 328; Mez in Perk. Frag. Fl. Philip. (1904) 142. *P. colonum* Linn., var. *pseudocolonum* Nees in Nov. Act. Nat. Cur. 19 (1843) Suppl. 1: 172. *P. cumingianum* Steud. Syn. 1 (1855) 58; Miq. Fl. Ind. Bat. 3 (1859) 447; F.-Vill. Nov. App. (1883) 311. *Echinochloa colona* Link Hort. Berol. 2 (1833) 209; Miq. Fl. Ind. Bat. 3 (1859) 463. *Oplismenus echinatus* H. B. K. Nov. Gen. et Sp. Pl. 1 (1815) 108; Kunth Enum. 1 (1833) 142; Presl Rel. Haenk. 1 (1830) 321. *Orthopogon subverticellatus* Llanos Frag. Pl. Filip. (1851) 38.

Philippines (1422 *Cuming*). Luzon, Manila (362 *Merrill*) July, 1902; Province of Pangasinan, Rosales (288 *Merrill*) May, 1902; Province of Rizal, Morong (1402 *Ramos*) August, 1906; Province of Bataan, Dinalupijan (1549 *Merrill*) January, 1903; Province of Pampanga, Bacolor (57 *Parker*) June, 1904; Province of Principe, Baler (1143 *Merrill*) October, 1902. Mindanao, Davao (440, 587 *Copeland*) March, 1904. Palawan, Point Separation (1793 *Merrill*) February, 1903; Iwahig (871 *Foxworthy*) May, 1906. Balabac (460 *Mangubat*) March, 1906.

Tropical and warm countries of the World.

(5) **Panicum crus-galli** Linn. Sp. Pl. (1753) 56; F.-Vill. Nov. App. (1883) 311; Hook. f. Fl. Brit. Ind. 7 (1897) 30; Mez in Perk. Frag. Fl. Philip. (1904) 142, pro parte; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 328. *P. limosum* F.-Vill. Nov. App. (1883) 311. *P. hispidulum* Retz.; F.-Vill. l. c. *Echinochloa crus-galli* Beauv. Agrost. (1812) 53; Miq. Fl. Ind. Bat. 3 (1859) 464. *Oplismenus limosus* Presl Rel. Haenk. 1 (1830) 321; Kunth Enum. 1 (1833) 144. *Orthopogon hispidus* Llanos Frag. Pl. Filip. (1851) 37. *Or. loliaceus* Llanos l. c.

Luzon, Manila (5 *Merrill*) April, 1902; District of Lepanto, Balili (4644 *Merrill*) November, 1905; Province of Rizal, Tanay (2269 *Merrill*) May, 1903; Bosoboso (3346 *Ahern's collector*) September, 1905; Morong (1403 *Ramos*) August, 1906; Province of Pampanga, Bacolor (58 *Parker*) June, 1904; Province of Tayabas, Atimonan (21 *Gregory*, 660 *Whitford*) August, 1904.

Warm and temperate regions of the World.

Var. **muticum** Doell.; Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 268.

Luzon, Manila (*Whitford*) August 1905; Province of Benguet, Bued River (4307 *Merrill*) November, 1905; Baguio (6378 *Elmer*) May, 1904.

Distribution of the species.

(6) **P. stagninum** Retz. Obs. 4 (1779–91) 17; F.-Vill. Nov. App. (1883) 311; Usteri Beitr. Kenn. Philip. Veg. (1905) 133. *Echinochloa stagnina* Beauv. Agrost. (1812) 57; Miq. Fl. Ind. Bat. 3 (1859) 464. *Orthopogon dichotomus*

Llanos Frag. Pl. Filip. (1851) 38. *Panicum crus-galli* var. *stagninum* O. Kuntze Rev. Gen. Pl. (1891) 783.

Luzon, Manila (39 *Merrill*) May, 1902: Province of Laguna, Los Baños (5116 *Merrill*) March, 1906: Province of Pampanga, Calumpit (4233 *Merrill*) September, 1905. Philippines (1422 *Cuming*, pro parte) T., *Balili*.

Tropical Asia and Malaya.

Mez in Perk. Frag. Fl. Philip. (1904) 142, referred No. 39 *Merrill* to *Panicum crus-galli* Linn., but the differences between typical *P. crus-galli* and *P. stagninum* are too great to warrant the reduction of the latter. Regarding our specimen of No. 1422 *Cuming*, both *Panicum colonum* and *P. stagninum* are represented on the sheet. Steudel cites as the type of *Panicum cumingianum* No. 422 *Cuming*, apparently a typographical error for 1422; his description of the species applies to *Panicum colonum* rather than to *P. stagninum*.

Sect. Brachiaria.

(7) **Panicum ambiguum** Trin. Mém. Acad. St. Pétersb. VI. 3^2 (1835) 243; Steud. Syn. 1 (1855) 61; Hook. f. Fl. Brit. Ind. 7 (1897) 33; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 327; Miq. Fl. Ind. Bat. 3 (1859) 447; F.-Vill. Nov. App. (1883) 311; Mez in Perk. Frag. Fl. Philip. (1904) 141. *Urochloa paspaloides* Presl Rel. Haenk. 1 (1830) 318; Kunth Enum. 1 (1833) 75; Scribn. in Rept. Mo. Bot. Gard. 10 (1899) 54. *pl. 14*, non *Panicum paspaloides* Pers.

Luzon, Province of Nueva Viscaya (120, 307 *Merrill*) May, June, 1902. Mindoro, Puerto Galera (3332 *Merrill*) October, 1903. Mindanao, Lake Lanao, Camp Keithley (149, 395 *Clemens*) February, March, 1906. Palmas (5369 *Merrill*) October, 1906.

British India, Mauritius, and Ceylon to Luchu Archipelago, Malaya, Polynesia.

(8) **Panicum prostratum** Lam. Ill. 1 (1791) 171; Kunth Enum. 1 (1833) 89; Steud. Syn. 1 (1855) 62; Miq. Fl. Ind. Bat. 1 (1859) 446; F.-Vill. Nov. App. (1883) 311; Ceron Cat. Pl. Herb. (1892) 180; Hook. f. Fl. Brit. Ind. 7 (1897) 33; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 332; Mez in Perk. Frag. Fl. Philip. (1904) 143. *Panicum crispum* Llanos Frag. Pl. Filip. (1851) 42. *Panicum calaccense* Steud. Syn. 1 (1855) 65; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Ceron Cat. Pl. Herb. (1892) 180.

Philippines (498 *Cuming.*) (Cotype of *Panicum calaccense* Steud.). Luzon, Province of Isabela (132 *Merrill*) June, 1902: Province of Nueva Viscaya, Bagabag (115 *Merrill*) June, 1902: Province of Union, Bauang (5605 *Elmer*) February, 1904: Province of Pampanga, Arayat (4227 *Merrill*) September, 1905. Panay (*Copeland*) January, 1904. Palawan (4173, 4187 *Curran*) May, 1906; (872 *Foxworthy*) May, 1906. Basilan (126 *DeVore & Hoover*) April, 1903, depauperate form. Palmas (5368 *Merrill*) October, 1906.

India to southern China, Formosa, Malaya, and tropical Australia.

(9) **Panicum villosum** Lam. Ill. 1 (1791) 173; Kunth Enum. 1 (1833) 98; Hook. f. Fl. Brit. Ind. 7 (1897) 34; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 333; Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 269.

Luzon, Province of Benguet (4281, 4360, 4396 *Merrill*) October, November, 1905: District of Lepanto (4459 *Merrill*) November, 1905. Mindanao, Lake Lanao, Camp Keithley (148 *Clemens*) February, 1906.

British India to Tonkin, southern China and Formosa.

(10) **Panicum remotum** Retz. Obs. 4 (1779–91) 71; Kunth Enum. 1 (1833) 125; Steud. Syn. 1 (1855) 68. *Panicum petiveri* Trin. Icon. *t. 176. f. C. Panicum*

ramosum Mez in Perk. Frag. Fl. Philip. (1904) 143, non Linn. *Panicum poligonatum* Llanos Frag. Pl. Filip. (1851) 41. *Panicum umbrosum* F.-Vill. Nov. App. (1883) 311? non Retz. *Panicum distachyum* F.-Vill. Nov. App. (1883) 311? non Linn. *Panicum miliiforme* Presl Rel. Haenk. 1 (1830) 300; Kunth Enum. 1 (1833) 96; Miq. Fl. Ind. Bat. 3 (1859) 448; F.-Vill. Nov. App. (1883) 312; Scribn. Rept. Mo. Bot. Gard. 10 (1899) 47. *pl. 20.*

Luzon, Manila (352 *Merrill*) July, 1902: Province of Zambales, Iba (332 *Merrill*) June, 1902. Mindanao, Lake Lanao, Camp Keithley (*Clemens*) December, 1906.

British India.

Hackel notes on No. 352 *Merrill*, that the plant is *Panicum remotum* Retz., and not *P. ramosum* Linn., proper, as determined by Mez. Scribner is of the opinion that *Panicum miliiforme* Presl is a distinct species, but I can find no characters in the description as given by Presl, or in the figure given by Scribner, drawn from Presl's type material, by which the species can be distinguished from *Panicum remotum* Retz.

(11) **Panicum crassiapiculatum** Merrill, nom. nov. *Panicum latifolium* Hook. f. Fl. Brit. Ind. 7 (1897) 39, excl. syn. et var. *majus*, non Linn.

Balabac (5387 *Merrill*) October, 1906.

Bengal to the Malayan Peninsula.

Panicum latifolium Linn., is confined to North America, the first reference in Linnaeus' Species Plantarum under the description of the species being to Morison's Hist. Pl. 3: 196. *t. 8. f. 4*, a Virginian plant, of which *Panicum porterianum* Nash is a synonym. The second reference given by Linnaeus is to Sloane Hist. Jam. 1: 114. *t. 71. f. 3*, an entirely different plant of the West Indies, which is *Panicum divaricatum* Linn. The Asiatic plant referred by Hooker f., to *Panicum latifolium* Linn., is not at all related to that species and has in my opinion little affinity with *Panicum divaricatum* Linn., of the West Indies. As noted by Hooker f., the compressed thickened tips of the empty glumes are very characteristic of the Asiatic form, the Balabac plant closely matching specimens from the Malayan Peninsula.

Sect. Hymenachne.

(12) **Panicum amplexicaule** Rudge Pl. Guian. (1805) 21. *t.* 27. Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 327. *Panicum myurus* H. B. K. Nov. Gen. et Sp. Pl. 1 (1815) 98, excl. syn. Lam.; Hook. f. Fl. Brit. Ind. 7 (1897) 39; Merr. Philip. Journ. Sci. 1 (1906) Suppl. 27; Usteri Beitr. Kenn. Philip. Veg. (1905) 133.

Luzon, Manila (*Merrill*) May, 1902: Province of Bataan, Lamao (*Whitford*) September, 1905.

British India to Formosa, Malaya, tropical Australia and South America.

(13) **Panicum auritum** Presl Rel. Haenk. 1 (1830) 305 et var. *procerius* Presl l. c.: Nees Agrost. Bras. (1829) 176; Kunth Enum. 1 (1833) 113; Stend. Syn. 1 (1855) 70; Miq. Fl. Ind. Bat. 3 (1859) 456; Nees in Nov. Act. Nat. Cur. 19 (1843) Suppl. 1: 172; F.-Vill. Nov. App. (1883) 312; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Hook. f. Fl. Brit. Ind. 7 (1897) 40; Mez in Perk. Frag. Fl. Philip. (1904) 142; Scribn. Rept. Mo. Bot. Gard. 10 (1899) 46. *pl. 15.*

Philippines (1274 *Cuming*). Luzon, Manila (27 *Merrill*) May, 1902: Province of Tayabas, Atimonan (667 *Whitford*) August, 1904: Province of Bataan, Dinalupijan (1599 *Merrill*) January, 1903: Province of Rizal, Morong (1442 *Ramos*) August, 1906. Culion (476 *Merrill*) December, 1902. Mindanao, Dis-

trict of Davao (129 *DeVore & Hoover*) April, 1903: Lake Lanao, Camp Keithley (151, 400 *Clemens*) February, March, 1906. Palawan (845 *Foxworthy*) May, 1906.

British India to Malaya and ? Mauritius.

(14) **Panicum indicum** Linn. Mant. (1767) 184; Kunth Enum. 1 (1833) 133; F.-Vill. Nov. App. (1883) 311; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Hook. f. Fl. Brit. Ind. 7 (1897) 41; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 330; Mez in Perk. Frag. Fl. Philip. (1904) 142; Merr. Philip. Journ. Sci. 1 (1906) Suppl. 27. *Hymenachne indica* Büse in Miq. Fl. Ind. Bat. 3 (1859) 458.

Philippines (566 *Cuming.*). Luzon, Province of Benguet (5766 *Elmer*) March, 1904: District of Lepanto (4620 *Merrill*) November, 1905: Province of Bataan, Lamao (3109 *Merrill*) October, 1903: Province of Principe, Baler (1139 *Merrill*) September, 1902: Province of Nueva Viscaya, Quiangan (315 *Merrill*) June, 1902. Mindanao, Lake Lanao, Camp Keithley (94, 157 *Clemens*) January, February, 1906: District of Davao (588 *Copeland*) March, 1904.

Tropical Asia, Malaya, and Australia.

Var. **angustum** (Trin.) Hook. f. Fl. Brit. Ind. 7 (1897) 42; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 330. *Panicum angustum* Trin. Ic. Gram. *t. 334;* Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287.

Philippines (1667 *Cuming* in part, fide *Vidal*).

British India and southern China.

(15) **Panicum myosuroides** R. Br. Prodr. (1810) 189; Kunth Enum. 1 (1833) 77; Hook. f. Fl. Brit. Ind. 7 (1897) 42; Mez in Perk. Frag. Fl. Philip. (1904) 142. *Panicum angustissimum* Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 286; Ceron Cat. Pl. Herb. (1892) 179, non Hochst.

Philippines (1668 *Cuming*) 1836–40.

British India and tropical Africa to Malaya and tropical Australia.

Sect. Breviglume.

(16) **Panicum nodosum** Kunth Enum. 1 (1833) 97; Steud. Syn. 1 (1855) 59; Miq. Fl. Ind. Bat. 3 (1859) 448; F.-Vill. Nov.-App. (1883) 312; Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 268; Hook. f. Fl. Brit. Ind. 7 (1897) 43, (at least in part); Rendle, Journ. Linn. Soc. 36 (1904) 331. *P. multinode* Presl Rel. Haenk 1 (1830) 303, non Lam. *P. ouonbiense* Balansa in Morot Journ. de Bot. 4 (1890) 141; Mez in Perk. Frag. Fl. Philip. (1904) 142; Merr. Philip. Journ. Sci. 1 (1906) Suppl. 27. *P. violaceum* Llanos Frag. Pl. Filip. (1851) 42.

Luzon, Province of Nueva Viscaya (127 *Merrill*) June, 1902: Province of Nueva Ecija, Caraballo Sur Mountains (255 *Merrill*) May, 1902: Province of Pampanga, Arayat (4228 *Merrill*) September, 1905: Province of Cavite, Maragondong (4182 *Merrill*) July, 1905: Province of Bataan, Lamao (533 *Whitford*) July, 1904: Province of Tayabas, Atimonan (135 *Gregory*) August, 1904. Sibuyan (13 *McGregor*) July, 1904. Culion (527 *Merrill*) December, 1902. Palawan, San Antonio Bay (5247 *Merrill*) October, 1906. Balabac (5385 *Merrill*) October, 1906. Palmas (5367 *Merrill*) October, 1906.

Cochin China, and southern China, India, and Malaya.

As noted by Hackel, Balansa apparently described typical *Panicum nodosum* Kunth as *P. ouonbiense*. It is possible that the Indian *Panicum arnottianum* Nees, reduced by Hooker f., to *P. nodosum*, represents a distinct species.

Sect. Effusae.

(17) **Panicum brevifolium** Linn. Sp. Pl. (1753) 59, excl. syn.; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 328; Mez in Perk. Frag. Fl. Philip. (1904) 142. *Panicum ovalifolium* Poir. in Lam. Encycl. Suppl. **4** (1797) 279; Kunth Enum. **1** (1833) 113; Steud. Syn. **1** (1855) 84; Hook. f. Fl. Brit. Ind. **7** (1897) 44.

Culion (458 *Merrill*) December, 1902. Balabac (442 *Mangubat*) March, 1906; (5386 *Merrill*) October, 1906.

Tropical Africa, India, China, and Malaya.

(18) **Panicum miliaceum** Linn. Sp. Pl. (1753) 58; Kunth Enum. **1** (1833) 104; Steud. Syn. **1** (1855) 77; Hook. f. Fl. Brit. Ind. **7** (1897) 45; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 331.

Negros, Tanhay (*José Muñoz*) 1904. Cultivated only, V., *Cabug*.

Widely cultivated in warm countries. Millet.

(19) **Panicum trypheron** Schult. Mant. **2** (1822) 244; Hook. f. Fl. Brit. Ind. **7** (1897) 47; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 333; Mez in Perk. Frag. Fl. Philip. (1904) 143. *Panicum roxburghii* Spreng. Syst. **1** (1825) 320; Kunth Enum. **1** (1833) 126.

Semerara (4136 *Merrill*) July, 1905. Culion (678 *Merrill*) February, 1903. Mindanao, Davao (396 *Copeland*) March, 1904. No. 4478 *Merrill*, from the District of Lepanto, Luzon, differs from the type only in having the pedicels clavate and supplied with few long white hairs.

Tropical Africa to India, southern China and Malaya.

(20) **Panicum humile** Nees ex Steud. Syn. **1** (1855) 84; Hook. f. Fl. Brit. Ind. **7** (1897) 48; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 330; Hack. in Govt. Lab. Publ. **35** (1905) 80.

Luzon, District of Lepanto (4466 *Merrill*) November, 1905: Province of Tarlac, Concepcion (3623 *Merrill*) November, 1903.

British India to southern China and Malaya.

(21) **Panicum caesium** Nees in Hook. Kew Journ. **2** (1850) 97; Hook. f. Fl. Brit. Ind. **7** (1897) 48. *P. reticulatum* Thw. ex Trimen Cat. Ceyl. Pl. 105, non Griseb. *P. acroanthum* Mez in Perk. Frag. Fl. Philip. (1904) 141, non (?) Steud.

Luzon, Province of Nueva Viscaya, Quiangan (123 *Merrill*) June, 1902: Province of Pampanga, Arayat (1469, 4229 *Merrill*) March, 1903; September, 1904.

British India to Malaya.

(22) **Panicum luzoniense** Presl Rel. Haenk. **1** (1830) 308; Kunth Enum. **1** (1833) 121; Miq. Fl. Ind. Bat. **3** (1859) 457; F.-Vill. Nov. App. (1883) 312. *P. psilopodium* Rolfe, Journ. Bot **23** (1885) 216, non Trin.?; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287. *P. caesium* Mez in Perk. Frag. Fl. Philip. (1904) 142, non (?) Nees. *P. trypheron* Merr. Philip. Journ. Sci. **1** (1906) Suppl. 27, non Schult.

Philippines (1667 *Cuming*, in part). Luzon, Province of Nueva Ecija, Carranglang (316 *Merrill*) May, 1902: Province of Cavite, Maragondong (4183 *Merrill*) July, 1905: Province of Bataan, Lamao (6024 *Leiberg*) July, 1904: (3107 *Merrill*) October, 1903.

Malayan Peninsula.

This species may not be sufficiently distinct from *Panicum caesium* Nees. No. 1667 *Cuming*, in our herbarium, on which the Philippine references to *Panicum psilopodium* is based, is a mixture of *Panicum angustum* Trin., *P. prostratum* Lam., and the species here considered to represent *P. luzoniense*. The specimen

before me is very fragmentary, but I can not distinguish it from the other material here referred to *P. luzoniense*.

(*Panicum tuberculatum* Presl Rel. Haenk. 1 (1830) 307; Kunth Enum. 1 (1833) 120; Miq. Fl. Ind. Bat. 1 (1859) 454; F.-Vill. Nov. App. (1883) 312.

"Hab. in Luzonia" Presl.

Hooker f., reduces this to *Panicum maximum* Jacq., but Presl's description does not closely apply to the latter species. I have seen no specimens of *Panicum maximum* from the Philippines, and if it does occur in the Archipelago, it will be only as an introduced plant.)

(23) **Panicum repens** Linn. Sp. Pl. ed 2 (1763) 87; Kunth Enum. 1 (1833) 103; Ceron Cat. Pl. Herb. (1892) 180; Hook. f. Fl. Brit. Ind. 7 (1897) 49; Rendle in Forbes & Hamsl. Journ. Linn. Soc. Bot. 36 (1904) 332; Mez in Perk. Frag. Fl. Philip. (1904) 143. *Panicum ischaemoides* Retz. Obs. 4 (1779–91) 17; Nees in Nov. Act. Nat. Cur. 19 (1843) Suppl. 1: 175; Miq. Fl. Ind. Bat. 1 (1859) 450; F.-Vill. Nov. App. (1883) 312. *Panicum miliare* Mez in Perk. Frag. Fl. Philip. (1904) 142, Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 27, non Lam. *P. convolutum* Beauv. ex Spreng. Syst. 1: 319; Presl Rel. Haenk. 1 (1830) 304; Miq. Fl. Ind. Bat. 3 (1859) 450; F.-Vill. Nov. App. (1883) 312. *Panicum tuberosum* Llanos Frag. Pl. Filip. (1851) 40, teste F.-Vill.

Luzon, Manila (10 *Merrill*) April, 1902; (29 *McGregor*) October, 1904: Province of Bataan, Dinalupijan (1568 *Merrill*) January, 1903; Lamao (*Whitford*) September, 1905: Province of Pampanga, Arayat (10 *Bolster*) May, 1905; near Calumpit (4251 *Merrill*) September, 1905: Province of Zambales, Subic (*Hallier*) December, 1903. Apo (Mindoro Straits), (429 *Merrill*) December, 1902. Mindanao, Lake Lanao, Camp Keithley (154 *Clemens*) February, 1906: Cotabato (*Copeland*) May, 1904.

Tropical and subtropical regions of the World, especially near the seashore.

(24) **Panicum proliferum** Lam. Encycl. 4 (1797) 747; Steud. Syn. 1 (1855) 71; Hook. f. Fl. Brit. Ind. 7 (1897) 50; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 332; Mez in Perk. Frag. Fl. Philip. (1904) 143. *Panicum paludosum* Roxb. in Hort. Beng. 6, nomen, et Fl. Ind. 1: 307; Usteri Beitr. Kenn. Philip. Veg. (1905) 133.

Luzon, Manila (97 *Merrill*) July, 1902. Possibly referable here are Nos. 5972 and 6589 *Elmer*, from Benguet Province, Luzon.

Tropical Africa to India and Formosa, North and Central America.

(25) **Panicum luxurians** Willd. ex Nees in Mart. Fl. Bras. 2 (1829) 233; Kunth Enum. 1 (1833) 109; F.-Vill. Nov. App. (1883) 312. *P. montanum* Mez in Perk. Frag. Fl. Philip. (1904) 142; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 27; F.-Vill. Nov. App. (1883) 312; (?) Ceron Cat. Pl. Herb. (1892) 180, non Roxb.

Luzon, Province of Union, Bauang (5595 *Elmer*) February, 1904: Province of Bataan, Mount Mariveles (6735 *Elmer*) November, 1904. Culion (554 *Merrill*) December, 1902.

Endemic?

This species has the habit of *Panicum sarmentosum* Roxb., but differs from that and from *Panicum montanum* Roxb., in the long first glume which equals the spikelet in length. Mez identified No. 554 *Merrill* as *Panicum montanum*, but the specimen does not agree with the descriptions of that species. I have based the above identification entirely on the short description of *Panicum luxurians* given by Kunth in his Enumeratio, but the description does not apply in all particulars. *Panicum cordatum* Büse, from Java appears to be the same

but with broader leaves. If I have correctly identified Büse's species it is represented in our herbarium by Nos. 15109 and 27781 β Herb. Koorders, and also by specimens from plants cultivated in the Botanical Garden at Buitenzorg.

(26) **Panicum sarmentosum** Roxb. Fl. Ind. 1 (1820) 308; Kunth Enum. 1 (1833) 126; Steud. Syn. 1 (1855) 98; F.-Vill. Nov. App. (1883) 312; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Hook. f. Fl. Brit. Ind. 7 (1897) 54; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 333; Mez in Perk. Frag. Fl. Philip. (1904) 143; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 27. *Panicum vacillans* Steud. Syn. 1 (1855) 75. *P. extensum* Steud. l. c. 72, teste Vidal. *P. incomptum* Trin. Diss. 2: 200; Icon. 20. *t. 232;* Kunth Enum. 1 (1833) 112; Miq. Fl. Ind. Bat. 3 (1859) 451.

Philippines (679 *Cuming*). Luzon, Province of Bataan, Lamao (1019 *Whitford*) December, 1904; Dinalupijan (1608 *Merrill*) January, 1903: Province of Zambales, Subic (*Hallier*) December, 1903. Mindoro, Baco River (1668 *Merrill*) January, 1903; (120 *McGregor*) April, 1905. Culion (512 *Merrill*) December, 1902. Palawan, Point Separation (825 *Merrill*) February, 1903. Balabac (452 *Mangubat*) March, 1906.

India to southern China and Malaya.

(27) **Panicum caudiglume** Hack. in Oesterr. Bot. Zeitsch. 51 (1901) 428; Govt. Lab. Publ. 25 (1905) 80; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 27. *Panicum* n. sp.? affinis *Panico trachyrhachidi* Benth., Mez in Perk. Frag. Fl. Philip. (1904) 144.

Palawan (Paragua), San Antonio Bay (832 *Merrill*) February, 1903. Luzon, Province of Bataan, Lamao River (3307 *Merrill*) October, 1903.

Java.

(28) **Panicum mindanaense** Merrill, sp. nov.

Glabrum; culmis erectis, 30–40 cm. altis, ramosis, gracilibus, basi subgeniculatis, dense caespitosis; vaginis quam internodiis brevioribus; laminis lanceolatis, 2–5 cm. longis, plus minus 3 mm. latis, acuminatis; paniculis diffusis, ramosis, 10–15 cm. longis, ramis sparsis, remotis, filiformibus; spiculis 2.5–3 mm. longis, acuminatis, pedicellatis, ovato-lanceolatis; gluma prima ovato-lanceolata, spiculae aequante, acuminata.

A glabrous, caespitose grass 30 to 45 cm. high, the culms erect or ascending from somewhat geniculate bases, slender, branched; nodes glabrous. Sheaths lax, glabrous, shorter than the internodes. Panicles diffuse, 10 to 15 cm. long, the branches few, remote, slender, solitary or opposite, spreading or erect-spreading, angular, scabrous, the lower ones 5 to 8 cm. long. Spikelets 2.5 to 3 mm. long, acuminate, pedicellate, ovate-lanceolate, purplish; first glume equaling the spikelet, 5-nerved, ovate-lanceolate; second and third glumes subequal, 5-nerved, acute. Flowering glume elliptical-ovate, glabrous, shining, 1.2 mm. long.

Mindanao, Lake Lanao, Camp Keithley (99 *Clemens*) January, February, 1906.

A species related to *Panicum trachyrhachis* Benth., and *P. caudiglume* Hack., differing from both in its smaller spikelets and shorter leaves and from the latter in its glabrous leaves, and like those two species recognizable by its very long, acuminate first glume.

Sect. Ptychophyllum.

(29) **Panicum palmaefolium** Koen. in Naturforsch. 23 (1788) 208; Miq. Fl. Ind. Bat. 3 (1859) 449. *Panicum plicatum* Lam. Ill. 1 (1791) 171; Encycl. 4 (1797) 736; F.-Vill. Nov. App. (1883) 311; Mez in Perk. Frag. Fl. Philip. (1904) 143; Hook. f. Fl. Brit. Ind. 7 (1897) 55. *P. amplissimum* Steud. Syn. 1 (1855) 54; Vidal Phan. Cuming. Philip. (1885) 156; Rev. Pl. Vasc. Filip. (1886) 287. *P. neurodes* Schult. Mant. 2 (1824) 228; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Ceron Cat. Pl. Herb. (1892) 180; Usteri Beitr. Kenn. Philip. Veg. (1905) 133. *P. neurodes* var. *amplissimum* Walp. Ann. 6 (1861) 947. *P. nepalense* Spreng. Mant. 2 (1824) 321; Rolfe in Journ. Bot. 23 (1885) 216. *Panicum lene* Steud. Syn. 1 (1855) 54. *Setaria mauritiana* Spreng. Syst. 1 (1825) 305; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 26 (1904) 336. *S. lenis* Miq. Fl. Ind. Bat. 3 (1859) 468.

Philippines (553 *Cuming*). Luzon, Province of Benguet, Baguio (5919 *Elmer*) March, 1904; (4931 *Curran*) August, 1906: District of Lepanto, Balili (4611 *Merrill*) November, 1905: Province of Nueva Viscaya, Quiangan (133 *Merrill*) June, 1902: Province of Tayabas, Mount Banajao (976 *Whitford*) October, 1904. Mindoro, Baco River (305 *McGregor*) May, 1905. Palawan, Puerto Princesa (341 *Bermejos*) January, 1906; Point Separation (815 *Merrill*) February, 1903. Mindanao, Davao (640 *Copeland*) March, 1904: Lake Lanao, Camp Keithley (393 *Clemens*) March, 1906.

Tropical Africa to India, southern China, Japan, and Malaya.

Sect. Gibbosae.

(30) **Panicum pilipes** Nees et Arn. ex Büse in Miq. Pl. Jungh. (1855) 376; Miq. Fl. Ind. Bat. 3 (1859) 453; Hook. f. Fl. Brit. Ind. 7 (1897) 57; Mez in Perk. Frag. Fl. Philip. (1904) 143; Merr. Philip. Journ. Sci. 1 (1906) Suppl. 27. *P. hermaphroditum* Steud. Syn. 1 (1855) 67; Rolfe in Journ. Bot. 23 (1885) 216; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Ceron Cat. Pl. Herb. (1892) 180. *P. trigonum* Nees in Nov. Act. Nat. Cur. 19 (1843) Suppl. 1: 172; F.-Vill. Nov. App. (1883) 312, non Retz.

Philippines (554 *Cuming*). Luzon, Province of Nueva Ecija, Caraballo Sur Mountains (*Merrill*) May, 1902: Province of Bataan Dinalupijan (1576 *Merrill*) January, 1903; Lamao River, Mount Mariveles (1821 *Borden*); (1020 *Whitford*); (6650 *Elmer*); (3156 *Merrill*), 1903 to 1905: Province of Rizal (93 *Foxworthy*) January, 1906: Province of Zambales, Subic (*Hallier*) December, 1903: Province of Tayabas, Atimonan (623 *Whitford*) August, 1904. Culion (496 *Merrill*) December, 1902. Mindanao, Lake Lanao, Camp Keithley (*Clemens*) February, 1906: District of Davao (641 *Copeland*) March, 1904. Palawan (589 *Foxworthy*) May, 1906.

British India to Madagascar Islands, Malaya, Australia, and Polynesia.

(31) **Panicum patens** Linn. Sp. Pl. (1753) 86; Kunth Enum. 1 (1833) 126; Hook. f. Fl. Brit. Ind. 7 (1897) 57; Mez in Perk. Frag. Fl. Philip. (1904) 142; Usteri Beitr. Kenn. Philip. Veg. (1905) 133. *Panicum radicans* Retz.; F.-Vill. Nov. App. (1883) 312; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Ceron Cat. Pl. Herb. (1892) 180; Miq. Fl. Ind. 3 (1859) 453; Llanos Frag. Pl. Filip. (1851) 43.

Philippines (493 *Cuming*). Luzon, District of Lepanto (4473 *Merrill*) November, 1905: Province of Nueva Viscaya, Dupax (254 *Merrill*) May, 1902: Province of Rizal, Montalban (3419 *Ahern's collector*) November, 1905; Antipolo (1322 *Merrill*) February, 1903: Province of Zambales, Subic (*Hallier*) December, 1903. Mindoro, Baco River (281 *McGregor*) April, 1905. Palawan, Puerto Princesa (344 *Bermejos*) January, 1906; (730 *Merrill*) February, 1903. Point

Separation (821 *Merrill*) February, 1903. Mindanao, Lake Lanao, Camp Keithley (153 *Clemens*) February, 1906: District of Davao (252 *DeVore & Hoover*) April, 1903.

British India to southern China, Malaya, and Polynesia.

(32) **Panicum carinatum** Presl Rel. Haenk. 1 (1830) 309; Kunth Enum. 1 (1833) 112; Miq. Fl. Ind. Bat. 3 (1859) 452; F.-Vill. Nov. App. (1833) 312. Scribn. Rept. Mo. Bot. Gard. 10 (1899) 46. *pl. 17. Panicum radicans* Mez in Perk. Frag. Fl. Philip. (1904) 143; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 27, non Retz.

Mindoro, Puerto Galera (3328 *Merrill*) October, 1903. Balabac (451, 516 *Mangubat*) March, 1906. Culion (477 *Merrill*) December, 1902. Basilan (70 *DeVore & Hoover*) April, 1903. Palawan (826 *Foxworthy*) April, 1906. In Nos. 1520 and 3155 *Merrill* and No. 6646 *Elmer*, from the Province of Bataan. Luzon, the panicle branches and rhachis are supplied with few long white hairs, and Hackel proposes to call this forma *lasiocladum*.

Endemic?

The status of this species is very unsatisfactory, and true *Panicum carinatum* may prove to be an exact synonym of *Panicum patens* Linn. Mez[10] including in *Panicum radicans* Retz., both the form considered above and *Panicum pilipes* Nees et Arn. Schumann and Lauterbach[11] certainly misinterpreted *Panicum carinatum*, as they reduced to it the very different *P. pilipes* Nees et Arn. (*P. hermaphroditum Steud.*). Scribner[12] gives a figure of Haenke's specimen on which *Panicum carinatum* Presl was based, and considers it to be closely allied to and perhaps identical with *Panicum radicans* Retz., which by many authors is considered a synonym of *P. patens* Linn. The figure apparently represents a young stage of the Linnean species. Even if the material here referred to *Panicum carinatum* is correctly identified, it can not be distinguished from *Panicum patens* Linn., except by some minor characters, such as the smaller size of the panicle, but at the same time it is perhaps as distinct from *P. patens* as is the following species.

(33) **Panicum warburgii** Mez in Perk. Frag. Fl. Philip. (1904) 143. *P. patens* Linn. var. *parvulum* Warb. l. c. *P. patens* Linn. var. *warburgii* Hack. in herb.

Luzon, Province of Nueva Viscaya, Bayombong (303 *Merrill*) May, 1902. Mindanao, Lake Lanao, Camp Keithley (268 *Clemens*) February, 1906.

Endemic.

The validity of this species is very doubtful, and Hackel is doubtless correct in reducing it to a variety of *Panicum patens*. It is apparently only a depauperate condition of that species due to environment.

Sect. Pseudechinolaena.

(34) **Panicum uncinatum** Raddi Agrost. Bras. (1823) 41; Trin. Gram. Pan. 174; Sp. Gram. Ic. *t. 216;* Kunth Enum. 1 (1833); Miq. Fl. Ind. Bat. 3 (1859) 449; Hook. Fl. Brit. Ind. 7 (1897) 58.

Mindanao, Lake Lanao, Camp Keithley (266 *Clemens*) February, 1906.

Tropical Asia, Malaya, and America.

[10] Perk. Frag. Fl. Philip. (1904) 143.

[11] Fl. Deutsch. Schutzgeb. Südsee (1901) 179.

[12] *Rept. Mo. Bot. Gard.* 10 (1899) 46. *pl. 17.*

DOUBTFUL AND EXCLUDED SPECIES.

PANICUM MERTENSII Roth.; F.-Vill. Nov. App. (1883) 312. First credited to the Philippines by Llanos, Mem. Ac. Cienc. Mad. (1858), but certainly erroneously identified. An American species.

PANICUM GAUDICHAUDII Kunth; F.-Vill. l. c. 311. A species of the Marianne Islands. F.-Villar's record for this species as a Philippine plant has never been verified, probably an erroneous identification on his part=*Digitaria stricta* Gaudich.

PANICUM LEUCOPHAEUM H. B. K.; F.-Vill. l. c. 311.

Presl (Rel. Haenk. 1 (1830) 299) states regarding this species "Hab. in Mexico, in Luzonia" from which F.-Villar compiled his record for the Philippines. F.-Villar states, however, that he saw living specimens in Luzon and Panay, which might have been *Panicum villosum* Lam. The species is Mexican, and some Australian forms have been referred to it. It is not to be expected in the Philippines.

PANICUM HELOPUS Trin.; F.-Vill. l. c. 311.=*P. setigerum* Retz., a species of British India, hardly to be expected in the Philippines. F.-Villar reduces to *P. helopus*, *Setaria pilifera* Llanos Frag. Pl. Filip. (1851) 34, and while this reduction is apparently erroneous, I have been unable to determine Llanos's species satisfactorily from his very imperfect description.

PANICUM ELATIUS Kunth Rev. Gram. 1 (1829) 38; F.-Vill. Nov. App. (1883) 312.=*Panicum altissimum* Mey., a species of tropical America. Certainly an erroneous identification on the part of F.-Villar.

(30) ICHNANTHUS Beauv.

Similar to *Panicum*, but the flowering glume pedicellate and with two basal appendages or scars.

Species about 20, mostly tropical America, two in tropical Asia; one in the Philippines.

(1) **I. pallens** (Sw.) Munro in Benth Fl. Hongk. (1861) 414; Hook. f. Fl. Brit. Ind. 7 (1897) 60; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1804) 334; Hack. in Govt. Lab. Publ. 35 (1905) 80. *Panicum pallens* Sw. Prodr. (1788) 23; Kunth Enum. 1 (1833) 89. *P. nitens* Merr. Govt. Lab. Publ. 17 (1904) 8.

LUZON, Province of Bataan, Mount Mariveles (3221, 3756 *Merrill*) October, 1903, January, 1904.

Tropics of both hemispheres.

(31) OPLISMENUS Beauv.

Spikelets 1-flowered in small groups or clusters along the branches of the panicle, secund; first and second glumes always awned, the third frequently awned.

Species about 6, tropical and subtropical regions of both hemispheres; three in the Philippines.

1. Spikelets about 2 mm. long, greenish, closely imbricate, green; awns capillary ..... (1) *O. burmannii*
1. Spikelets 3 to 4 mm. long, loosely imbricate or scattered, often purplish; awns stout.
   2. More or less pubescent; spikes elongated..... (2) *O. compositus*
   2. Glabrous or nearly so; spikes short or reduced to a single fascicle of flowers ..... (3) *O. undulatifolius*

(1) **Oplismenus burmannii** (Retz.) Beauv. Agrost. (1812) 54; Kunth Enum. 1 (1833) 139; Hook. f. Fl. Brit. Ind. 7 (1897) 68; F.-Vill. Nov. App. (1883); Merr. Philip. Journ. Sci. 1 (1906) Suppl. 28. *Panicum burmannii* Retz. Obs. 3 (1779–91) 10. *Orthopogon burmannii* R. Br. Prodr. (1810) 194; Miq. Fl. Ind. Bat. 3 (1859) 442.

Luzon, Province of Bataan, Lamao River (3290 *Merrill*) October, 1903; (6645 *Elmer*) November, 1904. Mindanao, Province of Zamboanga (5483 *Merrill*) October, 1906.

Tropical Africa, Asia to Japan and Malaya.

(2) **Oplismenus compositus** (Linn.) Beauv. Agrost. (1812) 54; Kunth Enum. 1 (1833) 141; F.-Vill. Nov. App. (1883) 312; Mez in Perk. Frag. Fl. Philip. (1904) 144; Hook. f. Fl. Brit. Ind. 7 (1897) 66; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 337; Ceron Cat. Pl. Herb. (1892) 180. *O. indicus* Roem. et Schult. Syst. 2: 484; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 288; Ceron Cat. Pl. Herb. (1892) 180. *O. sylvaticus* Beauv.; F.-Vill. Nov. App. (1883) 312. *O. loliaceus* Beauv.; Kunth Enum. 1 (1833) 140; F.-Vill. Nov. App. (1883) 312. *Orthopogon hirtellus* Llanos Frag. Pl. Filip. (1851) 37. *Or. setarius?* Llanos l. c. 35. *Or. sylvaticus* Miq. Fl. Ind. Bat 3 (1859) 443. *Panicum compositum* Linn. Sp. Pl. (1753) 57. *P. lanceolatum* Retz.; F.-Vill. Nov. App. (1883) 311.

Philippines (531 *Cuming*). Luzon, Province of Rizal, Montalban (5072 *Merrill*) March, 1906; Antipolo (2 *Foxworthy*) January, 1906: Province of Benguet, Bued River (4309 *Merrill*) November, 1905: Province of Zambales, Subic (*Hallier*) December, 1903: Province of Nueva Viscaya, Quiangan (125 *Merrill*) June, 1902. Province of Bataan, Lamao (1021 *Whitford*) December, 1904. Culion (486, 489 *Merrill*) December, 1902. Panay, Iloilo (*Copeland*) January, 1904. Palawan, Puerto Princesa (208 *Bermejos*) December, 1905. Mindanao, Lake Lanao, Camp Keithley (150, 631 *Clemens*) February, July, 1906. Palmas (5364 *Merrill*) October, 1906.

Tropical regions of both hemispheres.

Var. **lasiorhachis** Hack. in Govt. Lab. Publ. 35 (1905) 81. *Oplismenus burmannii* Mez in Perk. Frag. Fl. Philip. (1904) 144, non Beauv.

Palawan (Paragua) Point Separation (826 *Merrill*) February, 1903.

Endemic.

(3) **Oplismenus undulatifolius** (Ard.) Beauv. Agrost. (1812) 54; Kunth Enum. 1 (1833) 139; Hook. f. Fl. Brit. Ind. 7 (1897) 66; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 338; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 28. *Panicum undulatifolium* Arduin. Animad. Bot. Spec. Alter. (1764) 14. *t. 4.*

Luzon, Province of Bataan, Mount Mariveles (2547 *Borden*) February, 1905; (6987 *Elmer*) November, 1904. Mindanao, Province of Zamboanga (5485 *Merrill*) October, 1906.

Southern Europe to tropical Africa, India, China and Japan.

Var. **imbecillis** (R. Br.) Hack. in Govt. Lab. Publ. 25 (1905) 82; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 28. *Panicum imbecillis* Trin. Ic. (1828–36) 16. *t. 191. Orthopogon imbecillis* R. Br. Prodr. (1810) 194. *Oplismenus minus* Merr. Govt. Lab. Publ. 17 (1904) 9.

Luzon, Province of Bataan, Mount Mariveles (3203 *Merrill*) October, 1903: District of Lepanto, Mount Data (4511 *Merrill*) November, 1905. Mindanao, Mount Apo (1136 *Copeland*) April, 1904.

Malaya and Australia.

(32) SETARIA Beauv.

Spikelets one to two flowered, ovate, in usually dense, cylindrical spike-like panicles, each spikelet subtended by one to many scabrous bristles which exceed the spikelets in length.

Species about 35, tropical and temperate regions of the World; 4 in the Philippines.

1. Inflorescence a dense, cylindrical spike-like panicle.
   2. Setæ few, 1 to 3, at the base of each spikelet.
      3. Inflorescence 5 to 7 cm. long, 1 cm. thick or less; setæ green ..... (3) *S. viridis*
      3. Inflorescence 5 to 20 cm. long, 1 to 3 cm. thick; setæ usually purplish ..... (1) *S. italica*
   2. Setæ many at the base of each spikelet, yellow or purplish ..... (2) *S. flava*
1. Inflorescence a lax, open, subpyramidal, few-flowered panicle; setæ 1 at the base of each spikelet..... (4) *S. laxa*

(1) **Setaria italica** (Linn.) Beauv. Agrost. (1812) 51; Kunth Enum. 1 (1833) 153; Hook. f. Fl. Brit. Ind. 7 (1897) 78; Llanos Frag. Pl. Filip. (1851) 24; Miq. Fl. Ind. Bat. 3 (1859) 467; F.-Vill. Nov. App. (1883) 312; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 180; Mez in Perk. Frag. Fl. Philip. (1904) 145; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 325. *Panicum italicum* Linn. Sp. Pl. (1753) 56. *P. miliaceum* Blanco Fl. Filip. ed. 1 (1837) 39; ed. 2, (1845) 28, non Linn. *Chaetochloa italica* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4 (1897) 39; Scribn. & Merr. l. c. 21 (1900) 20. *Setaria comosa* Miq. Fl. Ind. Bat. 3 (1859) 468. *Panicum comosum* Steud. Syn. 1 (1855) 53.

Luzon, Province of Rizal, Montalban (3410 *Ahern's collector*) November, 1905. Negros, Tanhay (*Jose Muñoz*) 1904. Culion (491 *Merrill*) December, 1902. Balabac (500 *Mangubat*) March, 1906. Cultivated only. T., *Daua, Dava.* I., *Bucacao.*

Cultivated in most tropical and temperate regions.

(2) **Setaria flava** (Nees) Kunth Rev. Gram. 1 (1829) 46; Enum. 1 (1833) 149; Merr. Philip. Journ. Sci. 1 (1906) Suppl. 28. *S. glauca* F.-Vill. Nov. App. (1883) 312; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 288; Ceron Cat. Pl. Herb. (1892) 180; Mez in Perk. Frag. Fl. Philip. (1904) 145, non Beauv. *Panicum flavum* Nees in Mart. Fl. Bras. 2 (1829) 180; *Panicum penicillatum* Willd.; Nees in Nov. Act. Nat. Cur. 19 (1834) Suppl. 1: 173. *Panicum rubiginosum* Steud. Syn. 1 (1855) 50. *Setaria rubiginosa* Miq. Fl. Ind. Bat. 3 (1859) 467; F.-Vill. Nov. App. (1883) 313. *Panicum chrysanthum* Steud. Nom. ed. 2, 2 (1841) 254. *Chaetochloa flava* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 4 (1897) 39. *C. glauca* var. *aurea* Wight in Contr. U. S. Nat. Herb. 9 (1905) 223. *Setaria glauca* var. *aurea* K. Sch. Fl. Deutsch. Schutzegeb. Südsee (1901) 180. *S. aurea* Hochst. ex A. Br. in Flora 24 (1841) 276. *S. glauca* Hook. f. Fl. Brit. Ind. 7 (1897) 78 pro parte.

Philippines (551, 1342 *Cuming*). Luzon, Province of Benguet (4355, 4694 *Merrill*) October, November, 1905; (4869 *Curran*) August, 1906: Province of Nueva Ecija, Carranglang (208 *Merrill*) May, 1902: Province of Nueva Viscaya, Quiangan (113 *Merrill*) June, 1902: Province of Bataan, Lamao (1936 *Borden*) October, 1904: Province of Tarlac, Concepcion (3630 *Merrill*) November, 1903: Province of Principe, Baler (1140 *Merrill*) October, 1902: Province of Rizal, Morong (1446 *Ramos*) August, 1906; Bosoboso (1105 *Ramos*) July, 1906. Seme-

RARA (4141 *Merrill*) July, 1905. MINDANAO, Davao (546 *Copeland*) March, 1904; (100 *DeVore & Hoover*) April, 1903.

Tropics of both hemispheres.

Perhaps only a variety of *Setaria glauca*, distinguished from the typical state of that species, especially in the decidedly smaller spikelets.

(3) **Setaria viridis** (Linn.) Beauv. Agrost. (1812) 51; Kunth Enum. 1 (1833) 151; Miq. Fl. Ind. Bat. 3 (1859) 467; F.-Vill. Nov. App. (1883) 312; Hook. f. Fl. Brit. Ind. 7 (1897) 80; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 336.

LUZON, Manila (*Merrill*) July, 1905. A single specimen found along a city street, introduced.

(4) **Setaria laxa** Merrill, sp. nov.

Culmis debilibus, erectis, glabris, ramosis, at 1 m. altis; vaginis quam internodiis multo brevioribus, glabris vel sparse pilosis, margine sursum ciliato-pilosis; laminis linearibus vel anguste-lanceolatis, membranaceis, 7–16 cm. longis; paniculis laxis, elongato-pyramidatis, ad 20 cm. longis, paucifloris, ramis ramulisque interdum pedicellis in setam productis, seta scabra, 2–4 mm. longa; spiculis paucis, solitariis vel binis, glabris, 2–2.2 mm. longis.

A slender, erect branched, nearly glabrous grass about 1 m. high, the culms 1.5 to 2 mm. thick, glabrous; nodes glabrous. Sheaths much shorter than the internodes, glabrous or slightly pilose, the margins above ciliate-pilose; ligule ciliate; blades linear or narrowly lanceolate, membranaceous, acuminate, 7 to 16 cm. long, 3 to 5 mm. wide, glabrous or beneath along the nerves with few long white hairs, the margins and nerves scabrous. Panicles lax, elongate or elongate-pyramidal, erect, about 20 cm. long, the branches slender, erect-spreading, about 8 cm. long, few-flowered, scabrous, the branches, branchlets, and sometimes the pedicels produced into a 2 to 4 mm. long scabrous awn. Spikelets few, purplish, solitary or in pairs, glabrous, narrowly ovate, acute, 2 to 2.2 mm. long, the first glume 3-nerved, ovate, acute, 0.6 mm. long; second glume 5-nerved, ovate, acute, 1.4 mm. long; third glume 5-nerved, 2 mm. long; flowering glume 2 mm. long, narrowly ovate, acute, minutely rugose.

LUZON, Province of Laguna, Los Baños (*Hallier*) December, 1903.

A species characterized by its lax habit and panicle, narrow leaves, and comparatively few spikelets. The panicle branches are slender and branched from the base, usually solitary, alternate. Perhaps as near *Panicum* § *Ptycophyllum* as *Setaria*, but the narrow leaves are not at all plicate and the pedicels usually, but not always, end in a single bristle subtending the spikelet. No. 21157 β *Koorders* from Java is very nearly the same, but in that specimen the leaves are tuberculate hispid or pilose.

DOUBTFUL AND EXCLUDED SPECIES.

SETARIA MACROSTACHYA H. B. K.; F.-Vill. Nov. App. (1883) 312.

An American species to which some Australian specimens have been referred. Not to be expected in the Philippines.

SETARIA VERTICILLATA Beauv.; F.-Vill. Nov. App. (1883) 312. F.-Villar's

record of this as a Philippine species has not been verified. To be expected in the Philippines. Tropical and temperate regions of the World.

SETARIA PILIFERA Llanos Frag. Pl. Filip. (1851) 34. Reduced by F.-Villar to *Panicum helopus* Trin., a species not known from the Philippines. Not satisfactorily determinable from the imperfect description.

SETARIA GLOBULARIS Presl Rel. Haenk. 1 (1830) 312; Kunth Enum. 1 (1833) 151; Miq. Fl. Ind. Bat. 3 (1859) 467; F.-Vill. Nov. App. (1883) 312; Scribn. Rept. Mo. Bot. Gard. 10 (1899) 52.

"Hab. in insulis Philippines" Presl. Scribner states that the sheet labeled by Presl, now in the Bernhardi herbarium at the Missouri Botanical Garden, contains three species, one being *Setaria caudata* Lam., one *S. composita* Kunth, and one undeterminable. As the first two species are tropical American, it seems probable that Presl credited the species to the Philippines through error, and that *Setaria globularis* Presl is a synonym of one of the above species, and not a Philippine plant.

(33) AXONOPUS Beauv.

Spikelets in whorled or digitate spikes, awned, the third glume with a small cleft palea.

Species 2 or 3, Tropical Asia, Malaya and Australia; 1 in the Philippines.

(1) **Axonopus semialatus** (R. Br.) Hook. f. Fl. Brit. Ind. 7 (1897) 64; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 334. *Panicum semialatum* R. Br. Prodr. (1810) 192; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Ceron Cat. Pl. Herb. (1892) 180. *Urochloa semialata* Kunth Rev. Gram. 1 (1829) 31; Enum. 1 (1833) 74; Mez in Perk. Frag. Fl. Philip. (1904) 144. *Panicum philippicum* F.-Vill. Nov. App. (1883) 312. *Holosctum philippicum* Steud. Syn. 1 (1855) 118; Miq. Fl. Ind. Bat. 3 (1859) 444. *Allotcropsis distachya* Presl Rel. Haenk. 1 (1830) 344. *t. 47;* Kunth Enum. 1 (1833) 518; Scribn. in Rept. Mo. Bot. Gard. 10 (1899) 37. *pl. 23. Arundinella nervosa* Nees in Steud. Syn. 1 (1855) 115; Miq. Fl. Ind. Bat. 3 (1859) 519, var. *β.*

PHILIPPINES (1363, 1414 *Cuming*). LUZON, Manila (*Scribner*) June, 1902: Province of Benguet, Twin Peaks (6391 *Elmer*) May, 1904: Province of Nueva Ecija, Carranglang (213 *Merrill*) May, 1902: Province of Nueva Viscaya, Bagabag (119 *Merrill*) June, 1902.

Africa and Mauritius to southern Asia, Malaya, and Australia.

Hooker f.[13] states that the genus *Urochloa* Beauv., was based on *Panicum javanicum*, and I have accordingly followed him in accepting the generic name *Axonopus*.

(34) CENCHRUS Linn.

Spikelets narrow, one or two to three together enclosed by an indurated spiny involucre, these involucres disposed in cylindrical spike or raceme.

Species about 12, tropical and subtropical regions of both hemispheres, extending into the temperate regions in North America; 1 (introduced) in the Philippines.

(1) **Cenchrus echinatus** Linn. Sp. Pl. (1753) 1050; Kunth Enum. 1 (1833) 166; Presl Rel. Haenk. 1 (1830) 317; Miq. Fl. Ind. Bat. 3 (1859) 472; F.-Vill. Nov. App. (1883) 313; Ceron Cat. Pl. Herb. (1892) 181; Mez in Perk. Frag. Fl. Philip. (1904) 145; Usteri Beitr. Kenn. Philip. Veg. (1905) 132.

[13] Fl. Brit. Ind., 7 (1897), 64.

Luzon, Manila (83, 366 *Merrill*) May, July, 1902; (34, 59 *McGregor*) October, 1904; Province of Cavite, Cavite (162 *Foxworthy*) July, 1905. Panay (*Copeland*) January, 1904. Culion (493 *Merrill*) December, 1902.

Introduced from tropical America.

(35) PENNISETUM Pers.

Spikelets in racemes, spikes or false spikes, narrow or ovate, single or in groups of twos or threes surrounded by many slender, dissimilar bristles, the first glume usually minute, sometimes obsolete.

Species about 40, mostly of tropical and subtropical Africa; 1 in southern Europe; a few in tropical Asia and America; 2 in the Philippines.

1. Slender, 0.7 m. high or less; leaves slender, convolute..... (1) *P. compressum*
1. Robust, 1.5 to 2 m. high; leaves flat, broad..... (2) *P. macrostachyum*

(1) **Pennisetum compressum** R. Br. Prodr. (1810) 195; Hook. f. Fl. Brit. Ind. 7 (1897) 85; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 338. *Gymnothrix nigricans* Presl Rel. Haenk. 1 (1830) 315; Kunth Enum. 1 (1833) 159. *Pennisetum nigricans* Trin. ex Steud. Nomen. ed. 2, 2 (1841) 297; Miq. Fl. Ind. Bat. 3 (1859) 470; F.-Vill. Nov. App. (1883) 313. *P. cenchroides* F.-Vill. Nov. App. (1883) 313, non Spreng.? *Cenchrus hexaflorus* Blanco Fl. Filip. ed. 1 (1837) 36; ed. 2 (1845) 24.

Luzon, Province of Benguet, Bagnio (5756 *Elmer*) March, 1904; Kabayan (4435 *Merrill*) October, 1905.

Burma to Tonkin, southern China, Japan, and Australia.

Cenchrus hexaflorus Blanco was previously considered by the author[14] to be a synonym of *Pennisetum macrostachyum* Trin., but Blanco's description applies much closer to *P. compressum* R. Br.

(2) **Pennisetum macrostachyum** Trin. in Mém. Acad. St. Pétersb. VI. 3[2] (1835) 177; Ceron Cat. Pl. Herb. (1892) 181; Schum. and Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 181. *Sericura elegans* Hassk. in Flora 25 (1842) Beibl. 2.

Luzon, Province of Tayabas, Atimonan (716 *Whitford*) August, 1904. Masbate (3381 *Merrill*) November, 1903. Mindanao, Lake Lanao, Camp Keithley (499 *Clemens*) April, 1906; Mount Malindang (4715 *Mearns & Hutchinson*) May, 1906.

Java to New Guinea and Polynesia.

(36) CHAMAERAPHIS R. Br.

Spikelets few on the branches of a simple panicle, the branchlets produced beyond the terminal spikelet as an awn-like bristle, the pedicels falling with the spikelets, the first empty glume very short. Postrate aquatic grasses.

Species about 5, tropical Asia, Malaya, Australia, and America; 1 in the Philippines.

(1) **Chamaeraphis aspera** (Koen.) Nees in Wall. Cat. (1828) No. 8679; Mez in Perk. Frag. Fl. Philip. (1904) 145. *Panicum asperum* Koen. in Naturf. 23 (1788) 209. *P. spinescens* R. Br. Prodr. (1810) 193; Kunth Enum. 1 (1833) 209. *Chamaeraphis spinescens* Poir. in Lam. Encycl. Suppl. 2: 189; F.-Vill. Nov.

[14] *Publications of the Bureau of Government Laboratories*, Manila (1905), No. 27, 91.

App. (1883) 313; Hook. f. Fl. Brit. Ind. 7 (1897) 62; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 339.

Luzon, Manila (375 *Merrill*) August, 1902: Province of Nueva Ecija, San Isidro (4194 *Merrill*) September, 1905.

British India to southern China, Malaya, and Australia.

(*Stenotaphrum complanatum* Schrank=*S. glabrum* Trin., has been reported from the Philippines by F.-Villar, Nov. App. (1883) 313, but his record has never been verified. The species is widely distributed in the Tropics and is to be expected in the Philippines.)

(37) THUAREA Pers.

Spikes surrounded by a sheathing leaf, at maturity the dilated base of the axis enveloping the one to two perfect spikelets, forming a beak which bores into the ground. A creeping maritime grass.

A monotypic genus extending from Ceylon to New Caledonia.

(1) **Thuarea involuta** (Forst.) R. Br. Prodr. (1810) 197. *Ischaemum involutum* Forst. Prodr. (1786) 73. *Thuarea sarmentosa* Pers. Syn. 1 (1805) 110; Kunth Rev. Gram. 1 (1829) 247. *t. 35;* Enum. 1 (1833) 174; F.-Vill. Nov. App. (1883) 313; Usteri Beitr. Kenn. Philip. Veg. (1905) 133; Merr. Philip. Journ. Sci. 1 (1906) Suppl. 28; Hook. f. Fl. Brit. Ind. 7 (1897) 91.

Mindoro, Baco (882 *Merrill*) April, 1903. Cajoagan (5244 *Merrill*) October, 1906. Mindanao, Province of Zamboanga (*Scribner*) June, 1903; (*Hallier*) February, 1904: District of Davao (564 *Copeland*) March, 1904. Pamas (5356 *Merrill*) October, 1906.

Seacoast from Ceylon to Madagascar, Malaya, Australia, and Polynesia.

(38) SPINIFEX Linn.

Coarse prostrate maritime grasses, the staminate spikelets in rigid peduncled spikes which are umbellately disposed. Pistillate spikelets in large globose heads of stellately spreading very long rod-like rhachides.

Species 4, 3 Australian, 1 widely distributed in tropical Asia, Malaya, Australia, and the Philippines.

(1) **Spinifex squarrosus** Linn. Mant. 2 (1771) 163; Blanco, Fl. Filip. ed. 1 (1837) 46; ed. 2 (1845) 31; ed. 3, 1 (1877) 57; Miq. Fl. Ind. Bat. 3 (1859) 474; F.-Vill. Nov. App. (1883) 313; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 288; Mez in Perk. Frag. Fl. Philip. (1904) 145; Hook. f. Fl. Brit. Ind. 7 (1897) 63. *Stipa spinifex* Linn. Mant. 1 (1867) 84; Blanco ll. cc.

Luzon, Province of Union, Bauang (5651 *Elmer*) February, 1904: Province of Zambales, Iba (333 *Merrill*) June, 1902: Province of Bataan, Lamao (*Whitford*) April, 1904. Apo (Mindoro Straits) (419 *Merrill*) December, 1902. Mindanao, Davao (511 *Copeland*) March, 1904; (154 *DeVore & Hoover*) April, 1903.

Tropical seashores from British India to southern China and Malaya.

Tribe VI. ORYZEÆ.

Spikelets perfect or unisexual, one-flowered, the flower enclosed by a flowering glume and palea which is usually 1-nerved. Empty glumes two or none. Stamens frequently 6.

(39) LEPTASPIS R. Br.

Staminate spikelets small, terminal on short branchlets; pistillate flowers 1 to 2, sessile on the lower portion of the same branches, large, globose, with two short empty glumes. Leaves large, broad, pedicellate.

Species 5 in the tropics of the Old World; 2 or 3 in the Philippines.

1. Leaves oblong to oblong-oblanceolate ..... (1) *L. urceolata*
1. Leaves lanceolate ..... (2) *L. cumingii*

(1) **Leptaspis urceolata** (Roxb.) R. Br. in Benn. Pl. Jav. Rar. (1838–1852) 23. *t. 6;* Miq. Fl. Ind. Bat. 3 (1859) 374; Steud. Syn. 1 (1855) 106; F.-Vill. Nov. App. (1883) 318; Vidal Rev. Pl. Vasc. Filip. (1886) 288; Phan. Cuming. Philip. (1885) 157. *L. manillensis* Steud. Syn. 1 (1855) 8; Miq. Fl. Ind. Bat. 3 (1859) 374; F.-Vill. Nov. App. (1883) 318. *Pharus urceolatus* Roxb. Fl. Ind. 3 (1832) 611.

Mindanao, Davao (702 *Copeland*) March, 1904; Catalonan (*Copeland*) April, 1902; Lake Lanao, Camp Keithley (614 *Clemens*) June, 1906.

Malayan Peninsula and Archipelago to New Guinea.

(2) **Leptaspis cumingii** Steud. Syn. 1 (1855) 416; Miq. Fl. Ind. Bat. 3 (1859) 375; F.-Vill. Nov. App. (1883) 318; Vidal. Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 288.

Philippines (1627 *Cuming*). Not seen.

Endemic.

(3) **Leptaspis** sp. *L. cochleata* Thw.? Hack. in Govt. Lab. Publ. 35 (1905) 81.

Mindanao, Davao (703 *Copeland*) March, 1904. Material too imperfect for satisfactory identification.

(40) ORYZA Linn.

Spikelets elongated; empty glumes of two small scales or bristles, and underneath these, two more minute rudimentary empty glumes. Flowering glume complicate and keeled, usually awned. Stamens 6.

Species about 6, in the Tropics of both hemispheres; 2 in the Philippines. 1, with many forms and varieties, cultivated (rice).

1. Spikelets paniculate; cultivated only ..... (1) *O. sativa*
1. Spikelets in a simple raceme; a sylvan species ..... (2) *O. meyeriana*

(1) **Oryza sativa** Linn. Sp. Pl. (1753) 333; Kunth Enum. 1 (1833) 7; Miq. Fl. Ind. Bat. 3 (1859) 368; F.-Vill. Nov. App. (1883) 318; Pilger in Perk. Frag. Fl. Philip. (1904) 145; Merr. Philip. Journ. Sci. 1 (1906) Suppl. 28; Blanco Fl. Filip. ed. 1 (1837) 273; ed. 2 (1845) 190 et varr. *binamban, glutinosa, lamuyo, pilosa, praecox, quinanda, rubra* et *violacea* Blanco ll. cc. *O. aristata* Blanco ll. cc. 274, 190. *O. latifolia* Desv.; F.-Vill. Nov. App. (1883) 319. *O. glutinosa, montana* et *praecox* Lour. Fl. Cochinch. (1790) 215; F.-Vill. Nov. App. (1883) 319. *O. minuta* Presl Rel. Haenk. 1 (1830) 208; Kunth Enum. 1 (1833) 7; Miq. Fl. Ind. Bat. 3 (1859) 371; F.-Vill. Nov. App. (1883) 319, ex descr.

Tropical Asia, but generally cultivated in tropical and warm countries of the World. Common rice, widely cultivated in the Philippines, with very numerous cultural varieties.

(2) **Oryza meyeriana** (Zoll. et Mor.) Baill. Hist. Pl. 12 (1894) 166; Pilger in Perk. Frag. Fl. Philip. (1904) 145. *Padia meyeriana* Zoll. et Mor. Verz. Ind. Archip. (1854–55) 103; Steud. Syn. 1 (1855) 3; Miq. Fl. Ind. Bat. 3 (1859)

373. *Oryza granulata* Nees et Arn. in Wight. Cat. No. 2354; Hook. f. Fl. Brit. Ind. 7 (1897) 93; Merr. in Govt. Lab. Publ. 6 (1904) 7.

Luzon, Province of Nueva Viscaya, Quiangan (116 *Merrill*) June, 1902. Palawan, Puerto Princesa (343 *Bermejos*) January, 1906.

Himalayan region to Java and Celebes.

(41) LEERSIA Sw.

Distinguished from *Oryza* by the aborted empty glumes and awnless flowering glume. Stamens one to three or in our species six.

Species 5, tropical and temperate regions of the World; 1 in the Philippines.

(1) **Leersia hexandra** Sw. Prodr. Veg. Ind. Occ. (1788) 21; Kunth Enum. 1 (1833) 94; Llanos Frag. Pl. Filip. (1851) 26; F.-Vill. Nov. App. (1883) 318; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 288; Ceron Cat. Pl. Herb. (1892) 181; Hook. f. Fl. Brit. Ind. 7 (1897) 94; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 345; Pilger in Perk. Frag. Fl. Philip. (1904) 145; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 28. *L. glaberrima* Trin.; Miq. Fl. Ind. Bat. 3 (1859) 367; F.-Vill. Nov. App. (1883) 318. *Hemalocenchrus hexandrus* O. Ktze. Rev. Gen. Pl. (1891) 777. *Leersia luzonensis* Presl, Rel. Haenk. 1 (1830) 207.

Philippines (529 *Cuming*). Luzon, Manila (41, 381 *Merrill*) May, August, 1902; Province of Benguet, Baguio (4337 *Merrill*) November, 1905. Province of Bataan, Lamao (*Whitford*) September, 1905. Mindanao, Lake Lanao, Camp Keithley (394 *Clemens*) March, 1906.

The most commonly cultivated forage grass in the Philippines. Sp.-Fil., *Zacáte*. T., *Barít*.

Tropical Africa, Asia, Malaya, Australia, and America.

Tribe VII. PHALARIDEÆ.

All the spikelets fertile, one-flowered with one to two staminate flowers inserted below the apparently terminal one. Empty glumes four, unequal, the third and fourth occasionally very small, or one of them rudimentary. Flowering glume and palea alike, laterally compressed, awnless, nerves one or wanting.

(42) MICROLAENA R. Br.

First and second glumes very short, the third and fourth longer than the flowering glume, all keeled. Inflorescence paniculate.

Species 5 confined to Australia and New Zealand with the exception of the following, which extends to Luzon.

(1) **Microlaena stipoides** (Labill.) R. Br. Prodr. (1810) 210; Benth. Fl. Austral. 7 (1878) 552; Kunth Enum. 1 (1833) 16; Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 269. *Ehrharta stipoides* Labill. Pl. Nov. Holl. 1 (1804) 91. *t. 118.*

Luzon, Province of Benguet, Mount Tonglong (4831 *Merrill*) November, 1905; Panai to Baguio (4696 *Merrill*) November, 1905; District of Lepanto, Mount Data (4543 *Merrill*) November, 1905.

Australia and New Zealand.

(43) ANTHOXANTHUM Linn.

Spikelets in short spike-like panicles; first and second glumes unequal, herbaceous, the third and fourth clothed with brown hairs. Flowering glume and palea short, membranous. Fragrant grasses.

Species 5 of the North Temperate Zone and Australia; 1 in northern Luzon.

(1) **Anthoxanthum luzoniense** Merr. Philip. Journ. Sci. 1 (1906) Suppl. 178.

Luzon, Province of Benguet, Pauai (4713 *Merrill*) November, 1905.

Endemic.

Tribe VIII. AGROSTIDEÆ.

Spikelets usually all perfect, 1-flowered, the rhachilla sometimes prolonged beyond the palea. Empty glumes often somewhat unequal, usually equaling or exceeding the flowering glume. Palea usually 2-nerved.

(44) ARISTIDA Linn.

Panicles usually expanded. Empty glumes longer than the flowering glume, the latter with a pointed callus and with a terminal trifid or three-branched awn.

Species about 125, in the warmer parts of both hemispheres; 3 or more in the Philippines.

1. A slender annual 20 cm. high or less. . . . . (1) *A. cumingiana*
1. Perennial.
   2. Stout, 1 m. high with large diffuse many-flowered panicles. . . (2) *A. culionensis*
   2. About 40 cm. high; panicles narrow, few-flowered. . . . . (3) *A. stipoides*

(1) **Aristida cumingiana** Trin. & Rupr. in Mém. Acad. St. Pétersb. VI. 7 (1849) 141; Miq. Fl. Ind. Bat. 3 (1859) 381; Steud. Syn. 1 (1855) 140; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 292; Ceron Cat. Pl. Herb. (1892) 184; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 381; Hook. f. Fl. Brit. Ind. 7 (1897) 224. *A. capillacea* Cav. Icon. 5 (1799) 43, *t.* 468. *f.* 1. non Lam. *A. trichodes* Walp. Ann. 3 (1852–53) 753. *Chaetaria trichodes* Nees in Hook. Kew Journ. 2 (1850) 1001.

Luzon, Province of Benguet, Ambuklao to Daklan (4385 *Merrill*) October, 1905; District of Lepanto, Suyoc to Cervantes (4446 *Merrill*) November, 1905; Province of Rizal, Antipolo (7 *Foxworthy*) January, 1906.

Northern India to southern China and the Philippines.

(2) **Aristida culionensis** Pilger in Perk. Frag. Fl. Philip. (1904) 145.

Culion (471, 515 *Merrill*) December, 1902.

Endemic.

(3) **Aristida stipoides** R. Br. Prodr. (1810) 174. var. **tenuisetulosa** Pilger in Perk. Frag. Fl. Philip. (1904) 146.

Luzon, Province of Zambales, Iba (329 *Merrill*) June, 1902.

Endemic, i. e., the variety, the species in northern and central Australia.

DOUBTFUL AND EXCLUDED SPECIES.

Aristida sorzogonensis Presl Rel. Haenk. 1 (1830) 224; Kunth Enum. 1 (1833) 192; Miq. Fl. Ind. Bat. 3 (1859) 381; F.-Vill. Nov. App. (1883) 319.

"Hab. in Luzonia ad Sorsogon" Presl. Not seen.

Aristida luzoniensis Cav. Icon. 5 (1799) 45, *t.* 470. *f.* 2; Kunth Enum. 1

(1833) 192; Miq. Fl. Ind. Bat. 3 (1859) 381; F.-Vill. Nov. App. (1883) 319. *Chaetaria luzoniensis* Beauv. Agrost. (1812) 30.

"Habitat in insula Luzon altera ex Philippicis" Cavanilles. Not seen; perhaps not a Philippine plant.

ARISTIDA LAXA Cav. Icon. 5 (1799) 44. *t. 470. f. 1;* Kunth Enum. 1 (1833) 192; Miq. Fl. Ind. Bat. 3 (1859) 381; F.-Vill. Nov. App. (1883) 319.

"Habitat prope Montevideo, et in insulis Philippicis" Cavanilles. Not seen; apparently a South American species erroneously credited to the Philippines.

ARISTIDA RIGIDA Cav. Icon. 5 (1799) 44. *t. 469. f. 2;* Kunth Enum. 1 (1833) 192; Miq. Fl. Ind. Bat. 3 (1859) 381; F.-Vill. Nov. App. 319.

"Habitat in insulis Philippicis" Cavanilles. Not seen.

ARISTIDA MURINA Cav. Icon. 1 (1799) 44. *t. 469. f. 1;* Kunth Enum. 1 (1833) 192; F.-Vill. Nov. App. (1883) 319.

"Habitat in Mindanao insula prope Samboangan" Cavanilles.

Apparently not a Philippine plant; credited to South America in Index Kewensis.

Although the above four species described by Cavanilles are figured by him, I have seen no Philippine specimens that match his figures and descriptions. As it is probable that the specimens on which the species were based were not from the Philippines, I have enumerated them here as doubtful ones.

(45) SPOROBOLUS R. Br.

Panicles various. Spikelets small, awnless, naked; flowering glume and palea usually exceeding the empty glumes; palea bifid. Fruit a utricle, the expelled seed usually remaining adherent for a time to the spikelet.

Species about 100, chiefly in temperate and tropical America, but some species in Asia, Africa, Malaya, and Australia; about 3 in the Philippines.

1. Second and third glumes subequal, the first shorter; annual..... (1) *S. piliferus*
1. First and second glumes much shorter than the third; perennial.
    2. Panicles narrowly pyramidal or elongated, the branches capillary, in scattered fascicles, rather lax..... (2) *S. diandrus*
    2. Panicles very narrow, spiciform, densely flowered, the branches short, appressed, covered to the base with crowded spikelets.. (3) *S. indicus*

(1) **Sporobolus piliferus** (Trin.) Kunth Enum. 1 (1833) 311, excl. var. *β*; Hook. f. Brit. Ind. 7 (1897) 251. *S. ciliata* Presl Rel. Haenk. 1 (1830) 242; Scribn. in Rept. Mo. Gard. 10 (1899) 53. *pl. 30;* Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 269. *Vilfa pilifera* Trin. Diss. (1824) 157; Sp. Gram. Icon. *t. 58.*

LUZON, Province of Benguet (4362, 4718 *Merrill*) October, November, 1905.

British India to Malacca and Central America.

(2) **Sporobolus diandrus** (Retz.) Beauv. Agrost. (1812) 26; Miq. Fl. Ind. Bat. 3 (1859) 375; F.-Vill. Nov. App. (1883) 321; Hook. f. Fl. Brit. Ind. 7 (1897) 247; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 387; Pilger in Perk. Frag. Fl. Philip. (1904) 146. *Agrostis diandra* Retz. Obs. 5 (1779–91) 19. *Vilfa diandra* Steud. Syn. 1 (1855) 155.

LUZON, Manila (92 *Merrill*) May, 1902: Province of Pampanga, Bacolor (45 *Parker*) May, 1904. PALAWAN (4168, 4169 *Curran*) May, 1906.

India to southern China and Malaya.

(3) **Sporobolus indicus** (Linn.) R. Br. Prodr. (1810) 170; Kunth Enum. 1 (1833) 211; F.-Vill. Nov. App. (1883) 321; Hook. f. Fl. Brit. Ind. 7 (1897) 247. *S. elongatus* R. Br. Prodr. (1810) 170; Usteri Beitr. Kenn. Philip. Veg. (1905) 133. *Agrostis indica* Linn. Sp. Pl. (1753) 63.

Luzon, Province of Isabela, Echague (139 *Merrill*) June, 1902; Province of Benguet, Baguio (6523, 5758 *Elmer*) March, June, 1904. Mindanao, Lake Lanao, Camp Keithley (98 *Clemens*) January, 1906.

Tropics of the World.

DOUBTFUL SPECIES.

Sporobolus humilis Presl Rel. Haenk. 1 (1830) 241; Kunth Enum. 1 (1833) 217; Miq. Fl. Ind. Bat. 3 (1859) 376; F.-Vill. Nov. App. (1883) 321; Scribn. in Rept. Mo. Bot. Gard. 10 (1899) 53. *pl. 30.*

"Hab. in insula Luzonia" Presl.

Perhaps not a Philippine plant, or possibly a much-dwarfed form of *Sporobolus diandrus* Beauv. Scribner, who has examined Haenke's specimen on which the species was based, makes no statement regarding the validity or relationship of the species.

Sporobolus scoparius Presl Rel. Haenk. 1 (1830) 243; Kunth Enum. 1 (1833) 216; Miq. Fl. Ind. Bat. 3 (1859) 376; F.-Vill. Nov. App. (1883) 321.

"Hab. ad portum Sorzogon" (Luzon) Presl.

Judging from the description, a very characteristic species. I have seen no Philippine material that agrees with it. Perhaps not a Philippine plant.

(46) GARNOTIA Brongn.

Spikelets small, in pairs along the branches of the strict or expanded panicle. Flowering glumes with slender awns or awnless.

Species 8, British India to Japan, Malaya, and the Sandwich Islands; 1 in the Philippines.

(1) **Garnotia stricta** Brongn. in Duperry Bot. Voy. Coqu. (1829) 132. *t. 21;* Hook. f. Fl. Brit. Ind. 7 (1897) 243; Merr. Philip. Journ. Sci. 1 (1906) Suppl. 28.

Luzon, Province of Benguet (6210 *Elmer*) April, 1904; (4716 *Merrill*) November, 1905; Province of Bataan, Mount Mariveles (6989 *Elmer*) November, 1904; (1146 *Whitford*) March, 1905; Province of Pampanga, Mount Arayat (3903 *Merrill*) October, 1904. Mindanao, Province of Zamboanga (5484 *Merrill*) October, 1906.

British India to the Sandwich Islands.

The Philippine form may represent a distinct species, characterized especially by the long-awned flowering glume.

(47) GARNOTIELLA Stapf.

A slender grass with narrow strict panicles. Spikelets small, solitary; empty glumes two, nerveless, subequal; flowering glume minute, hyaline, the palea a small, hyaline nerveless scale.

A monotypic endemic genus.

(1) **Garnotiella philippinensis** Stapf in Hook. Icon. Pl. IV. 5 (1896) *pl. 2494.*

Panay, Miagao (3994 *Vidal*) fide Stapf l. c.

Endemic.

(48) AGROSTIS Linn.

Panicles diffuse, many flowered. Spikelets small; flowering glumes thin-membranous or hyaline, awnless (in the Philippine representative), equaling or smaller than the empty glumes.

Species about 120, distributed over the entire globe, especially in the north temperate regions; 1 in the Philippines.

(1) **Agrostis elmeri** Merr. in Govt. Lab. Publ. 29 (1905) 7.

Luzon, Province of Benguet, Mount Tonglong (Santo Tomas) (6558 *Elmer*) June, 1904; (4812 *Merrill*) November, 1905; Pauai (4711, 4728 *Merrill*) November, 1905; District of Lepanto, Mount Data (4538, 4542 *Merrill*) November, 1905.

Endemic.

(49) CALAMAGROSTIS Roth.

Panicles open or spike-like, many flowered. Hairs on the callus of the flowering glume sometimes short, sometimes longer than the glume itself, which is thin-membranous and awned from the middle or below. Rhachilla elongated, pilose.

Species about 140, in the temperate and arctic regions of both hemispheres and on the mountains in the Tropics; 2 in the Philippines.

1. Panicle dense, spiciform..... (2) *C. filifolia*
1. Panicle rather lax, open..... (1) *C. arundinacea*

(1) **Calamagrostis arundinacea** Roth, var. **nipponica** (Fr. et Sav.) Hack. in Bull. Herb. Boiss 7 (1899) 652; Philip. Journ. Sci. 1 (1906) Suppl. 269. *Calamagrostis nipponica* Fr. et Sav. Enum. Pl. Jap. 2 (1879) 599.

Luzon, District of Lepanto, Mount Data (4564 *Merrill*) November, 1905; Province of Benguet (4697, 4701 *Merrill*) November, 1905.

Japan, i. e., the variety, the species widely distributed in Japan and Asia.

2. **Calamagrostis filifolia** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 179.

Luzon, Province of Benguet, Mount Tonglong (4839 *Merrill*) November, 1905; Pauai (4715 *Merrill*) November, 1905; District of Lepanto, Mount Data (4537 *Merrill*) November, 1905.

Endemic.

(*Deyeuxia quadriseta* Benth., to which F.-Villar reduces *China filiformis* Llanos, Frag. Pl. Filip. (1851) 9, non Link., has been reported from the Philippines by F.-Villar, Nov. App. (1883) 319. As this species is known only from Australia and New Zealand, it is probable that the Philippine record was based on an erroneous identification on the part of F.-Villar.)

Tribe IX. AVENEÆ.

Spikelets 2 to many-flowered, inflorescence paniculate, all the flowers perfect or one staminate; empty glumes often persistene and longer than the flowering glumes, the latter usually awned from the back or from near the apex, the awns geniculate or straight.

(50) ERIACHNE R. Br.

Panicles loose or dense; empty glumes many-nerved; flowering glumes awnless or with fine terminal awns, finally somewhat indurated, the spikelets rather small.

Species about 25, 2 Asiatic and Malayan, the others Australian; 2 in the Philippines.

1. Third and fourth glumes and palea bicuspidate..... (1) *E. pallescens*
1. Third and fourth glumes and palea long-awned..... (2) *E. triseta*

(1) **Eriachne pallescens** R. Br. Prodr. (1810) 184; Kunth Enum. 1 (1833) 310; Benth Fl. Austral. 7 (1878) 630; F.-Vill. Nov. App. (1883) 321; Hook. f. Fl. Brit. Ind. 7 (1897) 269; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 398; Pilger in Perk. Fl. Philip. (1904) 147.

CULION (520 *Merrill*) December, 1902.

British India to southern China, Malaya, and Australia.

(2) **Eriachne triseta** Nees ex Stend. Syn. 1 (1855) 237; Hook. f. Fl. Brit. Ind. 7 (1897) 369; Pilger in Perk. Fl. Philip. (1904) 147.

CULION (*Merrill*) February, 1903.

British India and Ceylon.

(*Eriachne gracilis* Brong., a species definitely known only from the Moluccas, has been reported from the Philippines by F.-Villar, Nov. App. (1883) 321; but the record was doubtless based on an erroneous identification.)

(51) COELACHNE R. Br.

Very delicate, prostrate grasses with narrow panicles and small, round, awnless, 2-flowered spikelets.

Species about 4, by some authors reduced to 1 with numerous varieties, British India to southern China and Australia; 1 in the Philippines.

(1) **Coelachne hackeli** Merr. in Govt. Lab. Publ. 29 (1905) 8.

LUZON, Province of Benguet, Baguio (5752 *Elmer*) March, 1904; (4338 *Merrill*) November, 1905.

Endemic.

(*Coelachne brachiata* Munro=*C. pulchella* R. Br. var. *brachiata* Munro, and *C. pulchella* R. Br., have been reported from the Philippines by F.-Villar, Nov. App. (1883) 321, and one or both may later be found in the Archipelago, although to date F.-Villar's records have not been verified.)

(52) AVENA Linn.

Spikelets large, 2 to 6-flowered, paniculate. Empty glumes membranous, unequal; flowering glumes rounded on the back, 5 to 9-nerved, the awn dorsal, geniculate, twisted below. Callus of the flowering glumes and the rhachilla often hairy.

Species about 60, temperate regions of the Old World, a few in the New World; 1 or 2 introduced into the Philippines.

(1) **Avena sativa** Linn. Sp. Pl. (1753) 79; Hook. f. Fl. Brit. Ind. 7 (1897) 275.

LUZON, Province of Benguet (4284, 4747 *Merrill*) November, 1905, one cultivated, the other on fresh talus slopes near a road construction camp.

(*Avena sterilis* Linn., and *A. fatua* Linn., have been reported from the Philippines by F.-Villar, Nov. App. (1883) 319, but to date his records have not been verified. If either or both occur in the Philippines it will be as is the case with *Avena sativa*, only as introduced plants.)

Tribe X. CHLORIDEÆ.

Spikelets one to many-flowered, in two series upon the outer side of the continuous rhachis of the spike or raceme, these spikes or racemes digitately or paniculately disposed. Flowering glumes deciduous with the fruit, the empty glumes usually two and persistent.

(53) CYNODON Pers.

Spikelets small; flowering glumes usually longer and broader than the narrow empty ones, ciliate on the keel. Spikes slender, digitate, divergent.

Species 5, mostly Australian, 1 cosmopolitan in tropical and warm regions; 2 in the Philippines.

1. Flowering stems 20 cm. high or less; leaves 3 to 4 cm. long; spikes 3 to 4, 3 cm. long or less ..... (1) *C. dactylon*
1. Flowering stems about 40 cm. high; leaves 7 to 9 cm. long; spikes 5 to 7, 8 to 10 cm. long ..... (2) *C. arcuatus*

(1) **Cynodon dactylon** (Linn.) Pers. Syn. 1 (1804) 85; Kunth Enum. 1 (1833) 259; Miq. Fl. Ind. Bat. 3 (1859) 382; F.-Vill. Nov. App. (1883) 319; Vidal Phan. Cuming. Philip. (1859) 159; Rev. Pl. Vasc. Filip. (1886) 292; Hook. f. Fl. Brit. Ind. 7 (1897) 288; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 402; Mez in Perk. Frag. Fl. Philip. (1904) 174; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 28. *Panicum dactylon* Linn. Sp. Pl. (1753) 58. *Capriola dactylon* O. Kuntze Rev. Gen. Pl. (1891) 764. *Cynodon linearis* Willd. Enum. Hort. Berol. (1809) 90; Presl Rel. Haenk. 1 (1830) 290; Scribn. in Rept. Mo. Bot. Gard. 10 (1899) 41. *Panicum glumacepatulum* Steud. Syn. 1 (1855) 41. *P. glumaceptalum* F.-Vill. Nov. App. (1883) 312. *Digitaria glumacepatula* Miq. Fl. Ind. Bat. 3 (1859) 439.

Philippines (550 *Cuming*). Luzon, Manila (24 *Merrill*) April, 1902: Province of Benguet, Baguio (5772 *Elmer*) March, 1904: Province of Pampanga, Bacolor (20 *Parker*) May, 1904. Panay, Iloilo (*Copeland*) January, 1904. Mindanao, Davao (568 *Copeland*) March, 1904. Sp.-Fil., *Grama*.

Widely distributed in the warmer parts of the World.

(2) **Cynodon arcuatus** Presl Rel. Haenk. 1 (1830) 290; Kunth Enum. 1 (1833) 259; Miq. Fl. Ind. Bat. 3 (1859) 383; F.-Vill. Nov. App. (1883) 320; Scribn. in Rept. Mo. Bot. Gard. 10 (1899) 41. *pl. 40;* Merr. in Govt. Lab. Publ. 17 (1904) 9; Philip. Journ. Sci. 1 (1906) Suppl. 28.

Luzon, Province of Tarlac, Concepcion (3619 *Merrill*) November, 1903: Province of Bataan, Lamao (3171 *Merrill*) October, 1903: Province of Rizal, Morong (1392 *Ramos*) August, 1906.

Endemic.

(*Microchloa setacea* R. Br., has been reported from the Philippines by F.-Villar Nov. App. (1883) 319, but his record has not been verified. As the species is widely distributed in the tropics of both hemispheres, it is to be expected in the Philippines.)

(54) CHLORIS Sw.

Empty glumes narrow, very acute; flowering glumes usually 2-cleft, frequently ciliate, one to several empty glumes above the flowering glumes which are usually broadly truncate and often awned.

Species about 50, in all warm countries; 1 (or more?) in the Philippines.

(1) **Chloris barbata** (Linn.) Sw. Fl. Ind. Occ. 1 (1797) 200; Kunth Enum. 1 (1833) 264; Miq. Fl. Ind. Bat. 3 (1859) 387; F.-Vill. Nov. App. (1883) 320; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 292; Hook. f. Fl. Brit. Ind. 7 (1897) 292; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 403; Pilger in Perk. Frag. Fl. Philip. (1904) 147. *C. longifolia* Steud. Syn. 1 (1855) 205; Miq. Fl. Ind. Bat. 3 (1859) 388; F.-Vill. Nov. App. (1883) 320. *C. rhachitricha* Steud. l. c.?; Miq. l. c.; F.-Vill. l. c. *Elcusine mucronata* Llanos Frag. Pl. Filip. (1851) 45.

Luzon, Manila (33 *Merrill*) April, 1902; (7 *Topping*) July, 1902; (35 *McGregor*) October, 1904; Province of Cavite, Cavite (165 *Foxworthy*) July, 1905. Palawan, Puerto Princesa (4170, 4183 *Curran*) May, 1906.

Tropics generally.

DOUBTFUL AND EXCLUDED SPECIES.

Chloris crinita Lag. Varied. Cienc. 4 (1805) 143; Kunth Enum. 1 (1833) 268; Miq. Fl. Ind. Bat. 3 (1859) 389; F.-Vill. Nov. App. (1883) 320.

"Insulae Philippinae" Kunth. Apparently not a *Chloris*, and probably not a Philippine plant.

Chloris truncata R. Br. Prodr. (1810) 186; Kunth Enum. 1 (1833) 266; Miq. Fl. Ind. Bat. 3 (1859) 387; F.-Vill. Nov. App. (1883) 320. *Chloris dolichostachya* Lag. Gen. et Sp. Nov. (1816) 5.

Chloris dolichostachya Lag., is credited by that author to the Philippines, and was reduced to *C. truncata* R. Br. by Link. Lagasca's description is insufficient for accurate identification of his species. *Chloris truncata* R. Br., is an Australian species.

Chloris inflata Llanos Frag. Pl. Filip. (1851) non Link, reduced by F.-Villar to the preceding, but apparently an erroneous reduction.

Chloris radiata Sw.; F.-Vill. Nov. App. (1883) 320. Certainly an erroneous identification on the part of F.-Villar. A species of tropical America.

Chloris rufescens Lag. Varied. Cienc. 4 (1805) 143; Kunth Enum. 1 (1833) 268; Miq. Fl. Ind. Bat. 3 (1859) 388; Llanos, Frag. Pl. Filip. (1851)?; F.-Vill. Nov. App. (1883) 320.

"Insulae Philippinae" Kunth. Possibly not a Philippine plant.

Chloris tener (Presl) Scribn. Rept. Mo. Bot. Gard. 10 (1899) 41. *pl. 40. Cynodon tener* Presl Rel. Haenk. 1 (1830) 291; Kunth Enum. 1 (1833) 260; Miq. Fl. Ind. Bat. 3 (1859) 383; F.-Vill. Nov. App. (1883) 320.

"Hab. ad Sorzogon, Luzoniae" Presl. Apparently an American plant, erroneously localized by Presl. Scribner states that it is very close to an American species, *Chloris petraea* Sw. Possibly only a reduced form of that species.

(55) ELEUSINE Gaertn.

Spikes digitate, the spikelets many flowered, crowded. Glumes closely imbricate, diverging, compressed and keeled, obtuse or mucronate.

Species 6, mostly of the tropical and subtropical regions of the Old World, 1 cosmopolitan; 1 in the Philippines.

(1) **Eleusine indica** (Linn.) Gaertn. Fruct. 1 (1788) 8; Kunth Enum. 1 (1833) 273; Presl Rel. Haenk. 1 (1830) 286; Llanos Frag. Pl. Filip. (1851) 45; Miq. Fl. Ind. Bat. 3 (1859) 386; F.-Vill. Nov. App. (1883) 320; Vidal Phan. Cuming. Philip. (1885) 159; Ceron Cat. Pl. Herb. (1892) 184; Pilger in Perk. Frag. Fl. Philip. (1904) 147; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 29; Hook. f. Fl. Brit. Ind. 7 (1897) 293. *Cynosurus indicus* Linn. Sp. Pl. (1753) 72. *Eleusine barbata* Vid. Rev. Pl. Vasc. Filip. (1886) 292.

Luzon, Manila (42 *Merrill*) May, 1902; (30 *McGregor*) October, 1904; Province of Bataan, Dinalupijan (1567 *Merrill*) January, 1903; Lamao (800 *Borden*) May, 1904; Province of Cavite, Cavite (159 *Foxworthy*) July, 1905; Province of Pampanga, Bacolor (25 *Parker*) May, 1904; Province of Union, Banang (5685 *Elmer*) February, 1904. Mindoro, Baco River (212 *McGregor*) April, 1905; Bongabong River (3619 *Merrill*) February, 1906. Mindanao, Davao (259 *DeVore & Hoover*) April, 1903.

Tropics of the Old World, introduced into the New.

DOUBTFUL AND EXCLUDED SPECIES.

ELEUSINE COROCANA Gaertn. Fruct. 1 (1788) 8. *t. 1;* Hook. f. Fl. Brit. Ind. 7 (1897) 294; F.-Vill. Nov. App. (1883) 320.

Widely cultivated in British India and reported from the Philippines by F.-Villar. F.-Villar's record not verified.

ELEUSINE VERTICELLATA Roxb.; Hook. f. l. c. 295; F.-Vill. l. c. 320.

Reported from the Philippines by F.-Villar, but his record was probably based on a form of *Eleusine indica* Gaertn. Tropical Asia, Africa, and Australia.

ELEUSINE POLYDACTYLA Steud. Syn. 1 (1855) 211; Miq. Fl. Ind. Bat. 3 (1859) 386; F.-Vill. Nov. App. (1883) 320.

Based on No. 824 *Cuming* from the Philippines, according to Steudel. Index Kewensis, however, gives the locality as tropical Africa.

(56) DACTYLOCTENIUM Willd.

Empty glumes strongly mucronate-pointed; rhachis produced as a point beyond the upper spikelets, otherwise much as the preceeding genus.

Species 1 with several varieties, cosmopolitan in the tropical and warmer regions of the World.

(1) **Dactyloctenium aegyptiacum** (Linn.) Willd. Enum. Hort. Berol. (1809) 1029; Kunth Enum. 1 (1833) 261; Miq. Fl. Ind. Bat. 3 (1859) 384; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 406; Pilger in Perk. Frag. Fl. Philip. (1904) 147. *Eleusine aegyptiaca* Desf. Fl. Atl. 1 (1798–1800) 85; F.-Vill. Nov. App. (1883) 320; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 293; Hook. f. Fl. Brit. Ind. 7 (1897) 295. *Digitaria lanosa* Llanos Frag. Pl. Filip. (1851) 28.

LUZON, Manila (63 *Merrill*) May, 1902; (36 *McGregor*) October, 1904; Province of Cavite, Cavite (157 *Foxworthy*) July, 1905; Province of Bataan, Dinalupijan (1569 *Merrill*) January, 1903; Province of Principe, Baler (1127, 1136 *Merrill*) September, 1902; Province of Union, Banang (5677 *Elmer*) February, 1904; Province of Rizal, Morong (1395 *Ramos*) August, 1906. PALAWAN, Puerto Princesa (4174, 4188 *Curran*) May, 1906. MINDANAO, Lake Lanao (*Clemens*) February, 1906; District of Davao (567 *Copeland*) March, 1904; (229 *DeVore & Hoover*) April, 1903.

Widely distributed in the Tropics of the Old World, introduced into the New.

(57) LEPTOCHLOA Beauv.

Inflorescence a panicle formed of numerous slender spikes. Spikelets small, two to many-flowered, rarely one-flowered, compressed, awnless.

Species about 12, warmer parts of both hemispheres, 2 in the Philippines.

1. Culms rather stout; spikelets 4 to 6-flowered ..... (1) *L. chinensis*
1. Culms slender; spikelets 2 to 3-flowered ..... (2) *L. filiformis*

(1) **Leptochloa chinensis** (Linn.) Nees in Syll. Ratisb. 1 (1824) 4; Steud. Syn. 1 (1855) 209; Miq. Fl. Ind. Bat. 3 (1859) 389; F.-Vill. Nov. App. (1883) 320; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 293; Hook. f. Fl. Brit. Ind. 7 (1897) 299; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 407; Pilger in Perk. Frag. Fl. Philip. (1904) 147. *L. tetraquetra* Presl Rel. Haenk. 1 (1830) 288; Miq. Fl. Ind. Bat. 3 (1859) 389; F.-Vill. Nov. App. (1883) 320, ex descr. *Poa chinensis* Linn. Sp. Pl. (1753) 69.

PHILIPPINES (825 *Cuming*). LUZON, Manila (9, 378 *Merrill*) April, August, 1902; Province of Pampanga, Bacolor (61 *Parker*) June, 1904; Province of Rizal, Morong (1400 *Ramos*) August, 1906.

British India to China, Japan, Malaya, and Australia.

(2) **Leptochloa filiformis** R. et S. Syst. 2 (1817) 580; Presl Rel. Haenk. 1 (1830) 288 (var. *humilior*); Miq. Fl. Ind.-Bat. 3 (1859) 389; Kunth Enum. 1 (1833) 270; F.-Vill. Nov. App. (1883) 320; Hook. f. Fl. Brit. Ind. 7 (1897) 298; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 407; Usteri Beitr. Kenn. Philip. Veg. (1905) 133.

LUZON, Province of Union, Bauang (5682 *Elmer*) February, 1904. PALAWAN, Puerto Princesa (4175 *Curran*) May, 1906.

Tropical Asia, Africa, Malaya, and America.

EXCLUDED SPECIES OF CHLORIDEÆ.

Several species of *Bouteloua* have been erroneously credited to the Philippines by various authors, but the genus is exclusively American. The species erroneously credited to the Philippines are as follows:

BOUTELOUA CURTIPENDULA (Michx.) Torr.; *Eutriana curtipendula* Trin.; Miq. Fl. Ind. Bat. 3 (1859) 383; F.-Vill. Nov. App. (1883) 320.

BOUTELOUA BARBATA Lag.; *Eutriana barbata* Kunth, Rev. Gram. 1 (1829) 96; Enum. 1 (1833) 282; Miq. Fl. Ind. Bat. 3 (1859) 284; F.-Vill. Nov. App. (1883) 321. *Actinochloa barbata* R. et S. Syst. 2 (1817) 420.

BOUTELOUA TENUIS Griseb.; *Chondrosium tenue* Beauv. Agrost. (1812) 41; Kunth Enum. 1 (1833) 276; F.-Vill. Nov. App. (1883) 320.

BOUTELOUA SIMPLEX Lag.; *Chondrosium simplex* Kunth Enum. 1 (1833) 276; F.-Vill. Nov. App. (1883) 320.

POLYSCHISTIS PAUPERCULA Presl Rel. Haenk. 1 (1830) 294. *t. 41. f. 12;* Kunth Enum. 1 (1833) 282; Miq. Fl. Ind. Bat. 3 (1859) 384; F.-Vill. Nov. App. (1883) 321.

"Hab. in insula Luzonia" Presl. Erroneously localized by Presl, a species of tropical America, not of the Philippines=*Pentarrhaphis* sp.

Tribe XI. **FESTUCEÆ.**

Inflorescence in panicles or racemes or spike-like racemes. Spikelets two to many-flowered, rarely 1-flowered, usually perfect. Empty glumes usually shorter than the nearest flowering glume; flowering glumes awnless or awned.

(58) **PHRAGMITES** Trin.

Spikelets loosely many-flowered, the lowest flower staminate, the others usually perfect; empty and flowering glums glabrous, the rhachilla long-penicellate. Tall, reed-like grasses with spreading many-flowered panicles.

Species about 3, 1 cosmopolitan, 1 in South America, and 1 in tropical Asia and Malaya; 2 in the Philippines.

1. Culms mostly 1.5 to 2.5 high; panicles mostly about 30 cm. long or less ..... (1) *P. vulgaris*
1. Culms frequently 5 m. high; panicles frequently 60 cm. long, the branches widely spreading ..... (2) *P. karka*

(1) **Phragmites vulgaris** (Lam.) Trin. Fund. Agrost. (1820) 134; Pilger in Perk. Fl. Philip. (1904) 147. *P. communis* Trin. l. c.; Kunth Enum. 1 (1833) 251; Hook. f. Fl. Brit. Ind. 7 (1897) 303; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 409; Usteri Beitr. Kenn. Philip. Veg. (1905) 133. *Arundo tecta* Blanco Fl. Filip. ed. 1 (1837) 48; ed. 2 (1845) 33, non Walt. *Arundo phragmites* Linn. Sp. Pl. (1753) 81. *A. vulgaris* Lam. Fl. Franc. 3 (1778) 615. *Phragmites phragmites* Karst. Deutsch. Fl. (1880–83) 379.

Luzon, Manila (382 *Merrill*) August, 1902: Province of Principe, Baler (1123 *Merrill*) September, 1902: Province of Benguet, Baguio (5778 *Elmer*) March, 1904. Mindoro, Baco (1252 *Merrill*) January, 1903. Culion (465 *Merrill*) December, 1902.

Temperate, subtemperate and tropical regions of the World. T., *Tambo.*

(2) **P. karka** (Retz.) Trin. ex Steud. Nomen. ed. 2, 2 (1840) 324; Hook. f. Fl. Brit. Ind. 7 (1897) 304; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 410; Usteri Beitr. Kenn. Philip. Veg. (1905) 133; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 29. *P. roxburghii* Steud. l. c.; Nees in Nov. Act. Nat. Cur. 19 (1843) Suppl. 1: 173; Miq. Fl. Ind. Bat. 3 (1859) 412; F.-Vill. Nov. App. (1883) 321, excl. syn. Blanco. *Arundo karka* Retz. Obs. 4 (1779–91) 21.

Luzon, Province of Bataan, Lamao (3178 *Merrill*) October, 1903; (6851 *Elmer*) November, 1904.

Tropical Asia, Africa, Malaya, and Australia.

(59) NEYRAUDIA Hook. f.

Similar to the preceding but the lateral nerves of the flowering glume long-penicellate and the rhachilla short-hairy.

Species 1, tropical Africa to Asia and Malaya.

(1) **Neyraudia madagascarensis** (Kunth) Hook. f. Fl. Brit. Ind. 7 (1897) 305; Pilger in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 409. *Arundo madagascarensis* Kunth Rev. Gram. 1 (1829) 273. *t. 48;* Enum. 1 (1833) 247; F.-Vill. Nov. App. (1883) 321; Vidal Rev. Pl. Vasc. Filip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 293; Ceron Cat. Pl. Herb. (1892) 185.

Philippines (623 *Cuming*) fide Vidal; (4017 *Vidal*) fide Ceron. Not seen.

British India to southern China and Malaya, tropical Africa, and Madagascar.

(60) DIPLACHNE Beauv.

Spikelets narrow, many-flowered, arranged in spike-like racemes which are paniculately disposed. Flowering glumes 1-nerved, keeled, usually 2-toothed, the keel mucronate or awn pointed.

Species about 15, in the warmer parts of both hemispheres; 1 in the Philippines.

(1) **Diplachne fusca** (Linn.) Beauv. Agrost. (1812) 163; Hook. f. Fl. Brit. Ind. 7 (1897) 329; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 411. *Leptochloa ? fusca* Kunth Enum. 1 (1833) 271. *Festuca fusca* Linn. Sp. Pl. (1753) 109.

Luzon, Manila (*Merrill*) January, 1906: Province of Laguna, Los Baños (5104 *Merrill*) March, 1906.

Tropical Asia, Africa, Malaya, and Australia.

(61) ERAGROSTIS Host.

Panicles various, usually open. Spikelets usually densely many-flowered. Flowering glumes imbricate, strongly 3-nerved, keeled, acute.

Species about 125 in all warm countries; about 10 in the Philippines.

1. Rhachilla of spikelets more or less jointed and breaking up from above downward. (Sect. CATACLASTOS.)
   2. Flowering glumes strongly acuminate ..... (1) *E. lasioclada*
   2. Flowering glumes acute or obtuse.
      3. Panicles 10 cm. long or less.
         4. Panicles open, rather lax ..... (2) *E. tenella*
         4. Panicles dense, spike-like, densely flowered; culm viscid below the panicle ..... (3) *E. viscosa*
      3. Panicles 20 to 40 cm. in length.
         4. Panicle branches whorled, scarcely branched from the base; spikelets 6 to 10 flowered ... (4) *E. interrupta*
         4. Panicle branches whorled and branched from the base, the branchlets capillary; spikelets 5-flowered or less ..... (5) *E. japonica*
1. Rhachilla of spikelet tough, persistent; flowering glumes falling away from its base upward. (Sect. PTEROESSA.)
   2. Spikelets flat, elliptical-ovate, the lateral nerves of the flowering glumes very prominent ..... (6) *E. unioloides*
   2. Spikelets linear to linear-oblong, compressed; nerves of the flowering glume prominent or not.
      3. Panicle branches elongated, spreading or ascending.
         4. Annual; spikelets pale ..... (7) *E. distans*
         4. Perennial; spikelets plumbeous.
            5. Panicles about 20 cm. long; branches ascending ..... (8) *E. elegantula*
            5. Panicles 10 cm. long or less; branches usually divaricately spreading ..... (9) *E. elongata*
      3. Panicle branches short, appressed, densely flowered throughout, giving the panicle a spiciform appearance ..... (10) E. *spartinoides*

(1) **Eragrostis lasioclada** Merrill, sp. nov. § *Cataclastos.*

Perennis; culmis erectis, ad 70 cm. altis, 3-nodis, simplicibus; vaginis quam internodiis brevioribus, marginibus sparse longe-pilosis; laminis anguste linearibus, acuminatis, 15–20 cm. longis, 2–3 mm. latis; paniculis oblongis, ad 15 cm. longis, rhachi ramis ramulis pedicellibusque sparse longe-pilosis, ramis inferioribus ad 4 cm. longis, erectis vel ascendentibus; spiculis oblongis, 6–7 mm. longis, 1 mm. latis, ad 5-floris; glumis sterilibus inaequalibus, 1-nervis, acutis vel acuminatis; glumis fertilibus 2.5–3.5 mm. longis, subulato-acuminatis.

A tufted erect perennial grass, the culms about 70 cm. tall, slender, simple, glabrous or slightly pilose; nodes 3, glabrous. Sheaths shorter than the internodes, compressed, the margins slightly long-pilose; ligule short, truncate; blades narrowly linear, plane or involute, acuminate, rigid, 15 to 20 cm. long, 2 to 3 mm. wide, slightly long-pilose, becoming glabrous. Panicles oblong, strict, narrow, about 15 cm. long, 1 to 2 cm. in diameter, the lower branches 4 cm. long, ascending or erect, the branches, branchlets, and pedicels with scattered long white hairs. Spikelets oblong, pale or purplish, about 5-flowered, 6 to 7 mm. long, 1 mm.

wide, the pilose pedicels 0.4 to 0.8 mm. long; empty glumes unequal, 1-nerved, acute or acuminate, ovate-lanceolate, the lower one 2 mm. long, the upper 2.5 mm. long; flowering glumes 2.5 to 3.5 mm. long, the upper ones longer than the lower, subulate-acuminate at the apex, with a prominent nerve on each side of the keel, the keel above and short awn scabrid. Palea 2 mm. long, linear-obovate, curved, deciduous, the keels ciliate.

Culion (416 *Merrill*) December, 1902. In old rice lands near sea level.

A species well characterized by its narrow panicles, sparsely long pilose sheaths, leaves and inflorescence, and acuminate flowering glumes. It may be the form credited to the Philippines by F.-Villar as *Eragrostis ciliata* Nees.

(2) **Eragrostis tenella** (Linn.) R. et S. Syst. 2 (1817) 576; Presl Rel. Haenk. 1 (1830) 274; Scribn. Rept. Mo. Bot. Gard. 10 (1899) 44. *pl. 44;* F.-Vill. Nov. App. (1883) 322; Pilger in Perk. Frag. Fl. Philip. (1904) 148; Hook. f. Fl. Brit. Ind. 7 (1897) 315. *E. plumosa* Link; F.-Vill. l. c. 322; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 293; Ceron Cat. Pl. Herb. (1892) 185; Usteri Beitr. Kenn. Philip. Veg. (1905) 132. *E. amabalis* O. Kuntze Rev. Gen. Pl. (1891) 773, non Wight et Arn. *Poa tenella* Linn. Sp. Pl. (1753) 69. *Cyperus paniculatus* Blanco Fl. Filip. ed. 1 (1837) 32; ed. 2 (1845) 22.

Philippines (714 *Cuming*). Luzon, Manila (*Hallier*) December, 1903; (6 *Merrill*) May, 1902; Province of Cagayan, Aparri (130 *Merrill*) June, 1902; Province of Cavite, Cavite (156 *Foxworthy*) July, 1905; Province of Union, Bauang (5681 *Elmer*) February, 1904; Province of Principe, Baler (1128 *Merrill*) September, 1902. Panay, Iloilo (*Copeland*) January, 1904. Palawan, Puerto Princesa (4171 *Curran*) May, 1906. Mindanao, Camp Overton (599 *Clemens*) June, 1906.

Tropical Asia, Africa, and Malaya.

Possibly the species credited to the Philippines by F.-Villar as *Eragrostis pilosa* Beauv., was a form of this species.

(3) **Eragrostis viscosa** (Retz.) Trin. in Mém. Acad. St. Pétersb. VI. 1 (1831) 397; Miq. Fl. Ind. Bat. 3 (1859) 392; F.-Vill. Nov. App. (1883) 322. *E. tenella* R. et S., var. *viscosa* Stapf in Hook. f. Fl. Brit. Ind. 7 (1897) 315; Pilger in Perk. Frag. Fl. Philip. (1904) 148. *Poa viscosa* Retz. Obs. 2 (1779–91) 20; Kunth Enum. 1 (1833) 336.

Luzon, Manila (371 *Merrill*) August, 1902.

Tropics of the Old World.

(4) **Eragrostis interrupta** (Lam.) Doell. in Mart. Fl. Bras. II. 3: 157, non Beauv.; Usteri. Beitr. Kenn. Philip. Veg. (1905) 132; Pilger in Perk. Frag. Fl. Philip. (1904) 148 "Beauv." *Poa interrupta* Lam. Ill. 1 (1791) 185. *Eragrostis interrupta* var. *koenigii* Stapf. in Hook. f. Fl. Brit. Ind. 7 (1897) 316. *E. minutiflora* Presl Rel. Haenk. 1 (1830) 274.

Luzon, Province of Nueva Viscaya, Bayombong (122 *Merrill*) June, 1902; Province of Tayabas, Atimonan (708 *Whitford*) August, 1904. Mindoro, Baco River (214 *McGregor*) April, 1905. Palawan (1792 *Merrill*) February, 1903. Balabac (468 *Mangubat*) March, 1906.

Tropical Asia, Africa, and Malaya.

Eragrostis interrupta Beauv., was based on *Poa interrupta* R. Br., which is a synonym of *Eragrostis elongata* Jacq., according to Hackel in lit. Lamarck's name is here accepted for the species.

(5) **Eragrostis japonica** (Thunb.) Trin. in Mém. Acad. St. Pétersb. VI. 1 (1830) 450; Hack. in Bull. Herb. Boiss. 7 (1899) 705. *E. tenuissima* Schrad. ex Nees Fl. Afr. Austral. (1841) 409, 410; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 393; Ceron Cat. Pl. Herb. (1892) 185. *E. interrupta* var. *tenuissima* Stapf in Hook. f. Fl. Brit. Ind. 7 (1897) 316; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 415. *E. aurea* Steud. Syn. 1 (1855) 266; Miq. Fl. Ind. Bat. 3 (1859) 394; F.-Vill. Nov. App. (1883) 322. *Vilfa verticillata* Steud. Syn. 1 (1855) 158? *Soporobolus verticillatus* Nees in Hook. Kew. Gard. Misc. 2 (1850) 101?; Miq. Fl. Ind. Bat. 3 (1859) 375. *Panicum leptanthum* Steud. Syn. 1 (1855) 79. *Poa japonica* Thunb. Fl. Jap. (1784) 31; Llanos Frag. Pl. Filip. (1851) 47. *P. amboinensis* F.-Vill. Nov. App. (1883) 322 non Linn., ex syn. Llanos.

Philippines (545, 1669 *Cuming*).

Tropical Asia to Japan.

(6) **Eragrostis unioloides** (Retz.) Nees ex Steud. Nom. ed. 2, 2 (1840) 364; F.-Vill. Nov. App. (1883) 322. *E. polymorpha* R. Br. Prodr. (1810) 180; Miq. Fl. Ind. Bat. 3 (1859) 394; F.-Vill. Nov. App. (1883) 322. *E. rubens* Lam.; F.-Vill. l. c. 322. *E. amabalis* Wight et Arn. in Hook. et Arn. Bot. Beechy Voy. (1841) 251, excl. syn. Linn.; Hook. f. Fl. Brit. Ind. 7 (1897) 317.

Luzon, Province of Rizal (3423 *Ahern's collector*) November, 1905.

Tropical Africa, Asia, and Malaya.

(7) **Eragrostis distans** Hack. in Govt. Lab. Publ. 35 (1905) 81.

Luzon, Province of Benguet, Kias (6608 *Elmer*) June, 1904; District of Lepanto, Cervantes to Mancayan (4472 *Merrill*) November, 1905.

Endemic.

(8) **Eragrostis elegantula** (Kunth) Steud. Syn. 1 (1855) 266; Pilger in Perk. Frag. Fl. Philip. (1904) 322; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 412; Stapf. in Hook. f. Fl. Brit. Ind. 7 (1897) 318. *E. brownei* F.-Vill. Nov. App. (1883) 322; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1885) 283; Ceron Cat. Pl. Herb. (1892) 185. *E. luzoniensis* Steud. Syn. 1 (1855) 266; Miq. Fl. Ind. Bat. 3 (1859) 393; F.-Vill. Nov. App. (1883) 322. *Uniola paniculata* Llanos Frag. Pl. Filip. (1851) 32. *E. nigra* Usteri Beitr. Kenn. Philip. Veg. (1905) 132, non Nees?

Philippines (1416 *Cuming*). Luzon, Manila (4, 5, 9 *Scribner*) June, 1902; Province of Benguet, Baguio (5760 *Elmer*) March, 1904; District of Lepanto, Balili (4462 *Merrill*) November, 1905; Province of Nueva Ecija, Carranglang (245, 264 *Merrill*) May, 1902; Province of Nueva Viscaya, Quiangan (134 *Merrill*) June, 1902. Semerara (4155 *Merrill*) June, 1905. Culion (463 *Merrill*) December, 1902.

Tropical Asia to Malaya, Australia, and New Caledonia.

(9) **Eragrostis elongata** Jacq. Eclog. Gram. (1813) 3. *t. 3;* Presl Rel. Haenk. 1 (1830) 275; Hook. f. Fl. Brit. Ind. 7 (1897) 319; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 413. *E. cumingii* Steud. Syn. 1 (1855) 266; Miq. Fl. Ind. Bat. 3 (1859) 394; F.-Vill. Nov. App. (1883) 322. *E. zeylanica* Nees in Nov. Act. Nat. Cur. 19 (1843) Suppl. 1: 204; Rolfe in Journ. Bot. 23 (1885) 216; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 283; Ceron Cat. Pl. Herb. (1892) 185; Pilger in Perk. Frag. Fl. Philip. (1904) 148. *E. brownei* Nees ex Steud. Nomen. ed. 2, 1 (1841) 562.

Philippines (672, 1104 *Cuming*). Luzon, Manila (8 *Scribner*) June, 1902; Province of Benguet, Baguio (4331 *Merrill*) November, 1905; Province of Union,

Bauang (5707 *Elmer*) February, 1904: Province of Nueva Viscaya, Dupax (*Merrill*) May, 1902. Culion (686 *Merrill*) February, 1903.

Tropical Asia, Malaya, and Australia.

(10) **Eragrostis spartinoides** Steud. Syn. 1 (1855) 265; Pilger in Perk. Frag. Fl. Philip. (1904) 148.

Philippines (668 *Cuming*). Luzon, Province of Nueva Ecija, Carranglang (257 *Merrill*) May, 1902. Semerara (4149 *Merrill*) June, 1905.

Endemic.

In addition to the above species of Eragrostis, *E. megastachya* Link.=*E. major* Host., has been reported from the Philippines by Vidal, Phan. Cuming. Philip. (1883) 159; Rev. Pl. Vasc. Filip. (1886) 293; based on No. 1782 *Cuming*. The identification may have been erroneous. I have seen no specimens of this species from the Philippines.

(62) CENTOTHECA Desv.

Panicles expanded the spikelets small, the flowering glumes rounded on the back, 5 to 7-nerved, awnless but usually with hooked appendages or small protuberances on the keel. Erect broad-leaved sylvan grasses.

Species three, tropical Africa, Asia, Malaya, and Polynesia; one in the Philippines.

(1) **Centotheca malabarica** (Linn.). *Poa malabarica* Linn. Sp. Pl. (1753) 69. *Centotheca lappacea* Desv. in Nuov. Bull. Soc. Philom. 2 (1810) 189; Kunth Rev. Gram. 1 (1829) 317. *t. 70;* Enum. 1 (1833) 366; Presl Rel. Haenk. 1 (1830) 258; Miq. Fl. Ind. Bat. 3 (1859) 398; F.-Vill. Nov. App. (1883) 322; Vidal Rev. Pl. Vasc. Filip. (1886) 293; Phan. Cuming. Philip. (1885) 159; Hook. f. Fl. Brit. Ind. 7 (1897) 332; Pilger in Perk. Frag. Fl. Philip. (1904) 148; Rendle in Forbes & Hemsl. Journ. Linn. Soc Bot. 36 (1904) 419; Usteri Beitr. Kenn. Philip. Veg. (1905) 132; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 29; Schum. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 184. *Cenchrus lappaceus* Linn. Sp. Pl. ed. 2 (1763) 1488. *Centotheca latifolia* Trin. Fund. Agrost. (1820) 141; O. Kuntze Rev. Gen. Pl. (1891) 765. *Melica philippinensis* Llanos Frag. Pl. Filip. (1851) 44.

Philippines (552 *Cuming*). Luzon, Province of Union, Bauang (5644 *Elmer*) February, 1904: Province of Bataan, Lamao River (6649 *Elmer*) November, 1904; (3264 *Merrill*) October, 1903; (1018 *Whitford*) December, 1904: Province of Zambales, Subic (*Hallier*) December, 1903: Province of Nueva Viscaya, Dupax (246 *Merrill*) May, 1902: Province of Tayabas, Atimonan (658 *Whitford*) August, 1904; Malicboi (36 *Ritchie*) April, 1903: Province of Principe, Baler (1126 *Merrill*) September, 1902. Sibuyan (10 *McGregor*) July, 1904. Panay, Province of Antique (42 *Yoder*) December, 1904. Culion (494 *Merrill*) December, 1902. Palawan, Puerto Princesa (342 *Bermejos*) January, 1906. Balabac (431, 515 *Mangubat*) March, 1906. Mindanao, Lake Lanao, Camp Keithley (264 *Clemens*) February, 1906.

Tropical Africa, Asia, Malaya, Polynesia, and Australia.

(63) LOPHATHERUM Brongn.

Spikelets often two-ranked, sessile on the branches of the panicle, linear, 1-flowered, with a tuft of sterile glumes at the apex; empty glumes two; flowering glumes, pointed or short awned.

Species three, British India to Japan and Malaya; one in the Philippines.

(1) **Lophatherum gracile** Brongn. in Duperry Voy. Coqu. Bot. (1829) 50. *t. 8;* Kunth Enum. 1 (1833) 391; Steud. Syn. 1 (1855) 300; F.-Vill. Nov. App. (1883) 323; Hook. f. Fl. Brit. Ind. 7 (1897) 331; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 420; Pilger in Perk. Frag. Fl. Philip. (1904) 148.

Luzon, Province of Nueva Ecija, Caraballo Sur Mountains (210 *Merrill*) May, 1902.

British India to southern China and Japan and Malaya.

(64) POA Linn.

Spikelets 2 to 6-flowered in open panicles. Rhachilla and callus as well as the marginal nerves of the flowering glumes often clothed with long soft hairs; all the glumes awnless.

Species about 140, chiefly of temperate and cold countries, a few on the high mountains in the Tropics; two in the Philippines.

1. First and second glumes distinctly shorter than the flowering glumes; keel and nerves silky-ciliate below ..... (1) *P. annua*
1. Second glume equaling the flowering glumes; keel silky-hairy below, the nerves glabrous ..... (2) *P. luzoniensis*

(1) **Poa annua** Linn. Sp. Pl. (1753) 68; Steud. Syn. 1 (1855) 250; F.-Vill. Nov. App. (1883) 322; Llanos Frag. Pl. Filip. (1851) 47; Hook. f. Fl. Brit. Ind. 7 (1897) 345; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 422; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 181.

Luzon, Province of Benguet, Bued River (4288 *Merrill*) November, 1905. Introduced.

Widely distributed, chiefly in temperate and subtropical regions.

(2) **Poa luzoniensis** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 180.

Luzon, Province of Benguet, Pauai (4712 *Merrill*) November, 1906.

Endemic.

(65) BROMUS Linn.

Spikelets paniculate, usually large. Flowering glumes 5 to 9-nerved, usually 2-toothed, awned or awnless, the awn never geniculate. Ovary with a hairy cushion-like appendage on the summit.

Species about 60, most abundant in the north temperate zone, a few in temperate South America and a few in the Tropics; one or two in the Philippines.

(1) **Bromus pauciflorus** (Thumb.) Hack. in Bull. Herb. Boiss. 7 (1899) 713 et 11, 3 (1903) 506; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. 36 (1904) 430. *Festuca pauciflora* Thumb. Fl. Jap. (1784) 52.

Luzon, Province of Benguet, Pauai (4714 *Merrill*) November, 1906.

China, and Japan.

The form here referred to *Bromus pauciflora* may prove to be a distinct species when more material is available for study and comparison.

DOUBTFUL SPECIES.

Bromus pallens Cav. Icon. 6 (1801) 66. *t. 591. f. 1;* Kunth Enum. 1 (1833) 418; Miq. Fl. Ind Bat. 3 (1859) 398; F.-Vill. Nov. App. (1883) 322

"Habitat in Manilae viciniis, ibique *Acanthus ilicifolius*, Nec legit." Cavanilles.

I have seen no specimens that agree with Cavanilles's description and figure. Possibly described from an introduced plant, or from one erroneously localized.

Bromus luzoniensis Presl Rel. Haenk. 1 (1830) 262. *Triticum luzoniensis* Kunth Enum. 1 (1833) 446; Miq. Fl. Ind. Bat. 3 (1859) 402; F.-Vill. Nov. App. (1883) 323.

"Hab. in Luzonia" Presl.

Probably of American and not Philippine origin, erroneously localized.

(66) BRACHYPODIUM Beauv.

Spikelets many-flowered, narrow, cylindrical, in simple racemes, very short-pedicellate. Flowering glumes usually awned from the point, 7 to 9-nerved. Palea with stiff-fringed keels.

Species about 6 in Europe and temperate Asia and in the mountains of tropical Asia, and Africa; one in Luzon.

(1) **Brachypodium silvaticum** Beauv. Agrost. (1812) 146, subspec. **luzoniense** Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 269.

Luzon, Province of Benguet, Mount Tonglon (4830 *Merrill*) November, 1905; Pauai (4710 *Merrill*) November, 1905; District of Lepanto, Mount Data (4536 *Merrill*) November, 1905.

Endemic, i. e., the subspecies, the species widely distributed in Europe, northern Asia and the mountains of India, China, and Japan.

(2) **Brachypodium silvaticum** Beauv. var. **asperum** Hack. in Philip. Journ. Sci. 1 (1906) Suppl. 269.

Luzon, Province of Benguet, Pauai to Bagnio (4698 *Merrill*) November, 1905.

Endemic.

Tribe XII. HORDEÆ.

Spikelets one to many-flowered, sessile on teeth or notches of the rhachis, forming a spike.

(67) MONERMA Beauv.

Spikes cylindrical, subulate, articulated. Spikelets deeply immersed in the rhachis, awnless, the terminal with two, the others with one empty glume, these coriaceous. Flowering glumes membranous.

Species three, southern Europe and Africa to tropical Asia, Malaya, Australia and Polynesia; one in the Philippines. A maritime grass.

(1) **Monerma repens** (Forst.) Beauv. Agrost. (1812) 117; Hack. in Govt. Lab. Publ. 35 (1905) 81. *Rottboellia repens* Forst. f. Prodr. (1797) 9. *Lepturus repens* R. Br. Prodr. (1810) 207; Kunth Enum. 1 (1833) 463; Steud. Syn. 1 (1855) 357; Hook. f. Fl. Brit. Ind. 7 (1897) 365.

Mindoro, Puerto Galera (3331 *Merrill*) October, 1905. Culion (606 *Merrill*) December, 1902. Cajoagan (5245 *Merrill*) October, 1906. Palmas (5354 *Merrill*) October, 1906.

Ceylon to Malaya, Polynesia, and Australia.

(68) TRITICUM Linn.

Spikes with a terminal spikelet, the rhachis articulate, the lowest 1 to 4 spikelets smaller than the others, awnless, sterile. Fertile spikelets inflated or ventricose, 2 to 5-flowered.

Species about 15, Europe, temperate Asia and America; 1, wheat, rarely cultivated in the Philippines.

(1) **Triticum vulgare** Vill. Hist. Pl. Dauph. 2 (1779) 153; F.-Vill. Nov. App. (1883) 323; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 284.

Luzon, Province of Benguet (4768 *Merrill*) November, 1906.

Wheat, rarely cultivated in the Philippines, not spontaneous.

(I have also specimens of *Hordeum sativum* L., var. *vulgare*, from plants cultivated in Benguet Province (No. 4746 *Merrill*), but like the preceding species this can not be considered a constituent of the Philippine flora.

Tribe XIII. BAMBUSEÆ.

Large, often tree-like perennial grasses, sometimes scandent. Spikelets 2 to 8 or sometimes 1-flowered, in panicles or racemes, mostly in tufts or clusters at the nodes of the panicle branches. Empty glumes two to several, increasing in size upwards, shorter than the flowering glumes. Flowering glumes awnless terminal awn. Palea two to many nerved, rarely nerveless.

(69) BAMBUSA Schreb.

Spikelets with 2 to 6 empty glumes, gradually increasing in size and becoming like the flowering glumes. Spikelets 2 to many-flowered. Ovary hairy. Usually tall arborescent shrubs, rarely climbers.

Species about 60 in the tropical region of both hemispheres, the Philippine representatives, from lack of material in flower and fruit not well understood.

From Blanco's descriptions and the scanty imperfect material of this genus at present available, it is impossible to make a satisfactory key to the species.

(1) **Bambusa blumeana** Schultes f. Syst. Veg. 7[2] (1830) 1343; Munro in Trans. Linn. Soc. 26 (1868) 101; Kunth Enum. 1 (1833) 431; F.-Vill. Nov. App. (1883) 323; Rendle in Ann. Bot. Gard. Calcutta 7 (1896) 50. *pl. 47*; Vidal Cat. Pl. Prov. Manila (1880) 47; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 29. *Bambus pungens* Blanco Fl. Filip. ed. 1 (1837) 270. Miq. Fl. Ind. Bat. 3 (1859) 421. *Bambus arundo* Blanco l. c. ed. 2 (1845) 188.

The commonly cultivated bamboo of the Philippines, perhaps not a native species. Not seen in flower. T., *Cauayan totoo, Cauayan.*

Malayan Peninsula and Archipelago.

Probably the species credited to the Philippines by F.-Villar as *Bambusa arundinacea* was a form of the above. The figure of *Bambusa arundinacea* given by Vidal, Sinopsis, Atlas. (1883) *t. 96. f. A.* was copied from Beddome's figure, and not drawn from Philippine material, teste Vidal l. c. p. 42.

(2) **Bambusa levis** Blanco Fl. Filip. ed. 1 (1837) 272; ed. 2 (1845) 189; Miq. Fl. Ind. Bat. 3 (1859) 421. *Dendrocalamus flagellifer* F.-Vill. Nov. App. (1883) 324 ex syn. Blanco, non Munro.

An endemic (?) species of uncertain value, known only from Blanco's description. T., *Cauayang boo.*

(3) **Bambusa lima** Blanco Fl. Filip. ed. 1 (1837) 271; ed. 2 (1845) 189; Miq. Fl. Ind. Bat. 3 (1859) 421; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 29. *Bambusa longinodis* F.-Vill. Nov. App. (1883) 323 non Miq.?

Represented by the following sterile specimens. Luzon, Province of Bataan,

Lamao (*Whitford*) September, 1905: Province of Pampanga, Arayat (1409 *Merrill*) March, 1903.

An endemic (?) species of uncertain value, characterized by its very long internodes. T., *Anos*.

(4) **Bambusa luconiae** Munro in Trans. Linn. Soc. **26** (1868) 115; F.-Vill. Nov. App. (1883) 323.

"Hab. in ins. Philip. Luçonia, montibus Mahaihai! Wilkes" Munro.

Described from sterile specimens and unrecognizable from the description alone.

(5) **Bambusa lumampao** Blanco Fl. Filip. ed. 1 (1837) 373; ed. 2 (1845) 189; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29; Miq. Fl. Ind. Bat. **3** (1859) 421. *Dendrocalamus membranaceus* F.-Vill. Nov. App. (1883) 324 ex syn. Blanco, non Munro.

Luzon, Province of Nueva Viscaya, Quiangan (126 *Merrill*) June, 1902: Province of Bataan, Lamao (*Whitford*) September, 1905: Dinalupijan (*Merrill*) January, 1903: Province of Pampanga, Arayat (*Merrill*) March, 1903.

An endemic (?) not well-known species, all the above specimens being sterile with the exception of the first which unfortunately has only very old flowers. Possibly referable to *Schizostachyum*. T., *Lumampao, Bocaui* (Blanco). Sp.-Fil. *Caña boho*.

(6) **Bambusa monogyna** Blanco Fl. Filip. ed. 1 (1837) 286; ed. 2 (1845) 187; Miq. Fl. Ind. Bat. **3** (1859) 420; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29. *Dendrocalamus strictus* F.-Vill. Nov. App. (1883) 324, ex syn. Blanco, non Nees.

Apparently represented by the following sterile specimens: Luzon, Province of Bataan, Dinalupijan (*Merrill*) January, 1903; Lamao (*Whitford*) September, 1905: Province of Pampanga, Arayat (*Merrill*) March, 1903.

An endemic (?) species of uncertain value. T., *Cauayan quiling*.

(7) **Bambusa nana** Roxb. Hort. Beng. (1814) 25; Gamble in Ann. Bot. Gard. Calcuta **7** (1896) 40. *pl. 38;* F.-Vill. Nov. App. (1883) 323; Usteri Beitr. Kenn. Philip. Veg. (1905) 133.

Occasionally cultivated as a hedge plant in Manila and probably in other towns in the Archipelago, a native of China and Japan. I have seen no Philippine specimens in flower or fruit. It is possible that the species credited to the Philippines by F.-Villar as *Bambusa tuldoides* was the same. F.-Villar states that he saw only cultivated specimens.

(8) **Bambusa blancoi** Steud. Syn. **1** (1855) 331; Miq. Fl. Ind. Bat. **3** (1859) 421. *Bambusa mitis* Blanco Fl. Filip. ed. 1 (1837) 271; ed. 2 (1845) 188, non Poir.; *Dendrocalamus sericeus* F.-Vill. Nov. App. (1883) 324, ex syn. Blanco, non Munro.

An endemic (?) species of uncertain value, known only from Blanco's description. T., *Tiananac*.

(9) **Bambusa textoria** Blanco Fl. Filip. ed. 1 (1837) 270; ed. 2 (1845) 188; Miq. Fl. Ind. Bat. **3** (1859) 421. *Gigantochloa atter* F.-Vill. Nov. App. (1883) 323, ex syn. Blanco, non Kurz.

An endemic (?) species of uncertain value, known from Blanco's description. T., *Calbang*.

It is probable that by no means all of the above species are *Bambusa*, but that some of them are referable to other genera such as *Dendrocalamus, Gigantochloa,* etc., but it is quite impossible to determine Blanco's species and refer them to their proper genera without complete material, and it is probable that

we shall be quite unable to locate some of the species absolutely. In addition to the above species, several others are represented in our herbarium, which from lack of complete material it is impossible to determine satisfactorily at this time.

(70) GIGANTOCHLOA Kurz.

Differing from *Bambusa* in having the filaments united into a tube, hence monadelphous. Tall arborescent species with numerous dense fascicles of spikelets in branched panicles.

Species about 10, British India and Malaya; one in the Philippines.

(1) **Gigantochloa scribneriana** Merrill sp. nov.

Frutex; ramis teretibus: foliis oblongo-lanceolatis, acuminatis, 25–30 cm. longis, 3–5 latis, ad marginem et nonnunquam supra nervos marginales serrulato-scabris, subtus pallidis et sparse pubescentibus; paniculis ut videtur 2 vel 3 metralis, aphyllis; ramis solitariis vel fasciculatis, elongatis, ad 80 cm. longis, glabris vel puberulis; spiculis ad ramulus floriferos fasciculatis, oblongo-ovatis, acutis, 1–1.5 cm. longis, fasciculis 1–4 cm. distantibus; glumis sterilibus 2 vel 3, bracteolis supremis eis similibus nec non paullo brevioribus; glumis fertilibus 4–6, plus minus 9 mm. longis, superioribus quam inferioribus longioribus, apice abrupte breviter acuminatis vel acutis, pubescentibus; staminibus 6; filamentis in tubo connatis; antheris lincaribus, exsertis.

Erect, apparently of large size. Branches terete. Leaves oblong-lanceolate, acuminate, somewhat narrowed below to the petiole, 25 to 30 cm. long, 3 to 3.5 cm. wide, the margins and sometimes the marginal nerves above serrulate-scabrous, beneath pale and somewhat pubescent, the nerves on both sides of the midrib 8 or 9; petiole 3 to 5 mm. long; sheaths glabrous or slightly puberulous, the mouth glabrous; ligule very short, truncate. Panicles apparently 2 or 3 m. long, leafless, the branches solitary or fascicled, elongated, about 80 cm. long, glabrous or puberulous, the bracts coriaceous, oblong or ovate-oblong, acute or acuminate, glabrous. Spikelets in fascicles of three to eight, the internodes 1 to 4 cm. long, the bracteoles broadly triangular-ovate, acute, coriaceous, 5 mm. long; spikelets oblong-ovate, acute or slightly acuminate, compressed, 1 to 1.5 cm. long; empty glumes 2 or 3, similar to the upper bracteoles but slightly shorter, broadly ovate, acute or apiculate, slightly pubescent, the margins ciliate; flowering glumes 4 to 6, broadly ovate, about 9 mm. long, 7 mm. wide, coriaceous, the apex short apiculate or acute, pubescent, the margins ciliate, the upper ones longer than the lower and the uppermost enclosing an imperfect flower. Palea slightly shorter than the glumes, the two keels ciliate. Stamens 6; filaments united into a tube; anthers linear, exserted, 7 to 8 mm. long, glabrous, apiculate. Ovary pilose; style elongated, pilose.

Cuyo (14 *C. Lamson-Scribner*) December, 1902.

The material is rather imperfect, there being no culm sheaths with the specimen, and no notes as to the size of the culms or the length of the inflores-

cence. It does not agree with any of the species of *Bambusa* described by Blanco, so far as I can determine from Blanco's descriptions. It is well characterized by its somewhat glaucous and slightly pubescent leaves, elongated panicle branches and somewhat pubescent spikelets, there being from three to eight spikelets in each fascicle.

(71) SCHIZOSTACHYUM Nees.

Spikelets 1-flowered, narrow-lanceolate, in remote, often dense fascicles along the panicle branches. Empty glumes 4 to 6, acuminate, gradually larger upwards. Stamens 6, free. Erect or scandent shrubs with slightly branched or simple inflorescence.

Species about 15, southern Asia to Malaya, Polynesia, and the Sandwich Islands; three or more in the Philippines.

1. Mouth of leaf-sheaths long-ciliate ..... (1) *S. acutiflorum*
1. Mouth of leaf-sheaths glabrous ..... (2) *S. dielsianum*

(1) **Schizostachyum acutiflorum** Munro in Trans. Linn. Soc. **26** (1868) 137; F.-Vill. Nov. App. (1883) 324; Vidal Rev. Pl. Vasc. Filip. (1886) 294; Phan. Cuming. Philip. (1885) 159; Ceron Cat. Pl. Herb. (1892) 168. *Dinochloa major* Pilger in Perk. Frag. Fl. Philip. (1904) 149. *Schizostachyum blumei* F.-Vill. Nov. App. (1883) 324? non Nees. *Dinochloa diffusa* Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29 pro parte.

PHILIPPINES (544 *Cuming*). LUZON, Province of Bataan, Lamao River (75, 519 *Whitford*) April, July, 1904; (1261, 2731 *Borden*) July, 1904, March, 1905; (2550, 3297 *Merrill*) June, October, 1903; Dinalupijan (1477, 1474, 1528 *Merrill*) January, February, 1903. MINDORO, Bongabong River (3740 *Merritt*) March, 1906.

Endemic.

I am not able to distinguish *Dinochloa major* Pilger from *Schizostachyum acutiflorum* Munro, duplicate types of both species being before me. I consider the plant to be a *Schizostachyum* rather than a *Dinochloa*.

(2) **Schizostachyum dielsianum** (Pilger). *Dinochloa dielsiana* Pilger in Perk. Frag. Fl. Philip. (1904) 148. *Dinochloa diffusa* Merr. in Govt. Lab. Publ. **29** (1905) 7; Philip. Sci. **1** (1906) Suppl. 29, pro parte. *Bambusa diffusa* Blanco Fl. Filip. ed. 1 (1837) 289; ed. 2 (1845) 287; ed. 3, **1** (1877) 334?

LUZON, Province of Pampanga (1408 *Merrill*) March, 1903; Province of Zambales (388 *Maule*) March, 1904; Province of Bataan, Mount Mariveles (6092 *Leiberg*) July, 1904. MINDORO, Baco River (279 *McGregor*) April, 1905. PALAWAN (Paragua) (711 *Merrill*) February, 1903; (3548 *Curran*) January, 1906.

Endemic.

A species very close to the preceding, distinguished mainly by its glabrous, not long fimbriate sheath apices, and a *Schizostachyum* rather than a *Dinochloa*. I had previously taken up Blanco's specific name *diffusa* for this species, and may have been correct in doing so, but as his description apparently applies as well to the preceding species as to the present one, it is perhaps best to discard *Bambusa diffusa* as an unrecognizable species.

(3) **Schizostachyum** sp.

LUZON, Province of Benguet, Sablan (6173 *Elmer*) April, 1904; Province of Cagayan, Tuguegarao (*Williamson*) February, 1906.

An undescribed species, teste Hackel in lit.

In addition to the above species, two or three others of this genus are represented in our herbarium by imperfect material.

(72) DINOCHLOA Buse.

Spikelets very small, 1-flowered, in distant small fascicles or scattered along the branches of a very large panicle. Empty glumes 3 or 2, obtuse. Flowering glume one, similar to the empty glumes. A scandent shrub.

Species two, Malayan Peninsula and Archipelago; one in the Philippines.

(1) **Dinochloa scandens** (Blume) O. Kuntze Rev. Gen. Pl. (1891) 773. *Bambusa scandens* Blume ex Nees in Flora 7 (1824) 291. *Nastus tjangkorreh* Schultes Syst. Veg. 7[2] (1830) 1358; Kunth Enum. 1 (1833) 430; Steud. Syn. 1 (1855) 333. *Dinochloa tjankorreh* Büse in Miq. Pl. Jungh. (1855) 388; Miq. Fl. Ind. Bat. 3 (1859) 415; F.-Vill. Nov. App. (1883) 324; Munro in Trans. Linn. Soc. 26 (1868) 153. *pl. 5;* Vidal Cat. Pl. Prov. Manila (1880) 48; Sinopsis Atlas (1883) *t. 96. f. C.;* Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 294; Ceron Cat. Pl. Herb. (1892) 186; Pilger in Perk. Frag. Fl. Philip. (1904) 150; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 29; Gamble in Ann. Bot. Gard. Calcutta 6 (1896) 112.

PALAWAN, Puerto Princesa (276 *Bermejos*) January, 1906; Casuarina Point (621 *Foxworthy*) March, 1906. BALABAC (447 *Mangubat*) March, 1906. BASILAN (2977, 3980, 3981 *Hutchinson*) February, 1906. MINDORO, Bongabong River (3701, 4066 *Merritt*) March, 1906. MINDANAO, Davao (1239 *Copeland*) April, 1904: Province of Surigao (319 *Bolster*) April, 1906.

Malaya.

Var. **angustifolia** (Hackel) *D. tjankorreh* var. *angustifolia* Hack. in herb.

Foliis parvis, 4 ad 17 cm. longis, 0.5 ad 1.5 cm. latis.

PHILIPPINES (637 *Cuming*). LUZON, Province of Bataan, Lamao (2102 *Borden*) November, 1904: Province of Laguna, Mount Maquiling (5145 *Merrill*) March, 1906. MINDORO, Pola (2224 *Merrill*) May, 1903. MINDANAO, District of Davao, Todaya (1239 *Copeland*) April, 1904. BASILAN (*Hallier*) January, 1904.

Distinguished from the type by its very much smaller leaves, but intermediate forms occur. Munro gives leaf measurements that include this narrow-leaved form in the species, but the measurements given by Gamble do not include it.

DOUBTFUL AND EXCLUDED SPECIES OF BAMBUSEÆ.

BEESHA RHEEDII Kunth; Vidal Cat. Pl. Prov. Manila (1880) 48; F.-Vill. Nov. App. (1883) 324. Above records for this species from the Philippines never verified, probably erroneous identifications=*Melocanna bambusoides* Trin., a species of British India and one not to be expected in the Philippines.

CEPHALOSTACHYUM CAPITATUM Munro. Credited to the Philippines by F.-Villar, Nov. App. (1883) 324. A species of British India, not to be expected in the Philippines.

DENDROCALAMUS GIGANTEUS Munro. Credited to the Philippines by F.-Villar Nov. App. (1883) 324, who states that he saw cultivated specimens. Possibly cultivated in the Philippines, but if so, rarely. The "giant bamboo" of British India.

DENDROCALAMUS LATIFORUS Munro. Credited to the Philippines by F.-Villar Nov. App. (1883) 324, who states that he saw cultivated specimens. A species of Formosa, southern China, and Burma, F.-Villar's record from the Philippines not verified. The figure given by Vidal Sinopsis Atlas (1883) *t. 96. f. B.* was not drawn from Philippine material, but was copied from the plate in Munro's monograph, teste Vidal l. c. p. 42.

OXYTENANTHERA sp. Ceron Cat. Pl. Herb. (1892) 185. An undetermined species of which I have seen no specimens.

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THE OCCURRENCE OF ANTIARIS IN THE PHILIPPINES.

By Elmer D. Merrill.

(*From the botanical section of the Biological Laboratory, Bureau of Science.*)

ANTIARIS Lesch.

Antiaris toxicaria (Pers.) Leschen. in Ann. Mus. Paris, 16 (1810) 478. *t. 22;* Blume, Rumphia, 1 (1835) 56. *t. 22, 23;* Benn. Pl. Jav. Rar. (1838–1852) 52. *t. 13;* Miq. Fl. Ind. Bat. 1 [2] (1859) 291; Hook. f. Fl. Brit. Ind. 5 (1888) 537; F. Vill. Nov. App. (1883) 202.

Mindoro, Bulalacao (1551 *Bermejos*) August 27, 1906. V., *Salogón;* T., *Dalit.*

This interesting species was first called to our attention by the Honorable *Dean C. Worcester,* Secretary of the Interior of the Government of the Philippine Islands, who brought from Bulalacao early in the year 1906, a small quantity of a substance used by the natives in that vicinity for poisoning arrows, but without botanical material by which the species yielding the product could be identified. As Dr. *R. F. Bacon* of the Bureau of Science had undertaken the chemical examination of the different arrow poisons used by the natives of the Philippines, a native collector was sent to Bulalacao with instructions to secure a quantity of the poison as well as botanical specimens from the tree yielding the product. Although the material secured was without fruit or flowers, a careful examination of it leads me to conclude that it is identical with *Antiaris toxicaria,* while Dr. *Bacon* informs me that a chemical examination of the poison shows it to be identical with that yielded by this species.

Miquel [1] credits the species to the Philippines, citing *Camell* for authority for its occurrence here. That the species was known from the Philippines over two hundred years ago, and that from *Camell's* time up to the year 1906 this much discussed and well known plant had not been rediscovered in the Archipelago, is at least interesting.

F.-Villar includes the species in his Novissime Appendix, citing *Miquel* and *Camell* for authority for its occurrence in the Philippines, but stating that he had not seen specimens.

Camell [2] states the following regarding this plant, under his "*De quibusdam Arboribus Venenatis:*"

"1. *Ipo,* seu *Hypo* arbor est mediocris, folio parvo, & obscurè virenti, quae tam malignae, & nocivae est qualitatis, ut omne vivens umbra sua interimat, unde narrant in circuitu, & umbrae distinctu plurima ossium, mortuorum hominum, anamaliumve videri. Circumvicinas etiam plantas enecat, & aves insidentes interficere ferunt, si *Nucus* Vomicae *Igasur,* plantam non invenerint, qua reperta vita quidem donantur, & servantur, sed defluvium patiuntur plumarum. *Antonius Molero* mihi retulit, post iter per Sylvosam viam, passum

[1] *Fl. Ind. Bat.* 1 [2] (1859) 292.
[2] J. Ray: *Hist. Plant.* 3 (1704) App. 87.

fuisse defluvium capillorum unius lateris, an forsan ex hac arbore ? Hypo *lae Indi Camuconcs, & Sambales, Hispanis* infensissimi longis excipiunt arundineis perticis, sagittis intoxicandis deserviturum, irremediabile venenum, omnibus aliis alexipharmacis superius, praeterquam stercore humano propinato. *An* Argensolae *arbor comosa,* quam *Insulae Celebes* ferunt, cujus umbra occidentalis mortifera, orientalis Antidotum. *An* Machucae *Zeuva* ? qui addit: Sagittis lacte fructus arboris *Mansanillo,* illitis vulneratos, non emori, sed intumescere, & hebetissimos reddi. Num *Mansanillo* idem, ac *Mansanan* seu *Pomum portus Acapulco* ? quod referunt primum bene sapere, sed mox infernali ardore fauces, & interiora adurendo exeruciare, quod si non perimit, saepius mortales accelerat accidentes: Asportatur in naves, ut mures, & glires eo comesto intereant."

This species has long been known to Europeans, and many of the early travelers in the Malayan Archipelago wrote fabulous accounts of the tree and its deadly properties. *Robert Brown*[3] has given an exhaustive historical account of it.

The distribution of true *Antiaris toxicaria* is somewhat doubtful, *Hooker* f., reducing to it *Antiaris innoxia* Blume and some other species, giving its distribution as from the Deccan Peninsula, Pegu to Martaban, Ceylon and the Malay Islands, stating that the north Australian *A. macrophylla* R. Br. may be the same. *Engler* gives the distribution as from Java to the Sunda Islands.

[3] Bennett, Brown and Horsefield: Plantæ Javanicæ Rariores (1838–52) pp. 53–63.

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INDEX TO PHILIPPINE BOTANICAL LITERATURE.

By Elmer D. Merrill.
(*From the botanical section of the Biological Laboratory, Bureau of Science.*)

The literature bearing directly or indirectly on Philippine botany is so extensive and so widely scattered that it has been considered advisable to prepare and publish from time to time lists of useful or essential works containing references to Philippine plants. Such lists will include short reviews of monographs of various genera and families that are represented in the Philippines, short articles, individual diagnoses, etc., and an attempt will be made to review obscure and rare papers referring to Philippine botany in the widest sense of the word. Special attention will be given to recent publications, but the older ones will not be ignored, if there is any special object in reviewing them. The ultimate object of this work is the preparation of a complete bibliography of Philippine botany. The list will be continued from time to time in this Journal.

Ames, Oakes. Descriptions of New Species of Acoridium from the Philippines. (*Proc. Biol. Soc. Wash.* **19** (1906) pp. 143–154.)

Eighteen new species of *Acoridium* are described, all, with the exception of *A. williamsii*, based on material collected by employees of the Bureau of Science. The species are as follows: *Acoridium williamsii, A. graminifolium, A. tenuifolium, A. tenue, A. parvulum, A. venustulum, A. strictiforme, A. anfractum, A. recurvum, A. philippinense, A. turpe, A. oliganthum, A. ocellatum, A. merrilli, A. longilabre, A. graciliscapum, A. cucullatum,* and *A. copelandii.*

Beccari, O. Le Palme delle Isole Filippine (in Martelli's *Webbia* (1905) pp. 315–359.)

An enumeration of all the palms definitely known from the Philippines, in which the following species and varieties are described for the first time: *Pinanga speciosa, P. copelandi, P. barnesii, P. elmerii,* and *P. chinensis* (from China); *Caryota merrillii; Orania paraguanensis; Livistona whitfordii, L. vidalii; Calamus mollis* var. *major, C. merrillii, C. siphonospathus* vars. *sublevis, oligolepis* (*major*), *oligolepis* (*minor*) and *polylepis.*

Beccari, O. Systematic Enumeration of the Species of Calamus and Daemonorops, with Diagnoses of the New Ones. (*Records Bot. Surv. India* **2** (1902) pp. 197–230.)

In this paper 164 species of *Calamus* are recognized and 77 species of *Daemonorops,* of which the following are credited to the Philippines: *Calamus spinifolius* n. sp., *C. mollis* Blanco, *C. Blancoi* Kunth, *C. cumingianus* n. sp., *C. mosleyanus* n. sp., *C. vidalianus* n. sp., *C. siphonospathus* Mart., *C. microcarpus* n. sp., *C. manillensis* H. Wendl., and *C. dimorphacanthus* n. sp. *Daemonorops fuscus* Mart., and *D. gaudichaudii* Mart. *Calamus discolor* Mart.,

C. curag Blanco and *C. meyenianus* Schauer are considered as doubtful, imperfectly known or unrecognizable species. All the species enumerated from the Philippines are endemic to the Archipelago.

Brand, A. Symplocaceae. (*Das Pflanzenreich*, 6 (1901) pp. 1–100.)

A single genus, *Symplocos*, is recognized, containing 281 species, of which the following are credited to the Philippines: *Symplocos patens* Presl, *S. patens* var. *ciliata* (Presl) Brand, *S. floridissima* Brand, *S. polyandra* (Blanco ?), Brand *S. ferruginea* Roxb., *S. oblongifolia* (Presl) Vidal, *S. cumingiana* Brand, and *S. luzoniensis* Rolfe, all endemic with the exception of *S. ferruginea*. (See also Brand in Perkins Frag. Fl. Philip. pp. 36–37.)

Brotherus, V. F. Contributions to the Bryologieal Flora of the Philippines, I. (*Öfversigt af Finska Vetenskaps-Societetens Förhandlingar* (1904–05) 47, No. 14, pp. 1–12.)

Forty species of Philippine mosses are enumerated, mostly from the collections of *Merrill, Copeland* and *Elmer*. The following species are described as new: *Dicranoloma perarmatum, Macromitrium merrillii, Orthomnium loheri, Entodon longidens, Sematophyllum piliferum* and *Hypnodendron copelandii*.

Buchenau, Fr. Alismataceae. (*Das Pflanzenreich* 16 (1903) pp. 1–66.)

No species of the family is credited to the Philippines, but since the publication of the monograph the widely distributed *Sagittaria sagittifolia* L., has been found in Mindanao. The other two families considered by *Buchenau* in the same work, *Scheuchzeriaceae* and *Butomaceae*, are not represented in the Philippines.

Buchenau, Fr. Juncaceae. (*Das Pflanzenreich* 25 (1906) pp. 1–284.)

No species of the family is credited to the Philippines, but the widely distributed *Juncus effusus* L., is found on the mountains of Luzon and Mindanao, and at least one other species of the genus is found in northern Luzon.

Christ, H. Zur Farnflora von Celebes. (*Ann. Jard. Bot. Buitenz.* II. 4 (1904) pp. 33–44.)

Forty-nine species are enumerated, many of which extend to the Philippines.

Christ, H. Filices Borneenses. Fougeres recueillies par les expéditions des Messieurs Nieuwenhuis et Hallier dans la partie équatoriale de Bornéo. (*Ann. Jard. Bot. Buitenz.* II. 5 (1905) pp. 92–140, plates 1.)

An enumeration of 155 species, many of which are described as new, with numerous references to species extending to the Philippines.

Christ, H. Filices Insularum Philippinarum. (*Bull. Herb. Boiss.* 6 (1898) pp. 127–154; 189–210, plates 3.)

Two hundred and seventy-one species of ferns and fern allies are enumerated, the list being based on the collections made by *A. Loher*. A number of species are credited to the Philippines for the first time and the following described as new: *Alsophila lepifera* J. Sm., var. *congesta, A. fuliginosa; Hymenophyllum subdemissum* and *H. discosum; Lindsaya loheriana* and *L. capillacea; Lomaria fraseri* Cunn., var. *philippinensis; Plagiogyria glauca* Kunze var. *philippinensis; Asplenium loherianum, A. contiguum* Kaulf., var. *bipinnatifidum; Athyrium sarasinorum* Christ, var. *philippinense; Aspidium loherianum, A. grammitoides, A. faurici* Christ var. *elatius; Polypodium loherianum, P. subobliquatum, P. sagitta, P. anomalum, P. lagunense;* and *Angiopteris cartilagidens*.

Christ, H. Filices Insularum Philippinarum, II. (*Bull. Herb. Boiss.* II. 6 (1906) pp. 987–1011.)

Like the preceding paper based also on material collected by *A. Loher*, with some references to specimens secured by other collectors, 102 species being enumerated, some reported from the Philippines for the first time and the following described as new: *Christopteris copelandi, Hymenolepis rigidissima, Cyclophorus argyrolepis, Selliguea flexiloba* Christ, var. *loheri, Polypodium elmeri* Copel., var. *separatum, P. mindanense, P. subirideum, P. subdrynariaceum, P. subopposition, Aspidium batjanense, Stenochlaena arthropteroides, Asplenium cymbifolium, A. colubrinum, Diplazium acrotis, D. inconspicuum, Athyrium loheri, Dryopteris rizalensis, Aspidium biseriatum, A. angilogense, Leptochilus stolonifer, L. rizalianus, Sacoloma moluccanum* Mett., var. *stenolobum, Pleurogramme loheriana, Vittaria philippinensis, V. crispomarginata, Cyathea loheri, C. callosa, C. adenochlamys, Gleichenia loheri,* and *G. linearis* Burm., var. *stipulosa.*

Christ, H. Die Farnflora von Celebes. (*Ann. Jard. Bot. Buitenz.* 15 (1897) pp. 73–186, plates 5.)

An enumeration of the ferns known from Celebes, 308 species being listed, with numerous references to species growing in the Philippines.

Copeland, Edwin Bingham. Outline of a Year's Course in Botany. (*Bureau of Education (Manila) Bull.* 24 (1906) pp. 1–18.)

An outline of the work in botany given at the Philippine Normal School, Manila, and in the secondary schools of the Archipelago.

Copeland, Edwin Bingham. Key to the Families of Vascular Plants in the Philippine Islands. (*Bureau of Education (Manila) Bull.* 24 (1906) pp. 19–32.)

An analytical key to the families of vascular plants known to be represented in the Philippines, following the system of *Engler and Prantl*, followed by a systematic enumeration of the families, 199 families being listed.

Copeland, Edwin Bingham. Fungi esculentes Philippinenses. (*Ann. Mycol.* (1905) 3: pp. 25–29.)

Twenty-one species described in the following genera: *Lycoperdon, Coprinus, Panaeolus, Agaricus* and *Lepiota.* In *Govt. Lab. Publ.* 28 (1905) pp. 141–146, the above paper is reprinted in English, with the addition of three half-tone plates under the title "New Species of Edible Philippine Fungi."

Diels, L. Droseraceae. (*Das Pflanzenreich* 26 (1906 pp. 1–136.)

A single genus, *Drosera*, is represented in the Philippines by the following species: *D. indica* L., British India to Australia, *D. spathulata* Labill., southern Japan and China to East Australia and New Zealand, and *D. peltata* Smith, British India to Australia.

Engler, A. Araceae-Pothoideae. (*Das Pflanzenreich* 21 (1905) pp. 1–330.)

The following species are credited to the Philippines: *Pothos longifolius* Presl, Philippines to Java, Sumatra and the Moluccas; *P. scandens* Linn., British India to Malaya; *P. inaequilaterus* (Presl) Engl., Philippines and Sumatra; *P. ovatifolius* Engl., endemic; *P. philippinensis* Engl., endemic; *P. luzonensis* (Presl) Schott, endemic; *Pothoidium lobbianum* Schott, a monotypic genus, Philippines, Celebes and the Moluccas. No form of *Acorus* is credited to the Archipelago, but the genus is represented in Luzon by forms referred to *A. calamus* L., but of which I have seen only sterile specimens. The Philippine form is possibly referable to *A. gramineus* Soland.

Graebner, P. Typhaceae and Sparganiaceae. (*Das Pflanzenreich*, **2** (1900) . *Typhaceae* pp. 1–18; *Sparganiaceae* pp. 1–26.)

Of the *Typhaceae*, *Typha angustifolia* L. subsp. *javanica* Schmizl. is the only form credited to the Philippines. The *Sparganiaceae* are not represented in the Philippine flora.

Harms, H. Einige neue Arten der Gattungen Cynometra und Maniltoa (*Notizblatt Kgl. Bot. Gart. und Mus. Berlin* **3** (1902) pp. 186–191.)

Several species are described in both genera, including two from the Philippines, *Cynometra simplicifolia* and *C. warburgii*.

Hayata, B. Compositae Formosanae. (*Journ. Coll. Sci. Tokyo* **18** (1904) No. 8, pp. 1–45, plates 2.)

An enumeration of all the *Compositae* known from Formosa with analytical keys to genera and species. The same species are again enumerated by *Matsumura* and *Hayata* in their "Enumeratio Plantarum in Insula Formosa sponte crescentium," etc.

Hayata, B. Revisio Euphorbiacearum et Buxacearum Japonicarum. (*Journ. Coll. Sci. Tokyo* **20** (1904) No. 3, pp. 1–92, plates 6.)

The article contains analytical keys to the genera and species, with descriptions of both. Formosan species are included, 24 genera and 65 species of *Euphorbiaceae* and 2 genera and 3 species of *Buxaceae* being recognized, many of the former extending to the Philippines.

Hayek, August von. Verbenaceae novæ herbarii Vindobonensis. (*Fedde's Repertorium* **2** (1906) pp. 86–88.)

Several species of *Verbenaceae* are described as new including one, *Callicarpa elegans* Hayek n. sp. l. c. 88, from the Philippines, the type being No. 1460 *Cuming*.

Koehne, E. Lythraceae (*Das Pflanzenreich* **17** (1903) pp. 1–326.)

The following species are credited to the Philippines: *Rotalia mexicana* Cham. et Schlecht., var *spruceana* (Griseb.) Koehne, *R. ramosior* (L.) Koehne, *R. leptopetala* Koehne, *R. indica* (Willd.) Koehne, all widely distributed; *Ammannia coccinea* Rottb., subsp. *longifolia* Koehne, *A. baccifera* Linn., forma *typica*, Koehne, subf. *contracta* Koehne et subsp. *viridis* (Hornem.) Koehne, all widely distributed; *Pemphis acidula* Forst., a strand-plant extending from Africa, tropical Asia to Malaya, Polynesia and Australia; *Lagerstroemia indica* L. (introduced and cultivated only !) *L. speciosa* (L.) Pers., *L. batitinan* Vid., *L. piriformis* Koehne, *L. paniculata* (Turcz.) Vidal, the last three endemic; *Lawsonia inermis* Linn., introduced and cultivated.

Laguna, Maximo. Cien Helechos de Filipinas dispuestos con arreglo á la última edición (1874) de la "Synopsis Filicum" de Hooker y Baker. (*Ann. Soc. Esp. de Hist. Nat.* **7** (1878) pp. 1–19.)

An enumeration of 102 species of Philippine ferns, collected by *Baranda*, containing no descriptions and apparently no changes in nomenclature, but calling attention to the validity of some of *Cavanilles'* species, notably *Lygodium semihastatum*.

Maiden, J. H. On the Identification of a Species of Eucalyptus from the Philippines. (*Proc. U. S. Nat. Museum* **26** (1903) 691–692.)

One of the few species of this characteristic Australian genus found north of Australia, was collected by the botanists of the Wilke's U. S. Exploring Expedition near Zamboanga, Mindanao, in January, 1842, and described by *Asa Gray* under the name given it by the collector, *Eucalyptus multiflora* Rich. After examining the type Mr. *Maiden* reduces it to *Eucalyptus naudiniana* F. v. Müller, a species of the Bismark Archipelago.

Martelli, U. Le Composite raccolte dal Dottor O. Beccari nell' arcipelago Malese e nella Papuasia. (*Nuovo Giorn. Bot. Ital.* 15 (1883) pp. 281–305.)

An enumeration of the *Compositae* collected by Dr. *Beccari*, many of which extend to the Philippines.

Matsumura, J., and **Hayata, B.** Enumeratio Plantarum in Insula Formosa sponte crescentium hucusque rite cognitarum adjectis descriptionibus et figuris specierum pro regione novarum. (*Journ. Coll. Sci. Tokyo* 22 (1906) pp. 1–702, plates 18.)

An enumeration of all the plants known to the authors from Formosa with the descriptions of some new species, about 1,912 species being enumerated of which about 775 are known to extend to the Philippines. Undoubtedly the former number will be considerably increased as more extensive explorations are made in Formosa, and the latter will be increased when we shall have obtained a more thorough knowledge of the flora of northern Luzon and of the Batane Islands. The work on the Formosa flora is being prosecuted by Dr. *Hayata* and lists of additions are being published by him from time to time in the *Botanical Magazine, Tokyo.*

Merrill, Elmer D. Botanical Work in the Philippines. (*Bureau of Agriculture (Manila) Bull.* 4 (1903) pp. 1–53.)

An historical account of the work accomplished on the Philippine flora by various authors, with an account of the Manila Botanical Garden, herbaria and botanical libraries in Manila, Philippine botanical material in Europe and America and a partial bibliography relating to Philippine botany.

Merrill, Elmer D. Report on Investigations Made in Java in the Year 1902. (*Forestry Bureau (Manila) Bull.* 1 (1903) pp. 1–84.)

In the enumeration of the Philippine plants identified at Buitenzorg (Plantæ Ahernianæ, pp. 15–55) 66 families, 225 genera and about 400 species are listed, several genera, *Wallaceodendron, Erythroxylon, Walsura, Actephila, Gynotroches, Lepiniopsis,* and *Couthovia,* are reported from the Philippines for the first time and 5 species are described as new, *Evodia mindanaensis* (=*E. latifolia* DC.!), *Semecarpus macrophylla, Palaquium ahernianum, Vitex philippinensis* and *Timonius philippinensis.* Various errors in identifications have been corrected in later publications, but others remain to be considered. Among the apparent errors in identifications *Pinus khasia* is a form of *P. insularis,* as is the species following enumerated without name. *Quercus philippinensis,* is not *DeCandolle's* species but is *Q. celebica, Artocarpus blumei* is probably incorrectly identified and the specimen may be referable to *A. communis* Forst. *Ailanthus moluccana* is not that species but *A. philippinensis* Merr., *Canarium commune* is not the Linnean species but is *C. ovatum. Toona ciliata* is doubtful as to the species, the material being sterile it is impossible to be sure of the identification. *Walsura robusta* is not *Roxburgh's* species but distinct, *W. aherniana* Perk. *Pterospermum blumeanum,* whether or not *Korthal's* species, the specimens are referable to the earlier *P. obliquum* Blanco. *Saurauia reinwardtiana* Bl., specific identity very doubtful., *Arthrophyllum diversifolium* Bl., should be excluded, as the specimen cited is *Oroxylum indicum* Vent.!, leaf specimens only. *Trachelospermum,* the generic identification is doubtful, fruits only. *Ixora amboinica* can be excluded as the specimen cited is apparently referable to *Phaleria.* Undoubtedly other errors in identifications will be found later as the material is more thoroughly worked over and carefully compared.

Mez, Carl. Myrsinaceae. (*Das Pflanzenreich*, **9** (1902) pp. 1–437.)

Of this large and widely distributed family the following species are credited to the Philippines: *Maesa laxa* Mez, *M. haenkeana* Mez, *M. manillensis* Mez, *M. denticulata* Mez, *M. cumingii* Mez, *M. gaudichaudii* Mez, all endemic; *Ardisia corniculatum* (L.) Blanco, *A. floridum* R. & S., both widely distributed in the Indo-Malayan region; *Ardisia tomentosa* Presl, *A. philippinensis* A. DC., *A. disticha* A. DC., *A. mindanaensis* Mez, *A. marginata* Bl., *A. sulcata* Mez, *A. scabrida* Mez, *A. humilis* Vahl, *A. boissieri* A. DC., *A. pirifolia* Mez, *A. verrucosa* Presl, *A. grandidens* Mez, *A. perrottetiana* A. DC., *A. serrata* (Cav.) Pers., *A. castaneifolia* Mez, *A. candolleana* (O. Ktz.) Mez, *A. scalaris* Mez, *A. cumingiana* A. DC., *A. proteifolia* Mez, *A. warburgiana* Mez, *A. saligna* Mez, *A. crispa* (Thunb.) A. DC., *A. pardelina* Mez, *A. sinuatocrenata* Mez, *A. jagorii* Mez, all endemic except three species; *Discocalyx philippinensis* (A. DC.) Mez, *D. vidalii* Mez, *D. effusa* Mez, *D. minor* Mez, *D. cybianthoides* (A. DC.) Mez, *D. angustifolia* Mez, all endemic; *Embelia porteana* Mez, *E. philippinensis* A. DC. both endemic; *Rapanea philippinensis* (A. DC.) Mez, endemic. Since the publication of the monograph representatives of 2 other genera, *Ambylanthopsis* and *Labisia* have been discovered in the Philippines, and some species of genera listed above have been described. (See Mez, *This Journal* 1 (1906) Suppl. pp. 271–275.)

Palla, E. Scleria luzonensis Palla sp. nov. (*Allgemeine Bot. Zeitschr.* (1907).

The above new species described, to be issued in *Kneucker's* "Cyperaceae exsiccatæ," the type from Mount Arayat, Luzon.

Pax, F. Aceraceae. (*Das Pflanzenreich*, **8** (1902) pp. 1–89.)

Of the single genus in the family, *Acer* Linn., 114 species and many varieties are recognized, but none are credited to the Philippines. Since the publication of the above monograph 2 species have been discovered in the Archipelago, both undescribed by *Pax*, thus adding an additional family to the list of those previously known from the Philippines.

Pax, F., and Knuth, R. Primulaceae. (*Das Pflanzenreich* **22** (1905) pp. 1–386.)

Of this family *Androsace saxifragifolia* Bunge, northern India to China, Japan, Formosa, and Luzon, and *Lysimachia japonica* Thunb., with about the same distribution but extending to Java, and *L. ramosa* Wall., var. *typica* R. Knuth, Himalaya, Burma, Java, and Luzon, are the only forms credited to the Philippines. A few more species are, however, found in northern Luzon.

Perkins, J. Fragmenta Floræ Philippinæ. (Contributions to the Flora of the Philippine Islands, Leipzig, Gebrüder Borntraeger (1904–05) pp. 1–212, plates 4.)

This work was issued in three fascicles, I, pp. 1–66, March 12, 1904; II, pp. 67–152, June 30, 1904, and III, pp. 153–212, February 20, 1905. It was prepared by Dr. *Perkins* with the assistance of various specialists and was based largely on the Philippine collections of *Warburg*, *Ahern*, and *Merrill*. The chief groups treated are *Leguminosae*, *Dipterocarpaceae*, *Anacardiaceae*, *Meliaceae*, *Pinaceae*, *Taxaceae*, *Marantaceae*, *Gonystylaceae*, *Burseraceae*, *Elaeocarpaceae*, *Tiliaceae*, *Malvaceae*, *Bombacaceae*, *Sterculiaceae*, *Rosaceae*, and *Rutaceae*, by Perkins; *Symplocaceae* by A. Brand; *Acanthaceae* by G. Lindau; *Fagaceae* by O. von Seeman; *Typhaceae* by P. Graebner; *Orchidaceae* by R. Schlechter; *Palmae* by O. Beccari; *Sapindaceae* by L. Radlkofer; *Asclepiadaceae* by R. Schlechter and O. Warburg; *Myristicaceae*, *Pandanaceae*,

Begoniaceae, *Ulmaceae*, *Moraceae*, *Urticaceae*, *Balanophoraceae*, *Aristolochiaceae*, *Magnoliaceae*, *Thymeliaceae*, and *Ericaceae*, by O. Warburg; *Eriocaulonaceae* by W. Ruhland; *Gramineae* by C. Mez and R. Pilger; *Piperaceae* by C. de Candolle and ferns by E. B. Copeland. In this work no less than 2 genera and 219 species and varieties are described as new and 1 family, several genera and many species credited to the Philippines for the first time.

Perkins, J. Zwei neue Meliaceen. (*Notizblatt Kgl. Bot. Gart. und Mus. Berlin* (1903) pp. 78–79.)

Aglaia harmsiana and *Cipadessa warburgii* are described, the descriptions being translated into English in Perk. Frag. Fl. Philip. (1904) 30, 32.

Perkins, J., and **Gilg, E.** Monemiaceae. (*Das Pflanzenreich* 4 (1901) pp. 1–122.)

Thirty-one genera are recognized, but no representative of the entire family is cited from the Philippines. Since the publication of the work *Kibara ellipsoidea*, *K. depauperata*, *K. grandifolia*, and *Matthaea chartacea* have been described by *Merrill*. *Kibara coriacea* was previously credited to the Philippines by *Rolfe*, and *Matthaea sancta* by *Ceron*.

Pfitzer, E. Orchidaceae-Pleonandrae. (*Das Pflanzenreich* 12 (1903) pp. 1–132.)

Neuwiedia veratrifolia Blume and *N. zollingeri* Reichb. f., are credited to Luzon with doubt, and *Apostasia wallichii* R. Br., as perhaps growing in Luzon; *Paphiopedilum rothschildianum* (Reichb. f.) Pfitz., var. *elliotianum* (O'Brien) Pfitz., *P. philippinense* (Reichb. f.) Pfitz., and the variety *platytaenium* Desb., *P. roebbelinii* (Reichb. f.) Pfitz., *P. haynaldianum* (Reichb. f.) Pfitz., *P. argus* (Reichb. f.) Pfitz., and *P. ciliolare* (Reichb. f.) Pfitz., all endemic except the last one, which is also found in the Malayan Peninsula.

Pilger, R. Taxaceae. (*Das Pflanzenreich*, 18 (1903) pp. 1–124.)

Of this family the following species are credited to the Philippines: *Dacrydium falciforme* (Parl.) Presl, Borneo and Mindoro; *D. elatum* (Roxb.) Wall., Malaya, Mindoro; *Podocarpus imbricatus* Blume, var. *cumingii* (Parl.) Pilger, the variety endemic, the species from Burma to Malaya; *D. costalis* Presl, endemic; *Phyllocladus protractus* (Warb.) Pilger, Philippines, Moluccas and New Guinea; *Taxus baccata* subsp. *wallichiana* (Zucc.) Pilger, British India to Malaya and Celebes, other forms widely distributed in tropical and temperate regions of the World. Since the publication of the monograph several additional species of *Podocarpus* have been found in the Philippines, some identical with previously described species of the Malayan region, others undescribed.

Prain, D. Novicae Indicae XVIII.—The Asiatic Species of Dalbergia. (*Journ. As. Soc. Beng.* 70 (1901) part 2, pp. 39–65.)

Seventy-four species of the genus are recognized, of which the following five are credited to the Philippines: *Dalbergia polyphylla* Benth, endemic; *D. tamarindifolia* Roxb., Himalayan region to Malaya and Luzon; *D. candenatensis* (Dennst.) Prain (*D. torta* Grah.) western India to Malaya, Polynesia and Australia; *D. ferruginea* Roxb., Malaya, Philippines, New Guinea, and *D. cumingiana* Benth., endemic.

Prain, D. A List of the Asiatic Species of Ormosia. (*Journ. As. Soc. Beng.* 69 (1900) part 2, pp. 175–186.)

Twenty-two species of the genus are recognized, of which only one is found in the Philippines, the endemic *Ormosia calavensis* Blanco. A second Philippine species, *Ormosia paniculata* Merr., has since been described, *Philip. Journ. Sci.* (1906) 1. Suppl. 64.

Prain, D. Report on the Indian Species of Pterocarpus. (*Stray Leaves from Indian Forests;* issued with *Indian Forester* 26 (1900) No. 10, pp. 1–16.)

Five species are considered, especially with a view to the identity of the species yielding the padouk timber of commerce. But one species considered extends to the Philippines, *P. indicus* Willd., but in a footnote on page 10, the Philippine *P. vidalianus* Rolfe is reduced to *P. echinatus* Pers., a species previously known only from south Celebes.

Rendle, A. B. Najadaceae. (*Das Pflanzenreich* 7 (1901) pp. 1–21.)

A single genus, *Najas* Linn., is recognized, containing 32 species and many varieties, of which the following are found in the Philippines: *Najas forcolata* A. Br., *N. falciculata* A. Br., and *N. graminea* Del.

Robinson, C. B. The History of Botany in the Philippine Islands. (*Journ. N. Y. Bot. Gard.* 7 (1906) pp. 104–112.)

A sketch of the history of Philippine botany from the year 1587 to the year 1906, including some data not included by *Merrill* in his "Botanical Work in the Philippines."

Robinson, C. B. Some Affinities of the Philippine Flora. (*Torreya,* 7 (1907) pp. 1–4.)

A review of the introduction to *Merrill's* "New or Noteworthy Philippine Plants, V" *Philip. Journ. Sci.* 1 (1906) Suppl. pp. 169–246.

Ruhland, W. Eriocaulonaceae. (*Das Pflanzenreich,* 13 (1903) pp. 1–294.)

Nine genera are recognized of which but one, *Eriocaulon* Linn., with 193 species, is represented in the Philippines. The species credited to the Philippines are *E. truncatum* Ham., which should be excluded as the specimen cited from the Philippines, No. 2326 *Cuming,* was not collected in the Archipelago but in Malacca; *E. sexangulare* Linn., British India to China and the Philippines, and *E. sieboldianum* Sieb. et. Zucc., British India to China, Japan, the Philippines and Java. One species has been described from Philippine material since the publication of the above monograph, *E. merrillii* Ruhl.

Schindler, Anton K. Halorrhagaceae. (*Das Pflanzenreich* 23 (1905) pp. 1–133.)

Of this family but a single species, *Gunnera macrophylla* Blume, Java, Sumatra, Luzon and New Guinea, is credited to the Philippines. Since the publication of the monograph however the following species have been added to the Philippine flora: *Myriophyllum spicatum* L., widely distributed: *Halorrhagis micrantha* (Thunb.) R. Br., *H. philippinensis* Merr., *H. scabra* var. *elongata* Schindl., and *H. halconensis* Merr.

Schumann, K. Musaceae. (*Das Pflanzenreich,* 1 (1900) pp. 1–45.)

Five genera are recognized, two being represented in the Philippines, one *Musa* by many forms, the other *Ravenala* by occasional cultivated specimens. The only species of *Musa* credited to the Philippines by Schumann are *M. textilis* Née, the source of abacá, Manila hemp, and forms of *M. paradisiaca* L., the common banana and plantain. No attempt is made to reduce the numerous forms described by *Blanco* in his "Flora de Filipinas." *Ravenala madagascarensis* Sonn., the "traveller's palm" has been introduced into the Archipelago and is occasionally cultivated for ornamental purposes.

Schumann, K. Zingiberaceae. (*Das Pflanzenreich,* 20 (1904) pp. 1–458.)

The following species are credited to the Philippines: *Hedychium philippinense* K. Schum., endemic; (*Brachychilus* a genus of two species apparently erroneously credited to the Philippines in note on generic distribution and in conspectus of species, but under the species the Philippines are not mentioned); *Globba brevifolia* K. Schum., *G. gracilis* K. Schum., *G. campsophylla* K. Schum., *G. parviflora* Presl, *G. pyramidata* Gagnepain, *G.*

ectobolus K. Schum., *G. ustulata* Gagnepain, *G. barthei* Gagnepain, *G. heterobractea* K. Schum., all endemic; *Ammomum loheri* K. Schum., *Alpinia leptosolenia* K. Schum., endemic; *A. pubiflora* (Benth.) K. Schum., New Guinea, Caroline Islands and Mindanao; *A. brevilabris* Presl, *A. pulchella* K. Schum., New Guinea and Mindanao; *A. cumingii* K. Schum., *A. galanga* (L.) Sw., Malaya; *A. trachyascus* K. Schum., *A. macroscaphis* K. Schum., *A. haenkei* Presl, *A. elegans* (Presl) K. Schum., *A. rufa* (Presl) K. Schum., *A. parviflora* (Presl) Rolfe, *A. rolfei* K. Sch., *A. mollis* Presl, all endemic; *Costus speciosus* (Koenig) Smith, var. *leiocalyx* K. Schum., widely distributed. In addition to the above species definitely credited to the Philippines others are more or less common in the Archipelago such as *Hedychium coronarium* Koenig, species of *Kaempfera*, *Curcuma longa* Linn., *C. zeodaria* (Berg.) Rose., *Zingiber officinale* Rose., *Z. zerumbet* (L.) Sm., etc. (See also Ridley in *Govt. Lab. Publ.* **35** (1905) pp. 83–87.)

Schumann, K. Marantaceae. (*Das Pflanzenreich* **11** (1902) pp. 1–184.)

Of the 26 genera recognized, 4 are found in the Philippines, represented by the following species: *Donax arundastrum* Lour., British India to the Malayan Peninsula, Tonkin and the Philippines; *Monophrynium fasciculatum* (Presl) K. Schum., a monotypic endemic genus; *Phacelophrynium interruptum* (Warb.) K. Schum., *P. bracteosum* (Warb.) K. Schum., both endemic. *Maranta arundinacea* Linn., introduced from tropical America, the source of arrowroot, is commonly cultivated and subspontaneous in the Philippines. All the above species are considered and figured by *Perkins* in her Fragmenta Florae Philippinae (1904) pp. 67–73, plates 3.

Scribner, F. Lamson. Notes on the Grasses in the Bernhardi Herbarium, collected by Thaddeus Haenke, and described by J. S. Presl. (*Rept. Mo. Bot. Gard.* **10** (1899) 35–59, plates 54.)

Critical notes on the types of some of *Presl's* species, with illustrations, including many based on Philippine material, deposited in the herbarium of the Missouri Botanical Garden.

Solms-Laubach, H. Graf zu. Rafflesiaceae and Hydnoraceae. (*Das Pflanzenreich* **5** (1901) *Rafflesiaceae* pp. 1–19; *Hydnoraceae* pp. 1–9.)

The *Rafflesiaceae* are represented in the Philippines by *Rafflesia schadenbergiana* Goeppert, from Mindanao, and *R. manillana* Teschem., from Leyte, Samar and Luzon. To the latter species are reduced *R. cumingii* R. Br., *R. lagascae* Blanco and *R. philippinensis* Blanco. The *Hydnoraceae* are not represented in the Philippines.

Underwood, Lucien Marcus. A Summary of our Present Knowledge of the Ferns of the Philippines. (*Bull. Torr. Bot. Club.* **30** (1903) pp. 665–684.)

A consideration of the most important works treating the ferns of the Philippines and an account of the most important collections made in the Archipelago, with analytical keys to the families and genera of vascular cryptogams known to be represented in the Philippines, with some proposed changes in nomenclature, the final summary of vascular cryptogams being families 15, genera 105 and species 633.

Underwood, L. M. The Genus Stenochlaena. (*Bull. Torr. Bot. Club.* **33** (1906) pp. 35–50.)

The entire genus is considered, 23 species being recognized, of which the following are credited to the Philippines: *Stenochlaena laurifolia* Presl, endemic; *S. palustris* (Burm.) Bedd., widely distributed; *S. williamsii* n. sp., *S. aculeata* (Blume) Kunze, Tenasserim to Java and Borneo; *S. leptocarpa* (Fée) Underw., Java and the Philippines and *S. smithii* (Fée) Underw., endemic.

Vidal y Soler, Sebastian. Catálogo metódico de las plantas leñosas silvestres y cultivadas observadas en la provincia de Manila. (1880) pp. 1–48. (Reprint from *Revista de Montes* 4 (1880).)

In this work 531 species are enumerated, in which the following new names appear: *Pittosporum fernandezii*, *Aegle decandra*, *Dysoxylum blancoi*, *Parinarium racemosum*, *Medinilla lagunae*, *Homalium barandae*, and *Clerodendron naresianum*, but most of them are scarcely more than nomina nuda. Many of the errors in identifications were corrected later by Vidal in his Rev. Pl. Vasc. Filip. (1886). The introduction contains much of interest regarding the types of Philippine forests.

Usteri, Alfred. Beiträge zur Kenntnis der Philippinen und ihrer Vegetation, mit Ausblicken auf Nachbargebiete. (Inaugural-Dissertation zur Erlangung der philosophischen Doktorwürde der Universität Zurich, 1905, pp. 1–166, with 29 text-figures and 2 plates.)

This work contains a sketch of the geology and plant geography of the Philippines, meterology and climatology, notes on the islands of Guimaras, Cebu and Negros, a consideration of the different plant formations, notes on various cultivated plants, sugar culture, etc., and a catalogue of the plants collected, 1,431 species being enumerated from the Philippines, 1,303 from Java, 3 from Penang, 65 from Labuan, and about 100 from Singapore. In the enumeration of Philippine plants *Piper usterii* C. DC., and the variety *plurifistulosum* C. DC. are described, and in the *Orchidaceae* the name *Dendrobium usterii* Schltr. appears as a nomen nudum, later described in *Bull. Herb. Boiss.* II. 6 (1906) 458. Another new species is *Selaginella usterii* Hieron., with a very imperfect description. Under the Algae the following new species are described: *Phormidium usterii* Schmidle, and *Myxobactron usterianum* Schmidle, the latter the type of a new genus. Many species are credited to the Philippines for the first time.

Warburg, O. Pandanaceae. (*Das Pflanzenreich*, 3 (1900) pp. 1–97.)

Three genera, *Sararanga*, *Freycinetia* and *Pandanus* are recognized, the first with but a single species confined to the Solomon Islands and New Guinea, the other two genera widely distributed. *Freycinetia* with 62 species and *Pandanus* with 156. The Philippine forms recognized are *Freycinetia ferox* Warb., *F. luzonensis* Presl, *F. sphaerocephala* Gaudich., *F. vidalii* Hemsl., *F. jagorii* Warb., *F. philippinensis* Hemsl., and *F. scabripes* Warb., all endemic, and *Pandanus tectorius* Sol. (*P. odoratissimus* L. f., *P. spiralis* Blanco, *P. blancoi* Kth.). The species described by *Blanco*, *P. exaltatus*, *P. sabotan*, *P. gracilis*, *P. malatensis* and *P. radicans* are all considered doubtful species. Since the publication of *Warburg's* monograph a second species of *Sararanga* (*S. philippinensis*) has been found in the Philippines, and several species of *Freycinetia* and *Pandanus* have been described as new, while most of the species described by *Blanco* have been satisfactorially disposed of. (See, *Govt. Lab. Publ.* 17, 27, 29; *Philip. Journ. Sci.* 1 (1906) Suppl; Elmer, *Leaflets Philip. Bot.* 1 (1906).)

Williams, R. S. Notes on Luzon Mosses. (*The Bryologist*, 8 (1905) pp. 78–80.)

A popular account of some of the species observed while on a collecting trip in Luzon, including notes on forms observed about Manila, in the Province of Bataan, and in the Province of Benguet.

Reprinted from The Philippine Journal of Science.
Volume II, No. 4, Section C, Botany, July 15, 1907.

INDEX TO PHILIPPINE BOTANICAL LITERATURE, II.

By Elmer D. Merrill.
(*From the botanical section of the Biological Laboratory, Bureau of Science.*)

Anonymous. Decades Kewensis, Decas XLII. (*Kew Bull.* (1906) pp. 200–205.)

One Philippine species. *Peracarpa luzonica* Rolfe, is described on page 201, from Northern Luzon, the only other known species of the genus, *P. carnosa* Hook. f. et Th., extending from Northern India to Yunnan.

Boorsma, W. G. Ueber philippinische Pfeilgifte. (*Bull. l'Inst. Bot. Buitenzorg* 6 (1900) pp. 14–18.)

A consideration of *Lunasia amara* Blanco and *Lophopetalum toxicum* Loher, in connection with the use of the bark as a source of arrow poison.

Ceron, S. Catálogo de las plantas del herbario recolectado por el personal de la suprimida comisión de la flora forestal. (Manila (1892), pp. I–231, plate I.)

A catalogue of a portion of the plants collected in the Philippines by *Vidal*, including those enumerated by the latter in his Revision de plantas vasculares Filipinas (1886), and some collected after the publication of that work. A number of genera and species are credited to the Philippines for the first time and one new species is described, *Calophyllum vidalii F.-Villar*, l. c. 229, with plate, *C. cuneatum* Vidal and *C. rolfei* Vidal being cited as synonyms. It is not entirely clear who is the author of the entire work, but *Ceron's* name, then "Inspector general de Montes" for the Philippines appears on page 5 at the end of the introduction. The enumeration of species is however apparently the work of *Regino García*.

Chevalier, Auguste. Monographie des Myricacées. (Thèses presentées á la faculté des sciences de Paris (1901) pp. 1–257, plates 9, reprint from *Mém. Soc. Sci. Nat. Cherbourg* 32 (1901.)

Three genera, *Gale*, *Comptonia* and *Myrica* are recognized, the latter containing 51 species and many varieties, represented in the Philippines by the endemic *Myrica vidaliana* Rolfe. Other species of the genus have since been found in the archipelago.

Chodat, Robert. Polygalaceae novae vel parum cognitae, V. (*Bull. Herb. Boiss.*, 4 (1906) pp. 233–237.)

Securidaca philippinensis is described as new.

Chodat, Robert. Conspectus systematicus Generis Xanthophylli. (*Bull. Herb. Boiss. XX*, 4 (1906) pp. 254–264.)

Xanthophyllum bractcatum, *X. philippinense* and *X. robustum* are described from Philippine material, the first two endemic, the last extending from the Philippines to Borneo and Malaca.

Chodat, Robert. Monographia Polygalaceaeum. (*Mém. Soc. Phys. et Hist. Nat. Genève* (1903) pp. 1–500, plates 35.)

Of the genus *Polygala* 404 species are recognized, but one *P. warburgii* Chod., Philippines and New Caledonia being credited to the archipelago (*P. telephioides* of Philippine authors, non Willd.). Several other species are however found in the archipelago. *P. roncnosa* Juss., *P. chinensis* L., *P. polifolia* Presl. *P. luzoniensis* Merr., and *P. septemnerria* Merr.

Elmer, A. D. E. Leaflets on Philippine Botany (1906–07) pp. 1–208. Of the above work 9 articles have appeared, as follows:

Article 1, April 8, 1906, Philippine Rubiaceae, by *A. D. E. Elmer*, pp. 1–41. Of this family 149 species representing 42 genera are enumerated, of which several genera are reported from the Philippines for the first time, *Amaracarpus, Chasalia, Coelospermum, Galium, Mussaendiopsis*, and *Tricalysia*, and the following 45 species are described as new: *Amaracarpus longifolius, Argostemma solaniflora, Coelospermum ahernianum, Gardenia whitfordii, G. merrillii, G. elliptica, G. acutifolia, Ixora sparsiflora, I. bibracteata, Lasianthus hispidus, L. copelandi, L. bordeni, L. culionensis, Mussaenda grandiflora, M. benguetensis, Mussaendiopsis multiflora, Nertera dentata, Nauclea vidalii, Oldenlandia apoensis, O. yoderi, O. benguetense, O. banksii, O. ciliata, Ophiorrhiza biflora, Psychotria longipedicellata, P. bataanensis, P. subsessiliflora, P. rubiginosa, P. banahaensis, P. pinnatinerria, P. barnesii, Randia mindorensis, R. samalensis, R. uncaria, R. umbellata, R. fasciculiflora, Sarcocephalus ovatus, Tricalysia tinagaoense, Timonius attenuatus, T. benguetensis, T. quadrasii, T. oboratus, Uncaria philippinensis, Urophyllum sablanense* and *U. bataanense*. Many other species are credited to the Philippines for the first time but without citation of specimens representing them, the inference being that these species are represented in the herbarium of the Bureau of Science. In some genera, *Plectronia, Stylocoryne*, etc., new combinations are made without references to previously described species. Keys are given to the species under each genus, but no keys to the genera. According to the date of issue this work antedates Supplement I to the *Philippine Journal of Science*, on pages 126–137 of which some of the species mentioned above are also published. Careful work will be necessary to correlate these species. No attempt is made to enumerate all the species of the family credited to the archipelago by various authors, and no synonomy is given.

Article 2, April 10, 1906, pp. 1–21 (42–62). A Fascicle of Benguet Figs, by *A. D. E. Elmer*. Twenty-eight species are listed, of which the following are described as new: *Ficus fastigiata, F. irisana, F. cucaudata, F. confusa, F. umbrina, F. longipedunculata* (Merr.) Elm., *F. magnifica, F. rudis arborea, F. subintegra* (Merr.) Elm., *F. repandifolius*, and *F. integrifolia*.

Article 3, April 12, 1906, pp. 63–73. Additional New Species of Rubiaceae, by *A. D. E. Elmer*. The following 14 species are described as new: *Argostemma quadripetiolata, Oldenlandia filifolia, Psychotria subalpina, P. paloense, P. ellipticifolia, Gardenia morindaefolia, Ophiorrhiza pubescens, Ixora meyeri, I. leytensis, Tricalysia purpureum, Urophyllum banahaense, U. lucbanense, Timonius arborea* and *Lasianthus morus*. As with article 1, this paper antedates Supplement I to the *Philippine Journal of Science*, according to the date of issue, where some of the above species are also published, not always however based on the same material.

Article 4, April 15, 1905, pp. 74–77. Pandans of East Leyte, by *A. D. E.*

Elmer. Pandanus radicans Blanco is redescribed, and *P. paloensis* and *P. muricatus* are proposed as new.

Article 5, July 26, 1906, pp. 78–79. A New Polypodium and Two Varieties, by *E. B. Copeland. Polypodium* (*Phymatodes*) *monstrosum* Copel. is described, and the two varieties, *leucophlebium* and *integriore.*

Article 6, August 1, pp. 78 bis–82. New Pandanaceae from Mount Banahao, by *A. D. E. Elmer. Freycinetia monocephala, Pandanus banahaensis* and *P. utilissimus* are described as new.

Article 7, August 16, 1906, pp. 83–186. Manual of the Philippine Compositae, by *A. D. E. Elmer.* In this paper 60 genera and 103 species are credited to the Philippines, including introduced and cultivated species. *Ethulia, Centipeda, Epaltes, Anaphalis, Erechtites,* and *Chrysogonum* are reported from the Philippines for the first time, and the following species are described as new: *Vernonia lenticellata, V. benguetensis* sub *B. Vialis* D. C., *Eupatorium toppingianum, E. sambucifolium, Blumea laxiflora, Gnaphalium oblancifolium, Aster luzonensis, Senecio benguetense, S. confusus, S. rubiginosus, S. mindorensis,* and *Chrysogonum philippinense.* New names appear in *Gynura, G. vidaliana* for *G. purpurascens* Vid., non DC., and *G. latifolium* (*Crassocephalum latifolium* Moore). An attempt was made to account for all the species credited to the Philippines by various authors, important synonomy is given, keys to the tribes, genera and species, and short descriptions of all the genera and species admitted.

Article 8, December 10, 1906, pp. 187–205. A Fascicle of East Leyte Figs, by *A. D. E. Elmer.* Twenty-six species of *Ficus* are numerated, of which the following are described as new: *Ficus johnsoni, F. benguetensis leytensis, F. fiskei, F. guyeri, F. carpenteriana, F. satterthwaitei, F. cassidyana, F. rufi-caulis paloense* and *F. latsoni.*

Article 9, April 11, 1907, 207–208. A new Trigonostemum, by *Otto Stapf. Trigonostemum philippinense* Stapf is described, the genus being new to the Philippines.

Forbes, Francis Blackwell, and **Hemsley, William Botting.** An Enumeration of all the Plants known from China Proper, Formosa, Hainan, Corea and the Luchu Archipelago, and the Island of Hongkong, together with their Distribution and Synonomy. (*Journ. Linn. Soc. Bot.* **23** 1886–1888) pp. 1–521, plates 14: **24** (1889–1899) pp. 1–592, plates 10: **36** (1903–1905) pp. 1–686, with an Historical Note, Index, and List of Genera and Species discovered in China since the publication of the various parts of the "Enumeration.")

In the above work 8,271 species, of which 4,230 are endemic or not known to occur outside of the Chinese Empire are enumerated, but Sir *William T. Thistleton-Dyer* considers that the most moderate estimate can not put the whole flora as containing less than 12,000 species. Very many of the species enumerated extend to the Philippines, especially to northern Luzon, and the work is quite essential to the student of the Philippine flora.

Giesenhagen, K. Die Farngattung Niphobolus (1901, pp. 1–223, figures 20).

Fifty species are recognized, of which the following are credited to the Philippines: *Niphobolus splendens* (Hook.) Giesenh., endemic, *N. sticticus* Kze., British India and Ceylon to south China and Luzon, *N. nummularifolius* J. Sm., British India to Malaya, *N. lanuginosus* Giesenh., endemic, *N. samarensis* Giesenh., endemic, and *N. adnascens* Klf., south China to Malaya and Samoa. Several other species have since been found in the archipelago.

Gray, Asa. Characters of New or Obscure Species of Plants of the Monopetalous Orders in the Collection of the United States South Pacific Exploring Expedition under Captain Charles Wilkes, U. S. N., with Occasional Remarks, etc. (*Proc. Am. Acad.* 5 (1862.)

On page 324 a single species from the Philippines is described, *Gaultheria* (*Diplycosia*) *luzonica* = *Diplycosia luzonica* (A. Gray) Merr.

Harms, H. Anomopanax Harms, Eine im Herbar des Mus. Bot. Hort. Bogoriensis entdeckte neue Araliaceen-Gattung. (*Ann. Jard. Bot. Buitenzorg* II. 4 (1904) pp. 13–16.)

The new araliaceous genus *Anomopanax* is described, with three species, two, *A. celebicus* and *A. warburgii* from Celebes, the third, *A. philippinensis*, from Mindanao.

Hasskarl, J. K. Ueber einige neue Pflanzen der Philippinen aus der Cumingschen Sammlung. (*Flora*, 38 (1865) pp. 401–403.)

Three species are described: *Anredera cumingii* Hassk. (= *A. scandens* Moq.), *Symphorema glabrum* Hassk. (= *S. luzonicum* (Blanco) F.-Vill.) and *Tribulus macranthus* Hassk. (= *T. cistoides* L.).

Hemsley, W. Botting. Revision of the Synonomy of the Species of Aleurites. (*Kew Bull.* (1906) pp. 119–121.)

Four species of *Aleurites* are considered in connection with a preceding article on the source of Chinese wood-oil, *A. cordata* R. Br., Japan to Formosa and south China, *A. fordii* Hemsl., China, *A. triloba* Forst. (*A. moluccana* (L.) Willd.) Malaya and Polynesia and naturalized in many other tropical countries, and *A. trisperma* Blanco. The last two are common and widely distributed in the Philippines, the latter being endemic.

Laguna y Villanueva, Maximo. Apuntes sobre un nuevo roble (Q. jordanae) de la flora de Filipinas (1875) pp. 1–8, with plate.

In this work, all the species of *Quercus* then known from the Philippines are enumerated, and on page 7 *Quercus jordanae* is described, with a plate showing a branch and fruit, natural size.

Massee, George. Revision of the Genus Hemileia Berk. (*Kew Bull.* (1906) pp. 35–42, with one plate.)

Four species are recognized, of which one, *H. vastatrix* Berk. & Broome, the cause of the devastating coffee-leaf disease, is credited to the Philippines, on leaves of *Coffea arabica* L., and *C. liberica* Hiern. (It is abundant on the leaves of the former throughout the Philippines, and has practically killed the coffee industry in the Archipelago.)

Maxon, William R. A New Name for Kaulfussia Blume, a Genus of Marattaceous Ferns. (*Proc. Biol. Soc. Wash.* 18 (1905) pp. 239–240.)

The new generic name *Christensenia* is proposed, *Kaulfussia* Blume being invalidated by earlier use of the same name by *Dennstedt* and *Nees* in the *Polygalacea* and *Compositæ*. A single species is recognized, *Christensenia aesculifolia* (Blume) Maxon. The genus is represented in the Philippines by a distinct species, *C. cumingiana* Christ.

Moore, Spencer le M. Alabastra Diversa, Part XII. (*Journ. Bot.* 43 (1905) pp. 137–150.)

Among various species described from different parts of the World are three from the Philippines, *Aster philippinensis* from northern Luzon, and *Pogostemon philippinensis* from Luzon and Panay, and *Crassocephalum latifolium* from Negros.

Müller, J. Nouvelle espèce de Loranthus (L. mirabilis Van Huerck at Muell. Arg.) provenant des îles Philippines. (*Verhandl. Schweiz. Naturff. Gesellsch.* **55** (1872), pp. 47–48.)

A single species of *Loranthus* described, based on *Cuming's* No. 1966 from the Philippines, the species having been overlooked by the authors of Index Kewensis and by *Van Tieghem*. (See *Merrill* in *Philip. Journ. Sci.* **1** (1906) Suppl. 187.)

Rendle, A. B. New Philippine Plants. (*Journ. Bot.* **34** (1896) pp. 355–358.)

A short paper based on collections made by *John Whitehead* in the highlands on northern Luzon and in Mindoro, Mount "Dulangau" (correctly Dulangan), a spur of Mount Halcon. *Podocarpus faleiformis* Parl., *Phyllocladus hypophylla* Hook. f., *Daerydium elatum* Wall., *Cephalotaxus mannii* Hook. f., *Burmannia longifolia* Becc., *Platyclinis latifolia* Hemsl., *Litsaea villosa* Blume, *Gaultheria borneensis* Stapf, *Rhododendron cuneifolium* Stapf and *Strobilanthes penstemonoides* T. Andr., are reported from the Philippines for the first time, and *Vaccinium mindorense*, *Rhododendron lussonicnse*, *R. whiteheadi*, *R. subsessile*, *Microstylis mindorensis* and *Zeuxine whiteheadi* are described as new. Of the above *Cephalotaxus mannii* Hook. f., can be excluded, the identification having been made from sterile material, and Mr. *Rendle* informs us that he now considers the plant to be *Taxus baccatus* subsp. *wallichiana* (Zucc.) Pilger.

Schlechter, R. Neue Orchidaceen der flora des Monsun-gebietes. (*Bull. Herb. Boiss.* II. **6** (1906) pp. 295–310.)

Among other species described from the monsoon region is *Platyclinis microchila* Schltr., p. 302 "Kultiviert in einem Garten in Sandakan, in Britisch Borneo; soll von Manilla importiert sein."

Stapf, Otto. The Oil-grasss of India and Ceylon. (*Kew Bull.* (1906) pp. 297–363, plates 1.)

An exhaustive account of the grasses yielding the products known as Citronella oil, Lemon-grass oil, Vetiver, etc., with a consideration of the species including full synonomy, at least two of the species considered extending to the Philippines.

Stein, B. Leptospermum (Glaphyria) annae Stein. (*Gartenflora* **34** (1885) pp. 66–68, plate 1184.)

The above species described and figured, the type from Mount Apo, Mindanao.

Stein, B. Rhododendron kochii Stein. (*Gartenflora* **34** (1885) pp. 193–195, plate 1195.)

The above species described and figured, the type from Mount Apo, Mindanao.

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INDEX TO PHILIPPINE BOTANICAL LITERATURE, III.

By Elmer D. Merrill.

(*From the botanical section, Biological Laboratory, Bureau of Science, Manila, P. I.*)

Berkeley, M. J. Contributions to the Botany of H. M. S. Challenger, XXXVIII, Enumeration of the Fungi collected during the Expedition of H. M. S. Challenger, 1874–75. (*Journ Linn. Soc. Bot.* 16 (1878) pp. 38–54.)

On pages 45 to 48, thirty-five species and varieties of Philippine fungi are enumerated from "Camiguin, Malanipa and Malamon (Philippines)." Several species of fungi are described as new.

Britton, N. L. Botanical Exploration of the Philippines. (*Journ. N. Y. Bot. Gard.* 5 (1904) pp. 40–41.)

A short account of R. S. Williams' collecting trip in the Philippines.

Conard, Henry S. The Waterlilies, a Monograph of the Genus Nymphaea. (*Carnegie Inst. Publ.* 4 (1905) pp. 1–279.)

In the genus *Nymphaea* 34 species are recognized, two of which are credited to the Philippines, *Nymphaea pubescens* Willd. (*N. lotus* Linn., in part and Philippine authors), British India to the Philippines, Java and Australia, and *N. stellata* Willd., south and southeast Asia, the Philippines, Java and Borneo.

Engler, A. Beiträge zur Kenntniss der Araceae, X. (*Engl. Bot. Jahrb.* 3 (1906) pp. 110–143.)

The following Philippine species are described: *Rhaphidophora perkinsiae, R. copelandii, R. merrillii, R. warburgii; Aglaonema densinervium, A. latifolium*, and *Alocasia culionensis*, while *Epipremnum mirable* Schott., is credited to the Archipelago.

Haviland, G. D. A Revision of the Tribe Naucleeae (Nat. Ord. Rubiaceae). (*Journ. Linn. Soc. Bot.* 33 (1897) pp. 1–94, plates 4.)

Seven genera are recognized of which five are represented in the Philippines by the following species: *Sarcocephalus cordatus* Miq., India to Australia, *S. glaberrimus* Miq., Celebes and Philippines, *S. junghuhnii* Miq., Malaya; *Adina multifolia* n. sp., endemic; *Nauclea gracilis* Vid., endemic, *N. philippinensis* (Vid.) Hav., endemic, *N. strigosa* Korth., Borneo, Philippines, *N. nitida* n. sp., endemic, *N. media* n. sp., endemic, *N. forsterii* Seem., Philippines to Samoa, *N. purpurascens* Korth., Java, Borneo, Celebes, *N. bartlingii* DC., endemic, *N. reticulata* n. sp., endemic; *Mitragyna speciosa* Korth., Borneo and New Guinea, *M. diversifolia* (Wall.) Hav., India to Malaya; *Uncaria pedicellata* Roxb., India to New Guinea, *U. insignis* DC., Borneo, *U. velutina* Hav., endemic, *U. setiloba* Benth., *Amboina* and *U. hookeri* Vid., Borneo.

Hose, Bishop. A Catalogue of the Ferns of Borneo and some of the adjacent islands which have been recorded up to the present time. (*Journ. Straits Branch R. A. Soc.* **32** (1899) pp. 31–84.)

In this paper 430 species are enumerated, many of which extend to the Philippines.

Loher, A. Lophopetalum toxicum Loher. (*Icon. Bogor.* **1** (1897) pp. 56–67, plate 16.)

Lophopetalum toxicum, from Luzon, figured and described, with a note regarding the use of its bark by the Negritos as a source of arrow poison.

Massee, George. Fungi Exotici, II, Philippine Islands. (*Kew Bull.* (1899) p. 176.)

Nine species of fungi are recorded from Loher's Philippine collections, of which one, *Favolus purpureus*, is described as new.

Masters, Maxwell T. A General View of the Genus Pinus. (*Journ. Linn. Soc. Bot.* **35** (1904) pp. 560–659, plates 4.)

In this paper 73 species are considered, two of which are Philippine, *Pinus insularis* Endl., endemic, and *P. merkusii* Jungh. et DeVr., Luzon, Sumatra, Borneo and (?) the Shan States.

Pearson, H. H. W. On some Species of Dischidia with Double Pitchers. (*Journ. Linn. Soc. Bot.* **35** (1902) pp. 375–390 with one plate.)

On page 377 *Dischidia pectenoides* Pearson, is described from Luzon.

Rehder, Alfred. Synopsis of the Genus Lonicera. (*Rept. Mo. Bot. Gard.* **14** (1903) pp. 27–232, plates 20.)

Of this genus, 150 species, with many varieties and forms, are recognized, none of which, however, occur in the Philippines. Since the publication of the work, however, one or two species of *Lonicera* have been found in northern Luzon.

Ridley, H. N. New or little known Malayan Plants. (*Journ. Straits Branch R. A. Soc.* **44** (1905) pp. 189–211.)

Many species are described from different parts of the Malayan Peninsula, Borneo, etc., including one from the Philippines, *Calamus lindeni* Hort., page 200, based on a specimen from the Philippines cultivated in the Botanic Gardens, Singapore. On page 199 *Joinvillea malayana* is also described from material collected in Perak, Selangor and Sarawak, also being found in Palawan. (See Merrill in *Philip. Journ. Sci.* **1** (1906) Suppl. 181.) In the same work two other papers by the same author are published, both bearing more or less on Philippine botany, "The Gesneraceæ of the Malay Peninsula" **43** (1905) pp. 1–92, and "The Aroids of Borneo" **44** (1905) pp. 169–188.

Ridley, H. N. The Flora of Singapore. (*Journ. Straits Branch R. A. Soc.* **33** (1900) pp. 27–196.)

An enumeration of all the flowering plants and vascular cryptogams known to occur on the Island of Singapore, over 1,900 species being recorded from an area of a little over 200 square miles. Many of the species enumerated extend to the Philippines.

Ridley, H. N. Grasses and Sedges of Borneo. (*Journ. Straits Branch R. A. Soc.* **46** (1906) pp. 215–228.)

An enumeration of the *Cyperaceæ* and *Gramineæ* in recent Bornean collections, 87 species of grasses and 99 species of sedges being enumerated, both numbers much smaller than in the corresponding groups in the Philippines. Many of the species enumerated extend to the Philippines.

Ridley, H. N. Scitamineæ of Borneo. (*Journ. Straits Branch R. A. Soc.* 46 (1906) pp. 229–246.)

Including *Zingiberaceæ*, *Marantaceæ*, *Musaceæ* and *Lowiaceæ* 86 species are enumerated, many described as new and a few extending to the Philippines.

Ridley, H. N. The Scitamineæ of the Malay Peninsula. (*Journ. Straits Branch R. A. Soc.* 32 (1899) pp. 85–184.)

A paper of the same scope as the same author's Scitamineæ of Borneo, above, about 140 species being enumerated, including many new ones and a few that extend to the Philippines.

Skan, S. A. Skimmia japonica Thunb. (*Curtess' Bot. Mag.* IV. 1 (1905) Tab. 8038.)

This Japanese species figured and described; recently found also in northern Luzon.

Sydow, H. et P. Novae Fungorum species III. (*Ann. Myc.* 4 (1906) pp. 343–345.)

Among species described from various parts of the world is one from the Philippines, *Auerswaldia copelandi*, on leaves of *Caryota*.

Sydow, H. et P. Neue und kritische Uredineen IV. (*Ann. Myc.* 4 (1906) pp. 28–32.)

The following new species are described from Philippine material: *Uromyces hewittæ*, *Uredo davaoensis*, *U. hygrophilæ*, *U. philippinensis*, and *U. wedeliæ-bifloræ*.

Tavera, T. H. Pardo de. The Medicinal Plants of the Philippines (1901) pp. 1–269+XVI. English translation by Jerome B. Thomas.

A compilation of notes regarding the medicinal uses of various native plants, arranged according to Bentham and Hooker's Genera Plantarum, with descriptions of the species considered. The original work "Plantas medicinales de Filipinas" was published in Manila in 1892.

Underwood, L. M. The genus Alcicornium of Gaudichaud. (*Bull. Torr. Bot. Club.* 32 (1905) pp. 567–596.)

The generic name *Alcicornium* Gaudich., is accepted for *Platycerium*, and 13 species are recognized, of which two are found in the Philippines, *Alcicornium coronarium* (Müller) Underw., and *A. grande* (J. Sm.) Underw.

Wright, C. H. Pinanga maculata Porte. (*Curtiss' Bot. Mag.* IV. 1 (1905) Tab. 8011.)

This previously imperfectly known Philippine species figured and described.

Reprinted from the Philippine Journal of Science
Vol. III, Sec. C, No. 2, Botany.

INDEX TO PHILIPPINE BOTANICAL LITERATURE, IV.

By Elmer D. Merrill.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

Ames, Oakes. Orchidaceae: Illustrations and Studies of the Family Orchidaceae, issuing from the Ames Botanical Laboratory, North Easton, Massachusetts, fascicle 1 (1905) pp. 1–156; fascicle 2 (1908) pp. 1–288.

Of fascicle one, pages 1 to 13 and plates 1 to 3 treat of Philippine orchids, while pages 63 to 107 are occupied by a descriptive list of orchidaceous plants collected in the Philippines by botanists of the United States Government, about 60 species being considered, many of them described for the first time. Fascicle 2, pages 1 to 6 and plates 17 to 19 treat of Philippine orchids, and on plates 21 to 24 eighteen species of Philippine *Dendrochilum* are figured. The greater part of this fascicle is taken up by a paper entitled "Studies in the Orchid Flora of the Philippines," pages 17 to 257, with many figures, about 235 species being considered. This work is by far the most important one that has ever been issued on the Philippine representatives of this family.

Baker, J. G. Handbook of the Fern-Allies: A Synopsis of the Genera and Species of the Natural Orders Equisetaceae, Lycopodiaceae, Selaginellaceae, Rhizocarpeae. (1887) pp. 1–159.

In this work an attempt is made to describe all the species then known of the above orders, the following species being credited to the Philippines: *Lycopodium carinatum* Desv., *L. squarrosum* Forst., *L. filiforme* Roxb., *L. casuarinoides* Spring; *Selaginella auriculata* Spring, *S. commersoniana* Spring, *S. plumosa* Baker, *S. barbata* Spring, *S. cumingiana* Spring, *S. philippina* Spring, *S. involvens* Spring, *S. wallichii* Spring, *S. canaliculata* Spring, *S. willdenovii* Baker, *S. caulescens* Spring, *S. pennula* Spring, *S. pteryphyllos* Spring, *S. intertexta* Spring, *S. myosuroides* Spring; *Marsilea minuta* Linn., and by inference other species of *Lycopodium* and *Selaginella*, also *Psilotum* and *Azolla*.

Bailey, J. W., & Harvey, W. H. Algae in Rept. Wilkes U. S. Exploring Expedition 17 (1862) 155–192.

Six species of algae are recorded from the Philippines, one of which is described as new. Following the paper on algae, the *Diatomaceae* and other microscopic forms are enumerated. For *Diatomaceae* see Harvey & Bailey below.

Benjamin, Ludwig. Neue Gattungen und Arten der Utricularieen nebst einer neuen Entheilung der Gattung Utricularia. (*Linnaea* 20 (1847) pp. 299–320.)

Three species are described from Cuming's Philippine distribution, *Utricularia brevicaulis*, *U. rosulata*, and *U. heterosepala*. The first however was based on *Cuming 2289*, which was collected in Malacca, not in the Philippines.

Bescherelle, Émile. Essai sur le genre Calymperes. (*Ann. Sci. Nat. Bot.* VIII. **1** (1895) pp. 247–308.)

A monograph of the genus *Calymperes* (*Musci*) containing the descriptions of the following Philippine species: *C. aeruginosum* Hampe, *C. mammosum* Besch., *C. scalare Besch.*, and *C. setifolium* Besch., the only ones of the genus known from the Archipelago.

Brackenridge, William D. United States Exploring Expedition * * * Botany, Cryptogamia, Filices including Lycopodiaceae and Hydropterides. **16** (1854) pp. VIII+357, quarto, with folio atlas of 46 plates.

An enumeration of the vascular cryptogams collected by the Wilkes United States Exploring Expedition, seventy-seven species being enumerated from the Philippines, fifteen of which are described as new. (*See* Merrill, *This Journal*, p. 73.)

Briquet, John. Fragmenta monographiae Labiatarum, fasc. 5. (*Ann. Conserv. Jard. Bot. Genèv.* **2** (1898) pp. 101–251.)

Coleus igolotorum and *C. gaudichaudii* are described from Luzon, and a common *Hyptis* in the Philippines is shown to be *H. lanceolata* Poir., not *H. capitata*, as identified by most authors.

Briquet, John. Observations sur quelques Flacourtiacées de l'herbier Delessert. (*Ann. Conserv. Jard. Bot. Genèv.* **2** (1898) pp. 41–78.)

A treatment of the Asiatic species of *Scolopia*, including the Philippine forms.

Chamisso, A. de & Schlechtendal, D. de. De plantis in expeditione speculatoria Romanzoffiana observatis rationem dicunt. (*Linnaea* **1** (1826) pp. 1–73, and through all volumes up to **10** (1835–36) pp. 582–603.)

In this enumeration, the above authors, with the assistance of various specialists, consider the plants collected by the Romanzoff expedition, which was in the Philippines, at Cavite, from December 17, 1817 to January 29, 1818, collecting being done in the vicinity of Cavite and Manila and on a trip to Taal Volcano and return. About one hundred species are enumerated from Luzon, of which the following were described as new: *Rubus tagallus* C. & S., *Buddleia neemda* Buch. var. *philippensis* C. & S. (= *B. asiatica* Lour.), *Stemodia philippensis* C. & S. (= *Lindenbergia philippensis* Benth.), *Loranthus philippensis* C. et S., *Psychotria philippensis C. & S.*, *Coffea luçoniensis* C. & S. (= *Psychotria luçoniensis* F.-Vill.; *P. tacpo* Rolfe), *Hedyotis angustifolia* C. & S., *Tournefourtia urvilleana* Cham. (= *T. sarmentosa* Lam.), *Zanthoxylum lamarckianum* Cham. (= *Evodia trifolia* DC.), *Coleus acuminatus* Benth., *Conyza manillensis* Less. (= *Blumea manillensis* DC.), *Melampodium manillense* Less. (= *M. sericeum* Lag.), *Crossostephium artemesioides* Less., *Clerodendron intermedium* Cham., *Gmelina philippensis* Cham., *Aristolochia tagala* Cham., *Zornia nuda* Vog. (= *Z. diphylla* Pers.) and *Desmodium chamissonis* Vog. Most of the specimens on which the above species were based were examined by the author in the Berlin Herbarium in January of the present year.

Clusius, Carolus (Charles de l'Ecluse). Rariorum plantarum historiae (1601).

On pages 202 and 203 of part six of the above work, *Anisum philippinarum insularum* is figured and described from material secured in Manila by Thomas Candi (Cavendish). It is the star-anise (*Illicium anisatum*) of China, and does not grow in the Philippines, being imported for medicinal purposes. The reference is of interest as being the first citation of the Philippines in botanical literature.

Curtis, M. A., & Berkeley, M. J. Fungi in Rept. Wilkes U. S. Exploring Expedition Vol. 17 (1862) pp. 195–202.

A single species is mentioned from the Philippines, *Trametes australis* Fries var., from the Mangsee (Mangsi) Islands.

Duby, J. E. Diagnosis Muscorum novorum quos die 7 Dec. 1876 Societati Physicae et Historiae naturalis Genevensis cum iconibus et descriptionibus communicavit. (*Flora* 35 (1877) pp. 73–77; 90–95.)

Contains descriptions of three species of Philippine mosses collected by Padre Llanos, *Orthotrichum coralloides*, *Hypnum llanosii*, and *H. philippinense*. The same paper is reprinted in Mém. Soc. Phys. Genève 26 (1879) pp. 1–14, with the addition of plates, each species being figured.

Gagnepain, F. Revision des Genres Mantisia et Globba. (*Bull. Soc. Bot. France* 48 (1901) pp. 201–216.)

Four species of *Globba* are credited to the Philippines, *G. parviflora* Presl, *G. uliginosa* Miq., *G. ustulata*, and *G. barthei*, the last two being described as new. *G. uliginosa*, however, must be excluded as the Cuming plant cited was from Malacca, not from the Philippines.

Geheeb, A. Bryologische Fragmente III. (*Flora* 44 (1886) pp. 340–353.)

On pages 350 to 353, under the heading "Sulu-Moose," 16 species from the collections of F. W. Burbidge, 1877–78, are enumerated. Most of the species are from Sulu, but some are from Borneo.

Gray, Asa. Botany, Phanerogamia, United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842 under the command of Charles Wilkes, U. S. N. Vol. 1 (1854) pp. 1–777, with folio atlas of 100 plates. (Vol. 15 of the whole work.)

The Wilkes Expedition was in the Philippines for one month, January 13 to February 12, in the year 1842, about 500 species of plants being collected in the Archipelago in that time. In Dr. Gray's work 104 species from the Philippines are considered, of which 15 are described as new. The volume under consideration treats of the families from *Ranunculaceae* to *Loranthaceae*, inclusive, no more having been printed. The ferns collected on the expedition were considered by Brackenridge in volume 16 of the same work. (See Brackenridge above, and Merrill, The Philippine Plants collected by the Wilkes, U. S. Exploring Expedition, *This Journal*, 3 *Botany*, (1908) 73.)

Harvey, W. H., & Bailey, J. W. New species of Diatomaceae, collected by the United States Exploring Expedition under the command of Captain Wilkes, U. S. N. (*Proc. Acad. Phila.* 6 (1854) pp. 430–431.)

Contains the descriptions of the few species from the Philippines determined by the authors as new. Reprinted in *Quart. Journ. Microscop. Sci.* 3 (1855) 93–94, and in vol. 17, Wilkes Expedition reports (1862) pp. 178–180, in the latter place with the addition of the previously described species of other authors discovered in the collection, 26 in all.

Hemsley, W. Botting. On an Obscure Species of Triumfetta. (*Journ. Bot.* 28 (1890) pp. 1–3, *pl. 1.*)

The differences between *Triumfetta procumbens* Forst., and *T. subpalmata* Soland., are indicated and the latter is described for the first time, the form reported by the author previously from the Philippines under the name of *T. procumbens* Forst.[1]

[1] *Govt. Lab. Publ.* 6 (1904) 17.

Henry, A. The Genus Astilbe. (*Gard. Chron.* III. **32** (1902) pp. 95, 154–156, 171.)

Eleven species are considered, *Astilbe philippinensis* being described from Luzon, as new, the sole representative of the genus in the Philippines, previously confounded with *A. rivularis* Ham.

Jussieu, A. de. Monographie des Malpighiacées. (*Arch. Mus. Paris* **3** (1843) pp. 5–152; 255–616, reprint (1845) pp. 1–368, plates 23.)

Three species are described from Cuming's Philippine collections, *Ryssopteris microstemma* Juss., *R. dealbata* Juss., and *R. cumingiana* Juss.

Kränzlin, Fr. Cyrtandraceae Malayanae insulares novae. (*Journ. Linn. Soc. Bot.* **37** (1906) pp. 275–285.)

In this paper the following Philippines species are described: *Cyrtandra hypochrysea*, *C. macrodiscus*, *C. micrantha*, *C. benguetiana*, and *C. ilicifolia*, all from Luzon.

Lindberg, S. O. Uppställning af familjen Funariaceae. (*Öefv. Vet.-Akad. Förhandl.* **21** (1864) pp. 589–608.)

In an appendix to the above paper three species of Philippine mosses are described from Cuming's collection. *Spiridens longifolius*, *Pterobryum elatum*, and *Trachypus rugosus*.

Loesener, Th. Monographia Aquifoliacearum. (*Nova Acta Acad. Caes. Leopold.-Carol. Nat. Cur.* **78** (1901) pp. VIII+570, *plates 15.*)

Three genera are recognized, *Ilex* with 271 species, *Nemopanthes* with 1 species, and *Phelline* with 10 species, only the former represented in the Philippines and by the following forms: *Ilex crenata* Thunb., forma *luzonica* (Rolfe) Loes., *I cymosa* Blume (*I. philippinensis* Rolfe), *I. cymosa* var. *cumingiana* (Rolfe) Loes., *I. laurifolia* Zipp., Amboina and ? Philippines, and *I. triflora* Bl., var. *lobbiana* (Rolfe) Loes. *Ilex fletcheri* Merr., has since been described from Mindoro.

Maximowicz, C. J. Revisio Hydrangearum Asiae Orientalis. (*Mém. Acad. Imp. Sci. Pétersb.* VII. **10** (1867) pp. 48, *plates 3.*)

One Philippine species, *Hydrangea lobbii* Max., is described, but erroneously ascribed to Java, the type, *Lobb 446*, having been collected in Luzon, not in Java.

Montagne, C. Plantas cellulares quas in insulis Philippinensibus a cl. Cuming collectas recensuit observationibus non nullis descriptionibusque illustravit. (*Hook. Lond. Journ. Bot.* **3** (1844) pp. 658–662; **4** (1845) pp. 3–11.)

In this paper are enumerated 30 species of Philippine algae of which 4 were described as new; 23 species of lichens, one genus and three species described for the first time; 8 species of *Hepaticae*, one being new; and 14 species of mosses, two being new.

Moore, Albert Hanford. Revision of the Genus Spilanthes. (*Proc. Amer. Acad. Arts and Sci.* **42** (1907) pp. 521–569.)

Of this genus sixty-three species varieties and forms are recognized, of which two are found in the Philippines, *Spilanthes acmella* (L.) Murr., India to southern China and Australia, and *S. grandiflora* Turcz., Philippines and Australia. One Philippine species, *S. orata* Merr., is not considered. The specimen of Cuming's collection credited to the Philippines under *S. acmella* is from Malacca, not from the Philippines.

Müller, Carl. Musci Indici novi adjectis nonnullis aliis exoticis. (*Linnaea* 37 (1872) pp. 163–182.)

Contains the diagnoses of eight species of Philippine mosses, mostly based on material collected by Gustav Wallis in northern Luzon in 1870.

Müller, Carl. Novitates Bryotheceae Müllerianae. (*Linnaea* 38 (1874) pp. 545–572.)

Under "1, Musci Philippinenses," twenty-six species of Philippine mosses are described from the collections of Wallis, Semper and Cuming.

Müller, C. Addimenta ad Synopsin Muscorum nova. (*Bot. Zeit.* 20 (1862) p. 393.)

Contains the descriptions of two species of mosses from the Philippines, *Hypnum lasiomitrium* and *H. fusco-mucronatum*.

Müller, C. Supplementum novum ad Synopsin muscorum. (*Bot. Zeit.* 17 (1859) pp. 246–248.)

Contains the description of *Pilotrichum longifrons* from the Philippines.

Nees ab Esenbach. Gramineae herbarii Lindleyani. (*Hook. Journ. Bot. and Kew Gard. Miscel.* 2 (1850) pp. 97–105.)

About 77 species of grasses are enumerated from the Philippine collections of Hugh Cuming, eleven being described as new. This paper was not available in Manila at the time the author prepared his Enumeration of Philippine Gramineae,[2] and as a consequence a few names that appear in the paper do not occur in the enumeration.

Niedenzu, F. Zur Kenntnis der Gattung Crypteronia Blume. (*Engl. Bot. Jahrb.* 15 (1892) pp. 161–179.)

Five species are recognized, three of which are found in the Philippines, *C. leptostachys* Planch., *C. cumingii* Planch., and *C. paniculata* Blume, the first two being endemic.

Palacky, J. Uebersicht der von Miquel in der Flora Indiae batavae bestimmten Cuming'schen Philippinen-Pflanzen. (*Flora* 43 (1860) pp. 446–448.)

A list of about 225 species compiled from Miquel's Florae Indiae Batavae, being the plants of Cuming's Philippine collection mentioned by Miquel in that work.

Paris, E. G. Index Bryologicus sive enumeratio muscorum hucusque cognitorum adjunctis synonymia distributioneque geographica locupletissimis. (1894) pp. VI+1379 (*Act. Soc. Linn. Burd.*)

An index to the species of mosses published up to 1894, alphabetically arranged by genera and species, with known synonyms and geographical distribution of each species. About 75 species are credited to the Philippines.

Paris, E. G. Index Bryologicus . . . . . supplementum primum (1900) pp. 1–234 (*Mém. Herb. Boiss.*).

Supplementary to the preceding, about 25 additional species credited to the Philippines.

Pickering, Charles. The Geographical distribution of Animals and Plants, part 2 (1876) pp. 1–524.

The author was a member of the Wilkes United States Exploring Expedition, and pages 491 to 524 of the above work deal with the Philippines. The expedition was in Philippine waters from January 13, 1842 to February 12, of the same year, stops being made and collecting done at Manila, whence a

[2] *This Journal*, 1 (1906) *Suppl.* 307–392.

trip was made inland to Laguna de Bay to Santa Cruz, Majayjay, Mount Banajao, and Los Baños; later visiting Caldera, Mindanao, Jolo and Marongas Islet, and the Mangsee Islands. About 500 species of plants are enumerated from the Philippines, including ferns, but for most part with identifications to the genus or family only. The book ends abruptly at page 524 in the list of Mangsee (Mangsi) plants, and apparently no more was published. Some of the specimens mentioned are not to be found in the United States National Herbarium, the Gray Herbarium nor in the Herbarium of Columbia University. (See Merrill, the Philippine Plants collected by the Wilkes United States Exploring Expedition, *This Journal, Botany*, 3 (1908) 73.)

Planchon, J. E. Prodromus monographiae ordinis Connaraceārum. (*Linnaea* 23 (1850) pp. 409–442.)

Five species are described from the Philippines, all based on material collected by Cuming; *Rourea multiflora*, *R. heterophylla*, *Connarus neurocalyx*, *C. polyanthus*, and *C. obtusifolius*.

Regel, E. Cycas riuminiana Porte. (*Gartenflora* 12 (1863) pp. 16–17.)

The above Philippine species is figured and described.

Robinson, C. B. Some Features of the Mountain Flora of the Philippines. (*Journ. N. Y. Bot. Gard.* 8 (1907) pp. 113–117.)

A general discussion of the highland flora of the Philippines and some of its affinities, the following northern types being credited to Luzon for the first time, *Boenninghausenia albiflora* Reichb. f., *Thesium psilotoides* Hance, *Anaphalis adnata* DC., and *A. contorta* Hook. f.

Robinson, C. B. Ipomoea triloba L. in the Philippines. (*Torreya* 7 (1897) pp. 78–80.)

The above Linnean species, a native of tropical America is credited to the Philippines as an introduced plant, and to it is reduced *Ipomoea blancoi* Choisy, based on *Convolvulus dentatus* Blanco, non Vahl. Distribution, synonymy and citation of specimens are given.

Rolfe, R. A. Donax and Schumannianthus. (*Journ. Bot.* 45 (1907) pp. 242–244.)

Three species of *Donax* and two of *Schumannianthus* are considered and full synonymy is given, one species only extending to the Philippines, *Donax cannaeformis* (Forst. f.) Rolfe, to which must be referred *Maranta arundinacea* Blanco, non Linn., *M. dichotoma* Naves, non Wall., *Clinogyne grandis* Vidal, and numerous Philippine specimens referred to *Donax arundastrum* Lour., which species was erroneously interpreted by Schumann, and does not extend to the Philippines.

Schmidle, W. Einige neue Algen aus Java und den Philippinen (gesammelt von A. Usteri, Zürich). (*Hedwigia* 43 (1904) pp. 414–415.)

Four species are described, one from Java, one from Labuan, and the following from the Philippines, *Phormidium usterii* and *Myxobactron usterianum*. The same species appear again with short descriptions, the latter with a figure, in Usteri *Beiträge Kennt. Philip. und ihrer Vegetation* (1905) pp. 136–139, several other species of Philippine *Algae* being also enumerated in the latter place.

Schulz, O. E. Erythroxylaceae. (*Das Pflanzenreich* 29 (1907) pp. 1–176.)

In this monograph of the family two genera are recognized, *Erythroxylum* P. Br., and *Aneulophus* Benth., the former with 193 species, widely distributed in the tropics of the world, and the latter monotypic and African. *Erythroxylum* is represented in the Philippines by a single species, *E. cuneatum* (Wall.) Kurz (*E. burmanicum* Griff.), extending from British India to the Malayan Peninsula, Sumatra, Java, and Luzon.

Seemann, Berthold. Revision of the Natural Order Hederaceae, being a Reprint with Numerous Additions and Corrections of a series of Papers Published in the "Journal of Botany" British and Foreign. (1868) pp. 1–107, plates 7.

Heptapleurum insularum and *H. cumingii* are described from the Philippines and three or four other species are mentioned from the Archipelago. *Nothopanax cumingii* Seem., *Polyscias nodosa* Seem., *Aralia hypoleuca* Presl, and *Osmoxylon cumingii* Seem., the latter being a nomen nudum and a synonym of *Boerlagiodendron trilobatum* Merr. (*Cuming 754.*)

Spring, A. Monographie de la famille des Lycopodiacées. (*Mém. Acad. Brux.* 15 (1842) pp. 1–110; 24 (1850) pp. 1–358.)

Of *Lycopodium* 101 species are recognized and of *Selaginella* 209 species, the following being credited to the Philippines: *Lycopodium ulicifolium* Vent., *L. laxum* Presl, *L. phlegmaria* var. *longifolium* Spring, and *L. cernuum* L.; *Selaginella involvens* Spring, *S. tamariscina* Spring, *S. philippina* Spring, *S. auriculata* Spring, *S. commersoniana* Spring, *S. cupressina* Spring, *S. cumingiana* Spring, *S. laevigata* Spring, *S. pouzolziana* Spring, *S. wallichii* Spring, *S. caulescens* Spring, *S. pennula* Spring, *S. presliana* Spring, *S. flabellata* Spring, *S. geniculata* Spring, *S. myosuroides* Spring, *S. intertexta* Spring, *S. belangeri* Spring, *S. aristata* Spring, *Psilotum complanatum* Sw., and *P. capillare* Blume.

Stapf, Otto. Hallieracantha, a New Genus of Acanthaceae. (*Journ. Linn. Soc. Bot.* 38 (1907) pp. 6–17.)

The above genus of *Acanthaceae* is described, 19 species being considered, all Bornean except one, *H. philippinensis*, which is described from material collected at Zamboanga, Mindanao.

Sullivant, W. S. United States Exploring Expedition . . . under the command of Charles Wilkes, U. S. N. Botany, Musci. (1859) pp. 32, plates, 26, imperial folio.

This paper really forms the first part of Volume 17 of the Wilkes Expedition reports, but was published separately by the author. It contains the descriptions of two species of Philippine mosses, *Hypnum calderense* and *Neckera phyllogonioides*, while *Hypnum albescens* Schw. is credited to the Archipelago. The diagnoses of the new species were published previously under the title "Notices of some New Mosses in the Collection of the United States Exploring Expedition under Captain Wilkes. (*Proc. Am. Acad.* 3 (1857) pp. 181–185.)

Taubert, P. Zur Kenntnis der Arten der Gattung Stenomeris Planch. (*Engl. Bot. Jahrb.* 15 (1893) *Beibl.* 38, p. 2.)

Three species are recognized, *S. dioscorcaefolia* Planch., *S. wallisii* Taub., and *S. Cumingiana* Becc., all from the Philippines.

United States Exploring Expedition during the years 1838–1842 under the command of Charles Wilkes, U. S. N., Botany, Vascular Cryptogams, Vol. 17.

The first part of this volume was published in 1859 and contains the mosses by *Sullivant*, see above. In 1862 other parts were published. In the paper on lichens by Tuckerman no Philippine forms are recorded. For *Algae* and *Diatomaceae* see Bailey and Harvey above, and for Fungi see Curtiss & Berkeley above. (See Merrill, The Philippine Plants Collected by the Wilkes Expedition, *This Journal*, 3 *Botany* (1908) 73.)

Valeton, Th. Kritisch Overzicht der Olacineae. (1886) pp. 1–280, *plates 6.*

About three species are mentioned as extending to the Philippines, but no new species or names appear so far as the Philippine flora is concerned.

Warnstorf, C. Beiträge zur Kenntniss exotischer und europäischer Torfmoose. (*Bot. Centralblatt* 76 (1898) pp. 386–390.)

Contains the description of one Philippine species, *Sphagnum luzonense* Warnst., from northern Luzon, collected by *A. Loher*.

Van Tieghem, Ph. Sur les Loxanthera, Amylotheca et Treubella, trois genres nouveaux pour la tribu des Élytranthées dans la famille des Loranthacées (*Bull. Soc. Bot. France* 41 (1894) pp. 257–269.)

One Philippine species, *Amylotheca cumingii*, based on *Cuming 1969* is partially described.

Van Tieghem, Ph. Quelques genres nouveaux pour la tribu des Loranthées dans la famille des Loranthacées. (l. c. pp. 481–490.)

Lanthorus spicifer Presl is noted from the Philippines and *L. cumingii* is partially described, the latter based on *Cuming 1975*, the former on *Cuming 1949*.

Van Tieghem, Ph. Sur la groupement des espèces des genres dans les Loranthacées a calice dialysépale et anthères basifixes. (l. c. pp. 497–511.)

Stemmatophyllum luzonense (*Loranthus*, Presl), *S. cumingii* based on *Cuming 1966*, *S. sessilifolium*, *Cuming 1956*, and *S. nodosum*, *Cuming 1952*, *1958*, from the Philippines, are partially described.

Van Tieghem, Ph. Quelques compléments a l'étude des Loranthées a calice dialysépale et anthères basifixes, ou Phénicanthémées. (l. c. pp. 553–552.)

Stemmatophyllum acutum, based on *Cuming 1973* from the Philippines, is partially described.

Van Tieghem, Ph. Sur la groupement des espèces en genres dans Loranthées a calice gamosépale et anthères basifixes, ou Dentrophthecées. (l. c. 42 (1895) pp. 241–272.)

One new species appears from the Philippines, *Candollina barthei*, and three new combinations, *Cichlanthus philippensis* (*Loranthus* Cham.), *Candollina haenkeana* (*Loranthus* Presl) and *C. malifolia* (*Loranthus* Presl).

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INDEX TO PHILIPPINE BOTANICAL LITERATURE, V.

By E. D. Merrill.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

Anonymous. Decades kewensis, XLVII, XLVIII. *Kew Bull.* (1908) 105–116.

Pogostemon nepetoides Stapf is described from material collected in the Philippines by Micholitz.

Ascherson, P. & Graebner, P. Potamogetonaceae. *Pflanzenreich* **31** (1907) 1–184.

In this monograph of the family nine genera are recognized, of which *Potamogeton*, with 87 species and many varieties, is the only one represented in the Philippines. A single species, *P. malainus* Miq., is credited to the Archipelago, but two or three additional ones occur here.

Berkeley, M. J. Enumeration of the Fungi collected by H. Cuming, Esq., F. L. S., in the Philippine Islands. *Hook. Lond. Journ. Bot.* **1** (1842) 142–157, *t. 6, f. 4, 5; t. 7, f. 6–11.*

Thirty-five species are enumerated, of which twenty-two are described as new: *Agaricus philippinensis, Lentinus connatus, Panus badius, Lenzites pallida, L. acuta, Polyporus cumingii, P. grammocephalus, P. philippinensis, P. elongatus, P. intybaceus, Trametes versatilis, T. badia, Daedalea inconcinna, D. tenuis, Stereum perlatum, Corticium hydnatinum, Clavaria surculus, Sphaeria pileiformis, S. examinans, S. micraspis, Tulostoma pusillum,* and *Dichonema erectum.*

Boerlage, J. G. Koordersiodendron celebicum Engl. *Ic. Bogor.* **1** (1901) 55–58, *plates 94, 95.*

The above species is figured and described in detail; it is a synonym of *Koordersiodendron pinnatum* (Blanco) Merr., this monotypic genus extending from Luzon to Celebes and New Guinea.

Copeland, E. B. Some New and Critical Ferns. *Elmer's Leafl. Philip. Bot.* **1** (1908) 233–235. (Article 13.)

Dennstaedtia elmeri Copel., *Cyclophorus acrostichoides* var. *gracilis* Copel., *Elaphoglossum luzonicum* Copel., and *Dryopteris dubia* Copel., are described as new, and notes are given on several other species.

DeCandolle, C. A Revision of the Indo-Malayan Species of Cedrela. *Records Bot. Surv. Ind.* **3** (1908) 357–376.

Nine species are recognized, with many varieties, a single species, *C. febrifuga* Blume, being credited, with doubt, to the Philippines. See Merrill & Rolfe, *This Journal* **3** (1908) *Bot.* 105.

DeCandolle, C. Meliaceae novae. *Ann. Conserv. Jard. Bot. Genève* **10** (1907) 122–176.

Many species are described, including a single one from the Philippines, *Aglaia langlassei* C. DC., which is very closely allied to if not identical with *A. harmsiana* Perk.

Dunn, S. T. A Revision of the Genus Illigera, Blume. *Journ. Linn. Soc. Bot.* 38 (1908) 290–297.

Thirteen species are recognized, of which two are found in the Philippines, *I. ternata* (Blanco) Dunn (=*I. luzonensis* (Presl) Merr.), and *I. platyandra* Dunn, the former confined to the Philippines and Formosa, the latter to southern China, Hongkong, Indo-China, and the Philippines. In regard to the former, *Illigera luzonensis* is the oldest valid name, although the original description and plate are both erroneous in some details. I have examined the type in the Prague Herbarium.

Elmer, A. D. E. Freycinetia from Lucban. *Leafl. Philip. Bot.* 1 (1907) 212–219. (Article 11.)

Eleven species are enumerated from Lucban and Mount Banajao, Province of Tayabas, Luzon, of which eight are described as new: *F. lucbanensis* Elm. (=*F. ferox* Warb. !), *F. confusa* Elm. (=*F. vidalii* Hemsl. !), *F. hemsleyi* Elm. non Warb. (=*F. rigida* Elm.), *F. dilatata* Merr. ex Elm., *F. banahaensis* Elm., *F. palawanensis* Merr. ex Elm., *F. merrillii* Elm., and *F. warburgii* Elm. (See Merrill, Philippine Freycinetia, *This Journal* 3 (1908) *Bot.* 307–315.)

Elmer, A. D. E. Some New Leguminosae. *Leafl. Philip. Bot.* 1 (1907) 221–232. (Article 12.)

A new genus, *Luzonia*, is described, and the following new species: *Luzonia purpurea* Elm., *Cynometra densiflora* Elm. (=*Erythrophlœum* !), *C. alternifolia* Elm. (=*Hardwickia alternifolia* Elm., =*Kingiodendron* !), *Pithecolobium williamsii* Elm. (=*Wallaceodendron celebicum* Koord. !), *Dioclea umbrina* Elm., *Dunbaria merrillii* Elm., *Caesalpinia benguetensis* Elm. =*Mezoneurum benguetense* Elm. (=*C. sepiaria* Roxb.), *Strongylodon zschokkei* Elm., *Derris lianoides* Elm., *Bauhinia whitfordii* Elm., and *Mucuna curranii* Elm.

Elmer, A. D. E. A Fascicle of Tayabas Figs. *Leafl. Philip. Bot.* 1 (1907) 236–261. (Article 14.)

Forty-one species are enumerated from the region about Lucban, Province of Tayabas, Luzon, of which the following are described as new: *Ficus inequifolia* Elm., *F. warburgii* Elm., *F. banahaensis* Elm., *F. lucbanensis* Elm., *F. tayabensis* Elm., and *F. linearifolia* Elm. Several other species are credited to the Philippines for the first time.

Elmer, A. D. E. A century of New Plants. *Leafl. Philip. Bot.* 1 (1908) 272–359. (Article 16.)

One hundred species are described as new, a large number of which are manifestly identical with previously described ones. *Pollia philippinensis* is probably the same as *P. thyrsiflora* (Blume) Steud., *Persea sterculioides* is *Phoebe*, *Scutinanthe engleri* ascribed to *Burseraceae*, is *Heynia sumatrana* Miq. (*Meliaceae*), *Dichapetalum spicatum*, ascribed to *Dichapetalaceae*, is *Osmelia conferta* (Turcz.) Benth. (*Flacourtiaceae*), *Glochidion leytense* is an extreme form of *G. album* (Blanco) Boerl., *G. sablanense* is not specifically distinct from *G. benguetense*, *Pimelodendron dispersum* is *Actephila*, *Croton curtiflorus*, ascribed to the *Euphorbiaceae*, is *Sycopsis philippinensis* Hemsl. (*Hamamelidaceae*), *Antidesma membranaefolium* is *A. cumingii* Muell. Arg., *Ilex rolfei* is apparently the same as *I. formosana* Max., *Grewia banahaensis*, ascribed to *Tiliaceae*, is *Leptonychia* ! (*Sterculiaceae*), *Pterocymbium gigantifolium* is *Sterculia jagori* Warb., *Eurya myrtilloides*, ascribed to *Theaceae*, is *Ilex luzonica* Rolfe ! (*Aquifoliaceae*), *Homalium sarsogonense* is *H. villarianum* Vid., *Eugenia succulenta* is *E. robertii* Merr., *Rivea glabrata* is *R. luzonensis* Hallier f. !, *Schefflera piperoidea* is *S. trifoliata* Merr. & Rolfe !, *Stachys rubisepala* is *Calamintha umbrosa* (Bieb.) Benth. !, *Gomphostemma*

luzonense is *Paraphlomis rugosa* (Benth.) Prain (*Phlomis rugosa* Benth.), *Uncaria clavisepala* is *U. velutina* Havil., *Wendlandia membranifolia* is *W. luzoniensis* DC., and probably the same as *W. paniculata* DC., and *Blumea copelandii* is *Conyza japonica* Less.

This is the last article of the first volume of the "Leaflets", and is followed by four pages of errata and an index, bringing the volume up to 374 pages. In the errata the following new names appear: *Vernonia benguetensis* (*V. vialis* Elm. p. 94, non DC.), *Emilia marivelensis* (*E. humifusa* Elm. p. 148, non DC.), *Freycinctia rigida* (*F. hemsleyi* Elm. p. 214, non Warb.), *Hardwickia alternifolia* Elm. (*Cynometra alternifolia* Elm. p. 223), and *Mezoneurum benguetense* (*Caesalpinia benguetensis* Elm. p. 226).

In volume 2, the sequence of both articles and pages is continued from volume 1.

Gehrmann, K. Vorarbeiten zu einer Monographie der Gattung Bridelia mit besonderer Berücksichtgung der africanischen Arten. *Engl. Bot. Jahrb.* 41 (1908) Beil. **95**: 1–42.

Forty-three species are recognized, of which two, *Bridelia stipularis* Blume, and *B. tomentosa* Blume, are credited to the Philippines.

Hamet, R. Monographie du Genre Kalanchoe. Bull. Herb. Boiss. II 7 (1907) 870–900; 8 (1908) 17–48.

Sixty-one species are recognized, a single one, *Kalanchoe pinnata* Pers., credited to the Philippines.

Hennings, P. Fungi philippinenses I. *Hedwigia* 47 (1908) 250–265.

One hundred and thirteen species are enumerated, of which sixty-one species, and one genus, *Merrilliopeltis*, are described as new. The same paper is also printed in *This Journal* 3 (1908) *Bot.* 41–58., but the one in "Hedwigia" has priority.

Hemsley, W. B. Sycopsis philippinensis Hemsl. *Hook. Ic. Pl.* IV 9 (1907) sub *pl. 2836.*

The above species is described, but not figured, the first representative of the family (*Hamamelidaceae*), to be found in the Philippines. The same species has been later described by Mr. Elmer as *Croton curtiflorus*, Leafl. Philip. Bot. 1 (1908) 310.

Hemsley, W. B. Sciaphila clemensae Hemsl. *Hook. Ic. Pl.* IV 9 (1907) *pl. 2850, f. 7–14.*

The above species is described and figured from material collected by Mrs. Clemens in Mindanao; the second species of the genus for the Philippines.

Hemsley, W. B. Aleurites trisperma Blanco. *Kew Bull.* (1908) 105, 106.

Mature fruits and seeds of the above species are figured and described, and the relationships of the species with *Aleurites fordii* Hemsl., discussed.

Hochreutiner, B. P. G. Revision du Genre Hibiscus. *Ann. Conserv. Jard. Bot. Genève* 4 (1900) 23–169.

One hundred and ninety-seven species are recognized in the genus of which but few are definitely credited to the Philippines: of the species considered, the following are now known from the Archipelago; *Hibiscus lampas* Cav., *H. campylosiphon* Turcz., *H. tiliaceus* Linn., *H. syriacus* Linn. (cult.), *H. surattensis* Linn., *H. cannabinus* Linn. (cult.), *H. sabdariffa* Linn. (cult.), *H. rosa-sinensis* Linn. (cult.), *H. mutabilis* Linn. (cult.), *H. esculentus* Linn. (cult.), *H. abelmoschus* Linn., *H. haenkeanus* (Presl) Hochr., and *H. manihot* Linn. var. *pungens* (Roxb.) Hochr. Several additional species have since been described from the Archipelago.

Jack, J. B. & Stephani, F. Hepaticae Wallisianae. *Hedwigia* 31 (1891) 11–27.

Twenty-one Philippine species are enumerated, collected in Luzon by Wallis. Three species are described as new, *Herbertia longispina* Jack & Steph., *Thysanolejeunea gottschei* Jack & Steph., and *Schistochila wallisii* Gott. & Jack.

Kränzlin, F. Neue und kritischen Arten. *Orchis* 2 (1907) 16.

Microstylis philippinensis is described as new.

Macfarlane, J. M. Nepenthaceae. *Pflanzenreich* 36 (1908) 1–92.

The family consists of a single genus, *Nepenthes*, of which 58 species and many varieties are recognized. The following are credited to the Philippines: *Nepenthes blancoi* Blume, *N. philippinensis* Macfar., *N. copelandii* Merr., *N. rentricosa* Blanco, *N. burkei* Mast., and the varieties *excellens* Veitch and *prolifica* Mast., *N. phyllamphora* Willd., *N. alata* Blanco, and the varieties *coristata* Macfar., and *biflora* Macfar., and *N. deaneana* Macfar. The above species, with the exception of *N. phyllamphora* Willd., are endemic in the Philippines.

Mildbraed, J. Stylidiaceae. *Pflanzenreich* 35 (1908) 1–98.

Six genera are recognized, the species being mostly confined to the southern hemisphere, the greatest number in Australia. *Stylidium*, the largest genus, has 103 species, all Australian except a few that extend to Malaya and India. No species is recorded from the Philippines, but the Australian *Stylidium alsinoides* R. Br., has been collected several times in Luzon.

Murrill, W. A. Some Philippine Polyporaceae. *Bull. Torr. Bot. Club.* 34 (1907) 465–481.

Sixty-nine species are enumerated from the Philippines, the following being described as new: *Coriolus cuneatiformis, Funalia philippinensis, Hapalopilus subrubidus, Inonotus elmerianus, Microporellus subdealbatus, Polyporus coracinus, P. palensis, Spongipellis luzonensis, Trametes caespitosa, T. lamaensis, T. luzonensis, T. subacuta, T. williamsii, Tyromyces elmeri, Amauroderma elmerianum, Elfvingia elmeri, Fomes luzonensis, F. philippinensis, Ganoderma subtornatum, G. williamsianum, Pyropolyporus lamaensis, P. merrillii, P. williamsii,* and *Glocophyllum edule*. There are also many new combinations.

Murrill, W. A. A collection of Philippine Polypores. *Elmer's Leafl. Philip. Bot.* 1 (1908) 252–271. (Article 15.)

Thirty-six species are enumerated, the paper being compiled from one by the same author published previously in the *Bull. Torr. Bot. Club.* 34 (1907) 465–481, noted above.

Murrill, W. A. Additional Philippine Polyporaceae. *Bull. Torr. Bot. Club* 35 (1908) 391–416.

One hundred and two species are enumerated, based on material supplied by the Bureau of Science. One new genus, *Whitfordia*, based on *Fomes warburgiana* P. Henn., and the following 38 new species are described: *Coltricia benguetensis, Coriolopsis copelandi, C. bataanensis, C. melleoflava, C. subcrocata, C. clemensiae, Coriolus currani, C. perpusillus, C. rubritinctus, C. subvernicipes, Cycloporellus barbatus, Favolus resinosus, F. subrigidus, Hapalopilus ramosii, Hexagona luzonensis, H. pertenuis, Inonotus clemensiae, Trametes conglobata, T. insularis, Tyromyces merrittii, T. subchionens, T. unguliformis, Amauroderma asperulatum, A. bataanense, A. clemensiae, A. ramosii, Fomes subresinosus, F. subungulatus, Ganoderma balabacense, G. currani, Pyropolyporus subextensus, P. tenuissimus, P. tricolor, Daedalea isabellina, D. subconfragosa, Glocophyllum nigrozonatum, Lenzites clemensiae,* and *L. submurina*.

Oliver, D. Strychnos ignatii Bergius. *Hook. Icon.* IV 3 (1892) *pl. 2212.*

What is supposed to be the above species is figured and described, and the complicated synonymy of the species is discussed.

Oliver, D. Strychnos multiflora Benth. *Hook. Icon.* IV 3 (1892) *pl. 2213.*

The above Philippine species is figured and described.

Pampanini, R. & Bargagli-Petrucci, G. Monografia della famiglia delle Stackhousiaceae. *Bull. Herb. Boiss.* II 5 (1905) 901–916; 1046–1060; 1145–1160: 6 (1906) 39–44.

Two genera are recognized, *Stackhousia* Sm., and *Macgregoria* F. Muell., the latter monotypic and confined to Australia, the former with 20 species and many varieties, confined to Australia, Tasmania, and New Zealand, with a single variety in the Philippines. The specimen collected in Luzon by Cuming (no. 976), referred by Bentham to *S. muricata* Lindl., is made the type of *S. intermedia* Bailey var. *philippinensis* Pamp. The introduction and systematic part of the paper is by Pampanini, and the anatomical part is by Bargagli-Petrucci.

Pfitzer, E. & Kränzlin, F. Orchidaceae-Monandrae-Coelogyninae. *Pflanzenreich* 32 (1907) 1–169.

Fifteen genera are recognized, the following species credited to the Philippines: *Coelogyne bilamellata* Lindl., *C. sparsa* Reichb. f., *C. chloroptera* Reichb. f., *C. marmorata* Reichb. f., all endemic, the last imperfectly known; *Dendrochilum arachnitum* Reichb. f., *D. convallariiforme* Schauer, *D. filiforme* Lindl., *D. cucullatum* (Ames) Pfitz., *D. longilabre* (Ames) Pfitz., *D. graciliscapum* (Ames) Pfitz., *D. magnum* Reichb. f., *D. cobbianum* Reichb. f., *D. latifolium* Lindl., *D. cucumerinum* Reichb. f. (?), *D. uncatum* Reichb. f. and var. *lancifolia* Reichb. f., *D. cinnabarinum* Pfitz., *D. glumaceum* Lindl., and var. *valida* Rolfe, *D. longifolium* Reichb. f., *D. sphaeclatum* (Ames) Pfitz., *D. tenellum* (Ames) Pfitz., *D. williamsii* (Ames) Pfitz., *D. graminifolium* (Ames) Pfitz., *D. tenellifolium* (Ames) Pfitz., *D. tenue* (Ames) Pfitz., *D. parvulum* (Ames) Pfitz., *D. venustulum* (Ames) Pfitz., *D. strictiforme* (Ames) Pfitz., *D. oliganthum* (Ames) Pfitz., *D. occultatum* (Ames) Pfitz., *D. recurvum* (Ames) Pfitz., *D. philippinense* (Ames) Pfitz., *D. turpe* (Ames) Pfitz., *D. anfractum* (Ames) Pfitz., *D. merrillii* (Ames) Pfitz., *D.? pumilum* Reichb. f., *D. whitfordii* (Rolfe) Pfitz. & Kränzl., all endemic except *D. longifolium; Pholidota triotos* (Reichb. f.) Pfitz., *P. conchoidea* Lindl., and *P. imbricata* Lindl., the first two endemic, the last widely distributed. *Dendrochilum* especially should be studied with reference to Ames Orchidaceae 2 (1908) 76–121, where descriptions of and key to 43 Philippine species are given, including many new species not considered in the above monograph.

Prain, D. Patchouli. *Kew Bull.* (1908) 78–82.

The patchouli plant of commerce is shown to be *Pogostemon cablin* (Blanco) Benth., first described from Philippine material.

Prantl, K. Das System der Farne. *Arb. Kgl. Bot. Garten Breslau* 1 (1892) 1–38.

In a consideration of the genus *Microlepia*, the following species are credited to the Philippines: *M. trichosticha* J. Sm., *M. pilosula* (Wall.) Presl, and *M. speluncae* (L.) Moore.

Radlkofer, L. Sapindaceae Philippinenses novae. *Elmer's Leafl. Philip. Bot.* 1 (1907) 208–211. (Article 10.)

Four species are described as new, *Allophylus unifoliatus* Radlk., *Aphania angustifolia* Radlk., *Dictyoncura sphaerocarpa* Radlk., and *Mischocarpus ellipticus* Radlk.

Robinson, C. B. Alabastra philippinensia, I. *Bull. Torr. Bot. Club.* 35 (1908) 63–75.

In this paper the following new species are described: *Pandanus glauciphyllus, Thalictrum philippinense, Anaxagorea radiata, Cyathocalyx acuminatus, Mitrephora williamsii, Uvaria rubra, Uvaria scandens, Sabia philippinensis, Elaeocarpus venosus, Daphne luzonica, Sarcopyramis delicata,* and *Clethra williamsii. Thesium santaloides* Hance, and *Pisonia longirostris* T. & B., are credited to the Philippines for the first time, while critical notes are given on several other species. The paper is based on material collected in the Philippines by R. S. Williams.

Rolfe, R. A. The Localities of Cuming's Philippine Plants. *Kew Bull.* (1908) 116–119.

Considerable previously unpublished information regarding Cuming's explorations in the Philippines is given, taken largely from his correspondence with Sir William Hooker.

Rolfe, R. A. New Orchids, Decade 32. *Kew Bull.* (1908) 412–416.

Coelogyne loheri Rolfe is described from material collected in Luzon.

Schlechter, R. Monographie der Podochilinae. *Mém. Herb. Boiss.* 21 (1900) 1–78.

Four genera are recognized, of which the largest is *Podochilus* with 47 species, the following being credited to the Philippines: *P. serpyllifolius* Lindl. and *P. zollingeri* Reichb. f., Java and the Philippines, *P. cornutus* (Bl.) Schltr., Indo-Malaya to southern China and the Philippines, *P. micranthus* (Lindl.) Schltr., endemic, *P. undulatus* (Bl.) Schltr., Malay Archipelago and the Philippines, *P. xytriophorus* (Reichb. f.) Schltr., Malay Peninsula to Borneo and the Philippines, *P. pendulus* (Bl.) Schltr., Malay Peninsula and Archipelago to New Guinea and the Philippines, and *P. philippinensis* Schltr., endemic. *Thelasis* with 6 species has one representative in the Philippines, *T. clongata* Bl., extending to Hongkong, the Malay Peninsula and Archipelago.

Seemen, O. von. Eine neue Quercus-Art von den Philippinen. *Fedde's Repertorium* 5 (1908) 21.

Quercus merrillii Seem., is described from material collected in Palawan.

Servettaz, C. Note préliminaire sur la Systématique des Elaeagnacées. *Bull. Herb. Boiss.* II 8 (1908) 381–394.

Thirty-eight species of *Elaeagnus* are recognized, the only genus of the family extending to the Philippines, represented here by *E. cumingii* Schlecht., a species which has been reduced by most recent authors to *E. latifolia* Linn.

Sonnerat, P. Voyage à la Nouvelle Guinée, i-xvi, 1–202, *pl. 1–120.* Paris, 1776.

Pages 19–147 and plates 12–94 refer to the Philippines, and there are occasional Philippine notes elsewhere, so that these Islands, in spite of the title, form the main subject-matter of the book, which is of greater ornithological than botanical importance.

Sonnerat left France in 1769, and Port Louis in Mauritius on June 29, 1771, and visiting several smaller islands en route reached Cavite on September 3. He sailed again on December 29, having spent the intervening time in Manila, Cavite, and especially in what he considered an adventurous trip to the country near Laguna de Bay. The week from January 7 to 14 was passed at Antique in Panay, whence he sailed to Zamboanga, arriving January 18. From here one of the two ships made a side trip to Jolo. The reunited expedition sailed from Zamboanga on February 9, and made

no further stops in the Philippines, visited the Moluccas and other islands as far as New Guinea, and was again in Mauritius by June 4.

With the doubtful exception of *Menichea rozata*, no specific names were originated in this work, but several plants were figured and described, a majority of them Philippine. Those figured from this Archipelago are "le roucou" *pl. 13*, *Bixa orellana* L.; "la sapotte negro" *pl. 14–16*, *Diospyros ebenaster* Retz.; "la bergkias," *pl. 17, 18*, which he believed to be only an introduced plant in the Philippines, a species of *Gardenia*, referred by DeCandolle to *G. thunbergiana* L. f., somewhat resembling *G. longiflora* Vidal, but not agreeing exactly with any recent collections; "la pandacaqui," *pl. 19*, *Tabernaemontana pandacaqui* Poir., subsequently described from Sonnerat's collections, and erroneously localized as from New Guinea; "le rima ou fruit à pain," *pl. 57–60*, *Artocarpus rima* Blanco, usually reduced to *A communis* Forst.; "le cacao," *pl. 61, 62*, *Theobroma cacao* L.; "le petit citron doux," *pl. 63*, *Triphasia trifoliata* (L.) DC.; "la houette," *pl. 90, 91*, *Ceiba pentandra* (L.) Gaertn., here said to be native; "la menichea rozata," *pl. 92, 93*, on which *Butonica rosata* Miers was in part based, *Barringtonia racemosa* (L.) Roxb.; "la manssanas," *pl. 94*, *Zizyphus jujuba* L. Two other Philippine plants are figured from collections made before his arrival in the Islands, "la pagatpate," *pl. 10, 11*, *Sonneratia caseolaris* (L.) Engl., and "le bonet quarré ou la Commerçona," *pl. 8, 9*, *Barringtonia asiatica* (L.) Kurz. Reference is made on page 196 to the introduction into Mauritius in 1768 by Prevost of the nutmeg, afterwards described from Sonnerat's collections as *Myristica philippensis* Lam., Mauritius afterwards serving as a centre of distribution for this species into other tropical countries.

Many of his collections subsequently formed a part of Commerson's herbarium, and have occasionally been credited to the latter, who never visited the Philippines, being prevented by unfavorable conditions on the occasion of his chief attempt. (C. B. Robinson.)

Sonnerat, P. Voyages aux Indes orientales et à la Chine, fait par ordre du Roi, depuis 1774 jusqu'en 1781. i–xvi, 1–318, i–viii, 1–298, *pl. 1–140*. Paris, 1782.

This work is more or less supplementary to the preceding and only pages 104–119 of the second volume relate to the Philippines. No further description is given of species from the Archipelago, but there are interesting notes on the cultivation of many important plant products. He appears to have made but the one visit. (C. B. Robinson.)

Turczaninow, N. Description des Elaeocarpées des collections asiatiques de MM. Cuming et Zollinger. *Bull. Soc. Nat. Mosc.* **19** [2] (1846) 489–496.

The following species are described from the Philippines: *Elaeocarpus nitidus* Turcz., non Jack, which Turczaninow himself later [1] reduced to *E. oblongus* Gaertn., *Mocanera isotricha* (=*Elaeocarpus isotrichus* (Turcz.) F.-Vill.), and *M. multiflora* (=*E. multiflorus* (Turcz.) F.-Vill.).

Turczaninow, N. Decas secunda generum adhuc non descriptorum adjectis descriptionibus nunnullarum specierum Byttneriacearum. *Bull. Soc. Nat. Mosc.* **19**[2] (1846) 497–510.

Four genera and five species are described as new, based on Cuming's Philippine plants; *Hexagonotheca cordata* (=*Berrya ammonila* Roxb.), *Antherotriche lanceolata* (=*Anisoptera thurifera* Blanco), *Pterocalymna paniculata* (=*Lagerstroemia paniculata* (Turcz.) Vid.), *Gonostegia oppositifolia* and *G. alternifolia* (both =*Memoralis pentandra* (Roxb.) Wedd.).

[1] *L. c.* **31** [1] (1858) 235.

Turczaninow, N. Decas tertia generum adhuc non descriptorum adjectis descriptionibus nonnullarum specierum Myrtacearum Xerocarpicarum atque Umbelliferarum imperfectarum. *Bull. Soc. Nat. Mosc.* 20[1] (1847) 148–174.

A single Philippine plant is considered, *Anisostemon trifoliatus*, described as a new genus and species (=*Connarus trifoliatus* (Turcz.) Rolfe).

Turczaninow, N. Asclepiadeae aliquae indescriptae. *Bull. Soc. Nat. Mosc.* 21[1] (1848) 256–262.

One genus and species in two other genera are described as new, based on Cuming's Philippine plants; *Triplolepis cumingii* (=*Streptocaulon cumingii* (Turcz.) F.-Vill.), *Streptocaulon obtusum* (=*S. baumii* Decne.), and *Secamone macrostachya* (=*Tylophora perrottetiana* Decne.).

Turczaninow, N. Decas quarta et quinta generum adhuc non descriptorum. *Bull. Soc. Nat. Mosc.* 21[1] (1848) 570–591.

Four genera and six species are described as new, based on Cuming's Philippine plants; *Lachnopetalum glabrum* (=*Lepidopetalum perrottetii* Blume), *Otolepis nigrescens* (=*Otophora fruticosa* Blume), *Zygolepis rufescens* (=*Arytera rufescens* (Turcz.) Radlk.), *Meladenia densiflora* (=*Psoralea baduocana* (Blanco) Benth.), *Schleichera subundulata* (=*Mischocarpus sundaicus* Blume), and *S. revoluta* (=*Mischocarpus fuscescens* Blume).

Turczaninow, N. Synanthereae quaedam hucusque indescriptae. *Bull. Soc. Nat. Mosc.* 24[1] (1851) 166–214.

The following Philippine species are considered: *Conyza tetraptera* n. sp. (=*Laggera alata* Less.), *C. otigandra* n. sp. (=*C. viscidula* Wall.), *Minyranthes heterophylla* n. gen. & n. sp. (=*Siegesbeckia orientalis* L.), *Bidens tridentata* n. sp., and *B. denudata* n. sp. (both=*Glossogyne tenuifolia* Cass.), *Spilanthes grandiflora* n. sp., *Gynura affinis* n. sp. and *G. glabra* n. sp. (both=*G. sarmentosa* DC.).

Turczaninow, N. Asclepiadeae quaedam indescriptae fasciculus 2. *Bull. Soc. Nat. Mosc.* 25[2] (1852) 310–325.

A single Philippine species is considered, *Amblyoglossum brevipes* as a new genus and species (=*Tylophora brevipes* (Turcz.) F.-Vill.).

Turczaninow, N. Animadversiones ad primam partem herbarii Turczaninowianii nunc Universitatis Caesareae Charkowiensis. *Bull. Soc. Nat. Mosc.* 27[2] (1854) 271bis–372.

The following plants are credited to, or described from the Philippines: *Stephania corymbosa* Blume, to which 1160 Cuming is referred, the specimen being *S. cxigua* Miers, *Cissampelos cumingiana* n. sp. (=*C. parcira* L.), *Capparis lasiopoda* n. sp., *C. luzonensis* n. sp., *C. lobbiana* n. sp., the latter credited to Singapore, but the specimen was from the Philippines. *Roydsia philippinensis* n. sp., (=*Stixis philippinensis* (Turcz.) Merr.). *Hisingera? grandifolia* n. sp., which has been reduced to *Flacourtia rukam* Z. & M., *Salomonia ramosissima* n. sp. (=*S. oblongifolia* DC.). *Securidaca corymbosa* n. sp., *Pittosporum brachysepalum* n. sp. (=*P. pentandrum* (Blanco) Merr.), *Bergia glandulosa* n. sp. (=*B. serrata* Blanco), and *Pentaloba fasciculata* n. sp. (=*Alsodeia fasciculata* (Turcz.) F. Vill.=*Rinorea*). Three species of *Phoberos* are mentioned without specific name, all referable to *Scolopia*.

Turczaninow, N. Animadversiones in secundam partem herbarii Turczaninowianii, nunc universitatis Caesareae Charkowiensis. *Bull. Soc. Nat. Mosc.* 31[1] (1858) 185–250; 379–476.

In this paper about sixty Philippine species are considered, including four genera and thirty-seven species which are described as new, as follows: *Paronia rubiformis* n. sp. (=*Urena lobata* L.), *Hibiscus campylosiphon* n. sp. (=*Bombycidendron campylosiphon* (Turcz.) Warb.), *Malachra lincariloba*

n. sp. (=*M. fasciata* Jacq., var. *lincariloba* (Turcz.) Gürke), *Grewia petitiana* A. Rich.?, *G. cumingiana* n. sp., *G. criopoda* n. sp., *Columbia celebica* Blume?, *C. inaequilatera* n. sp. (=*C. serratifolia* (Cav.) DC.), *Sezegleewia involucrata* n. gen. & n. sp. (=*Symphorema luzonicum* (Blanco) F.-Vill.), *Diplodiscus paniculatus* n. gen. & n. sp., which has been reduced by Pierre to *Brownlowia*, but which is apparently a valid genus, *Hopea squamata* n. sp. (=*Shorea squamata* (Turcz.) Dyer), *Saurauia rugosa* n. sp. (=*S. elegans* (Choisy) F.-Vill.), *Sclerostylis nitida* n. sp. (=*Atalantia disticha* (Blanco) Merr.), *Micromelum tephrocarpum* n. sp., *M. molle* n. sp., the latter and possibly the former the same as *M. pubescens* Blume, *Ancistrolobus floribundus* n. sp. (=*Cratoxylon floribundum* (Turcz.) F.-Vill.), *A. micradenius* n. sp. (=*C. blancoi* Blume), *Schmidelia grossedentata* n. sp. (=*Allophylus grossedentatus* (Turcz.) Radlk.), *Sapindus forsythii* DC.?, the specimen being referable to *S. saponaria* Linn. var., *Sapindus cinereus* n. sp. (=*Euphoria cinerea* (Turcz.) Radlk.), *S. stellulatus* n. sp. (=*E. stellulata* (Turcz.) Radlk.), possibly not distinct from the preceding, *S.? cultratus* n. sp. (=*Trigonachras cultrata* (Turcz.) Radlk.), *Cupania lesserliana* Cambess. (the specimen is *Mischocarpus sundaicus* Bl.), *Dodonaea viscosa* L., *Otolepis nigrescens* Turcz. (=*Otophora fruticosa* Blume), *Aglaia cumingiana* n. sp., *A. macrobotrys* n. sp., *A. denticulata* n. sp., *A. hexandra* n. sp., *Schizochiton tetrapetalus* n. sp. (=*Chisocheton*), *Hartighsea cauliflora* n. sp. (=*Dysoxylum cumingianum* C. DC.), *H. schizochitoides* n. sp. (=*Dysoxylum schizochitoide* (Turcz.) C. DC.), *Sandoricum indicum* L., *Dasycoleum philippinum* n. sp. (=*Chisochiton philippinum* (Turcz.) Harms), *Cissus flexuosa* n. sp. (=*Stemonurus laxiflorus* (Miers) Merr.), *Vitis cumingiana* n. sp. a doubtful species, *Oxalis cumingiana* n. sp. (=*Biophytum sensitivum* (L.) DC.), *Toddalia effusa* n. sp. and *T.? ambigua* n. sp., (both=*T. asiatica* (L.) Kurz), *Euonymus timorensis* Zipp.?, (the specimen is *E. philippinensis* Merr.), *Celastrus polybotrys* n. sp. (=*C. paniculatus* Roxb.), *Cascaria cinerea* n. sp., *C. leucolepis* n. sp. (the latter based on a specimen collected by Lobb, and credited to Singapore, but Lobb's specimen in the Kew herbarium is labelled Luzon), *Stachycrater philippinus* n. gen. & n. sp. (=*Osmelia philippina* (Turcz.) Benth.), *Buchanania longifolia* Span.? (the specimen is *B. arborescens* Blume), *Garuga mollis* n. sp. (=*Garuga abilo* (Blanco) Merr.), and *Marignia? nitida* n. sp. (=*Glycosmis cochinchinensis* (Lour.) Pierre).

Turczaninow, N. Animadversiones ad Catalogum primum et secundum herbarii Universitatis Charkoviensis. *Bull. Soc. Nat. Mosc.* 36[1] (1863) 545–615.

The following Philippine species are considered: *Lachnopetalum glabrum* Turcz. is transferred to *Ratonia*, as *R. lachnopetalum*, and *Zygolepis rufescens* to the same genus as *R. zygolepis* (see above 684), *Zanthoxylum? triplinerve* n. sp., a doubtful species, *Chailletia benthamiana* n. sp. (=*Dichapetalum benthamianum* (Turcz.) Engl.), *Ryssopteris ovata* n. sp. (=*Anisopteris ovata* (Turcz.) Merr. & Rolfe), and *Helicteres hirsuta* Blume, var.?

Turczaninow, N. Verbenaceae et Myporaceae nonnullae hucusque indescriptae. *Bull. Soc. Nat. Mosc.* 36[2] (1863) 193–227.

Sezegleewia luconensis n. gen. & sp. (non *Sezegleewia* Turcz. supra) (=*Pterospermum obliquum* Blanco), and *Premna philippinensis* n. sp. (=*Vitex turczaninowii* Merr.), are described from the Philippines.

Turczaninow, N. Quelques observations sur les espèces du genre Clethra. *Bull. Soc. Nat. Mosc.* 36[2] (1863) 228–235.

Clethra lancifolia Turcz. is described from the Philippines, based on *Cuming 855*, and *Lobb 499*, the latter credited to Singapore, but collected in Luzon.

INDEX TO PHILIPPINE BOTANICAL LITERATURE, VI.

By E. D. Merrill.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

Baker, J. G. Handbook of the Amaryllidaceae including the Alstroemerieae and Agaveae (1888) XII+216.

Sixty-one genera are recognized, and all the species known to the author are described. Very few species are definitely credited to the Philippines, but several of those considered are found in the Archipelago, especially as introduced and cultivated plants. Indigenous and endemic species are very few in the Philippines. Two endemic species of *Crinum* are admitted, *C. cumingii* Baker and *C. gracile* E. Meyer; I have seen the types of both and consider them referable to a single species. *Eurycles sylvestris* Salisb. is the only other species definitely credited to the Philippines.

Bargagli-Petrucci, G. Le specie de Pisonia della Regione dei Monsoni. *Nuovo Giorn. Bot. Ital.* N. S. 8 (1901) App. 603–625, *t. 4.*

Twenty-one species are recognized, of which two are definitely recorded from the Philippines, *Pisonia excelsa* Bl., and *P. aculeata* Linn. Several additional species have been found in the Archipelago, *P. longirostris* T. & B., *P. alba* Span. (cult.), and apparently some undescribed forms.

Beccari, O. New or Little-known Philippine Palms. *Leafl. Philip. Bot.* 2 (1909) 639–650. (Article 36.)

Seven species are enumerated including the following described as new: *Arcca ipot, Pinanga negrosensis, P. rigida, Heterospathe elmeri,* and *Calamus elmerianus.*

Beccari, O. Asiatic Palms – Lepidocaryeae, Part 1. The species of Calamus. *Ann. Bot. Gard. Calcutta* 11 (1908) 1–578; *plates 231,* (folio).

A consideration of all the species of the genus known to the author, in which the following 17 Philippine representatives are described and figured: *Calamus mollis* Blanco, *C. meyenianus* Schauer, *C. blancoi* Kunth, *C. cumingianus* Becc., *C. ornatus* Bl. var. *philippinensis* Becc., *C. merrillii* Becc. n. sp., *C. mosleyanus* Becc., *C. spinifolius* Becc., *C. trispermus* Becc., *C. manillensis* H. Wendl., *C. microsphaerion* Becc., *C. ramulosus* Becc., *C. vidalianus* Becc., *C. siphonospathus* Mart. with the varieties *farinosus, sublaevis, oligolepis (minor), oligolepis (major),* and *polylepis* Becc., *C. microcarpus* Becc., *C. dimorphacanthus* Becc., and *C. discolor* Mart. Sixteen of the seventeen Philippine species are endemic, and the seventeenth (*C. ornatus* Bl.), Malay Peninsula, Sumatra, Java, and Borneo, is represented in the Philippines by an endemic variety.

Brotherus, V. F. Musci Novi Philippinenses 1. *Leafl. Philip. Bot.* 2 (1909) 651–658. (Article 37.)

The following species are described as new: *Campylopus calodictyon, Fissidens elmeri, Syrrhopodon macro-tristichus, Webera integerrima, W. elmeri, Symphysodontella subulata, Symphysodon subneckeroides, Distichophyllum elmeri, Hypopterygium delicatulum, Cyathophorum philippinense,* and *Pleuropus luzonensis.*

Castracane degli Antelminelli, F. Report on the Diatomaceae collected by H. M. S. *Challenger* during the years 1873–1876. Rept. Voy. H. M. S. *Challenger*, Botany 2 (1886) III+178, pls. 1–30.

The following are described from Philippine waters as new: *Amphora decora, A. philippinica, Pinnularia raëana, Navicula mammalis, N. decipiens, N. mirabilis, Glyphodesmis murrayana, G. challengerensis, G. margaritacea, Synedra capitulata, S. philippinarum, S. fimbriatum, Cyclophora tenuis, Surirella dives, S. multicostata, Campylodiscus zebuanus, C. lepidus, C. humilis, C. philippinarum, C. nitens, C. anceps, Nitzschia plana* var. *zebuana, N. obesa, N. vermiculata, Stephanophyxis kittoniana, Lauderia pumila. Rutilaria tulkii, R. edentulata, Biddulphia reticulata* var. *inermis, B. pellucida, Triceratium pulvillus, T. coronatum, T. grunowianum, T. insutum, Stictodiscus radiatus, S. radfordianus, S. affinis, S. reticulatus, S. margaritaceus, Omphalopelta shrubsoliana. Coscinodiscus variolatus, C. decrescens,* and *C. ? rudis.* A few additional species previously described by various authors are credited to the Philippines.

Christ, H. Some New Species of Malesian and Philippine Ferns. *Journ. Linn. Soc. Bot.* 39 (1909) 213–215.

Five species are described, of which two, *Alsophila matthewii* Christ, and *Trichomanes subtrifidum* Matthews & Christ are from Mount Maquiling, Luzon.

Copeland, E. B. Pteridophytes of the Horn of Negros. *Leafl. Philip. Bot.* 2 (1908) 387–426. (Article 19.)

One hundred and eighty species and varieties are enumerated from the Cuernos Mountains, southern Negros, the following being described as new: *Polystichum horizontale* Presl, var. *sordidum, Lomagramma pteroides* J. Sm., var. *subcoriacea* and var. *negrosensis, Dennstaedtia articulata, Lindsaya monosora, Plagiogyria tuberculata* Copel. var. *gracilis, Loxogramme dimorpha, Polypodium negrosense, Cyathea heterochlamydea, C. fructuosa,* and *Alsophila elmeri.* Numerous notes on distribution, habitats, and synonymy are given, as well as a key to the Philippine species of *Elaphoglossum.*

DeCandolle, Aug. Revision of the Philippine Species of Elaeocarpus. *Leafl. Philip. Bot.* 2 (1909) 634–638. (Article 35.)

Sixteen species are recognized with an analytical key, with four additional doubtful ones. *E. verruculosus, E. procerus,* and *E. elmeri* are described as new, and *E. fissistipula* Miq., is credited to the Philippines for the first time. *E. venosus* C. B. Rob. (1908) was overlooked, and several additional species have since been described.

Desvaux, A. N. Observations sur la famille des Légumineuses. *Ann. Sci. Nat.* 9 (1826) 404–431.

Tephrosia dichotoma is described as new from the Philippines; from the description it is the same as the species later described by Vogel as *T. luzoniensis.*

Dubard, M. Note sur les Palaquium des Philippines. *Bull. Mus. Hist. Nat. Paris* 15 (1909) 379–384.

Eighteen species of *Palaquium* are enumerated of which *P. vidalii* Pierre and *P. merrillii* Dubard are described as new, and *P. obovatum* (Griff.)

Engl., is credited with doubt to the Archipelago. Critical notes are given on the other species enumerated.

Elmer, A. D. E. Some Interesting Lauraceae. *Leafl. Philip. Bot.* 2 (1908) 375–384. (Article 17.)

This is the first paper of the second volume of the "Leaflets of Philippine Botany," but the sequence of both articles and pagination is continuous from volume 1. The present paper contains the descriptions of the following new species: *Actinodaphne microphylla, Endiandra arborea, Litsea plateaefolia, L. quercoides, L. membranacea, L. tayabensis, L. griscola* (=*L. garciae* Vid.), *Neolitsea intermedia*, and *Persea leytensis; Machilus philippinensis* Merr. is transferred to *Persea*.

Elmer, A. D. E. Six Undescribed Species of Macaranga. *Leafl. Philip. Bot.* 2 (1908) 427–434. (Article 20.)

The following Philippine species are described: *Macaranga caudatifolia, M. cuneata, M. cuernosensis, M. sylvatica, M. loheri* (=*M. cumingii* Muell.-Arg.), and *M. ramiflora*.

Elmer, A. D. E. Six New Myrsinaceae. *Leafl. Philip. Bot.* 2 (1908) 439–444. (Article 22.)

The following Philippine species are described: *Ardisia punctata, A. mezii, Discocalyx lincarifolia, D. psychotrioides, D. montana*, and *Maesa embelioides*.

Elmer, A. D. E. Synopsis of Rubus. *Leafl. Philip. Bot.* 2 (1908) 445–462. (Article 23.)

The paper applies only to the Philippine species, of which 17 are recognized, the following being described as new: *Rubus mearnsii, R. brevipetalus, R. zambalensis*, and *R. fraxinifolius* Poir., var. *haightii*. The species considered as *R. rugosus* Sm., is not Smith's species but the recently described *R. elmeri* Focke. Descriptions of all the species considered are given, with an analytical key.

Elmer, A. D. E. Three Score of New Plants. *Leafl. Philip. Bot.* 2 (1908) 463–525. (Article 24.)

This paper consists of the descriptions of the following species: *Isachne stricta, Celtis rubrovenia, Elatostema laxum, E. hastatum, E. delicatum, E. spinulosum, Loranthus cuernosensis, L. bicoloratus, Notothixos philippinensis, Goniothalamus magnificus, Hydrangea glandulosa, Pygeum fragrans, Melicope odorata* (=*M. luzonensis* Engl.), *Zanthoxylum diabolicum, Evodia pergamentacea, Micromelum curranii, Eurycoma dubia, Canarium nervosum, Dichapetalum glabrum, D. obovatum, Elateriospermum paucinervium, Sapium crassifolium, Claoxylon arborcum, Antidesma microcarpum, Trachelospermum philippinense, Glycosmis angularis, Turpinia ovalifolia, Urandra fuliginea, Meliosma sylvatica, Cissus suberosa, Leea negrosensis, Halconia negrosensis, Stereulia multistipularis, Saurauia avellana, S. negrosensis, Gordonia welbornii, Eurya auriculata* (=*E. amplexicaulis* Moore), *Garcinia pinnatinervia, Calophyllum hibbardii, Viola toppingii, Boerlagiodendron serratifolium, Diospyros reticulata* (=*D. curranii* Merr.), *D. brideliaefolia, Symplocos fragrans, S. curtiflora, S. angularis, Jasminum ixoroides* (=*J. bifarium* Wall.), *Anodendron corymbosum, Callicarpa subglandulosa, Clerodendron klemmei, C. preslii, Scutellaria marivelensis, Hypoestes linearis, Tricalysia negrosensis, Lasianthus humilis, Psychotria negrosensis, P. cuernosensis, P. microphylla, Ophiorrhiza caespitulosa*, and *Hedyotis leucocarpa*.

Elmer, A. D. E. The Genus Itea. *Leafl. Philip. Bot.* 2 (1908) 527–529. (Article 25.)

A discussion of the Philippine species only, two being considered and described as new, *Itea macsaefolia*, and *I. luzonensis* (*I. macrophylla* of other Philippine authors).

Elmer, A. D. E. A Fascicle of South Negros Figs. *Leafl. Philip. Bot.* 2 (1908) 531–551. (Article 26.)

Thirty-five species are enumerated of which the following are described as new: *Ficus hallieri* Merr. (insufficient diagnosis), *F. everettii*, *F. benguetensis* Merr., var. *negrosensis*, *F. cervina*, *F. cuernosensis*, *F. crassitora*, and *F. garciae*. *Ficus ruficaulis* var. *paloensis* Elm. is raised to specific rank.

Elmer, A. D. E. Gesneriaceae from the Cuernos Mts. *Leafl. Philip. Bot.* 2 (1908) 553–567. (Article 27.)

Seventeen species are enumerated, of which the following are described as new: *Cyrtandra maesifolia*, *C. fragilis*, *C. attenuata*, *C. pallida*, *C. antoniana*, *Rhynchoglossum spumosum*, *Trichosporum cuernosense*, and *T. truncatum*.

Elmer, A. D. E. A Score of New Plants. *Leafl. Philip. Bot.* 2 (1909) 573–594. (Article 29.)

Consists of the descriptions of the following species: *Mapania lucbanensis*, *M. banahaensis*, *Aphananthe negrosensis*, *Gymnacranthera negrosensis*, *Weinmannia negrosensis*, *Parinarium coccineum*, *Sabia reticulata*, *Saurauia panduriformis*, *Eugenia incrassata*, *E. robinsoni*, *E. vidaliana*, *Schefflera paniculata* (=*S. foetida* Merr.), *Linociera rubrovenia*, *Carruthersia imberbis*, *C. hirsuta*, *Erycibe dubia*, *Eranthemum fruticosum*, *Hemigraphis sublobatum*, *Psychotria diffusa cervina*, and *Pratia ovata*.

Elmer, A. D. E. Synopsis of Fagraea. *Leafl. Philip. Bot.* 2 (1909) 595–601. (Article 30.)

Eight species are considered of which the following are described as new: *F. negrosensis*, and *F. cuernosensis*. The paper applies only to Philippine forms.

Elmer, A. D. E. Synopsis of Artocarpus. *Leafl. Philip. Bot.* 2 (1909) 609–626. (Article 32.)

The paper considers only the Philippine species, seventeen being recognized, of which the following are described as new: *Artocarpus nigrescens*, *A. communis* var. *blancoi*, and *A. treculiana*. A key is given to the species recognized.

Elmer, A. D. E. The Genus Hydrocotyle. *Leafl. Philip. Bot.* 2 (1909) 627–629. (Article 33.)

The paper applies only to the Philippine species, five being recognized, with an analytical key; *H. benguetensis* and *H. delicata* are described as new.

Elmer, A. D. E. A New Grewia. *Leafl. Philip. Bot.* 2 (1909) 631, 632. (Article 34.)

Grewia negrosensis is described as new.

Engler, A. Addimentatum ad Araceas-Pothoideas. *Pflanzenreich* 37 (1908) 2, 3; II 138, 139.

This consists of a description of the genus *Epipremnopsis*, which is first made monotypic, all specimens being referred to *E. media* (Z. & M.) Engl., extending from India to Malaya, and the Philippines. In the "Addimentum II," 183, however, the Philippine form is separated as a distinct, endemic, Philippine species, as *E. hugeliana* (Schott) Engl.

Engler, A. & Krause, K. Araceae-Monsteroideae. *Pflanzenreich* 37 (1908) I 138.

The following species are credited to the Philippines: *Raphidophora perkinsiae* Engl., endemic, *R. philippinensis* sp. nov., *R. copelandii* Engl., endemic, *R. merrillii* Engl., endemic, *R. warburgii* Engl., endemic, *Epipremnum pinnatum* (L.) Engl., Indo-Malaya to Polynesia, *E. truncatum* sp. nov., *E. elmeria-*

num Engl. sp. nov., *Scindapsus hederaceus* Schott, Cochin China and Malaya, *S. curranii* sp. nov., and *Spathiphyllum commutatum* Schott, Philippines and Celebes. Four of the new Philippine species of *Raphidophora*, *Epipremnum*, and *Scindapsus* are described in the "Additamentum," pages 137, 138.

Finet, E.-A. Orchidées nouvelles ou peu connues. *Bull. Soc. Bot. France* XIV 9 (1909) 97–104.

Liparis disticha Lindl. var. *latilabris* Finet is the only Philippine form considered, the variety, based on *Cuming 2099*, being described as new.

Focke, W. O. Species Ruborum. Monographiae generis Rubi Prodromus, Pars I. *Bibl. Bot.* 72 (1910) 1–120, figs. 53.

The following Philippine species are considered: *Rubus pectinellus* Maxim., Japan and Luzon; *R. copelandi* Merr., endemic; *R. cumingii* O. Kuntze, endemic; *R. luzoniensis* Merr., endemic; *R. zambalensis* Elm., endemic.; *R. pirifolius* Sm. var. *latifolius* Focke, Java, Sumatra, and Negros; *R. benguetensis* Elm., endemic; *R. mearnsii* Elm., endemic; *R. angulosis* Focke n. sp., Malay Peninsula and Archipelago, "Anscheinend auch auf Luzon;" *R. glomeratus* Bl. var. *pilcanus* Focke n. var., Luzon, the species in Java; *R. vidalii* Focke n. sp., endemic; *R. hasskarlii* Miq., subsp. *dendrocharis* Focke, New Guinea, Bismarck Archipelago, Carolines, Fiji, Mindanao; *R. rolfei* Vid., endemic, and *R. elmeri* Focke n. sp., endemic.

Foslie, M. Nye Kalkalger. *Kgl. Vidensk. Selsk. Skrifter* (1908) no. 12: 1–9.

Litholepis indica Fosl., forma *philippinensis* Fosl., is described from Philippine material.

Gagnepain, F. Essai d'une classification des Cratoxylon asiatiques. *Notul. Syst.* 1 (1909) 14–22.

Eleven species are considered, four of which are reported from the Philippines. Of the Philippine forms, *C. floribundum* (Turcz.) F.-Vill., which I have reduced to *C. celebicum* Bl., is reduced by Gagnepain to *C. clandestinum* Bl., while *C. arborescens* (Vahl) Bl. is reduced to *C. blancoi* Bl., although Vahl's name is much the oldest.

Hennings, P. Fungi Warburgiani. *Hedwigia* 32 (1893) 216–227.

Thirty-one species of fungi are credited to the Philippines in this paper, of which a single one, *Xylaria luzoniensis*, is described as new.

Herter, W. Beiträge zur Kenntnis der Gattung Lycopodium. Studien über die Untergattung Urostachys. *Engl. Bot. Jahrb.* 53 (1909) Beibl. 98: 1–56.

One hundred and forty species are recognized, of which forty-eight are described as new. No species are credited to the Philippines by definite citation of specimens, but of those considered, the following have been reported from the Archipelago by various authors: *Lycopodium serratum* Thunb., *L. verticillatum* Linn. f., *L. carinatum* Desv., *L. squarrosum* Forst., *L. phyllanthum* Hook. & Arn., *L. phlegmaria* Linn., and *L. pinifolium* Blume.

Herter, W. Ein neuer Beitrag zur Kenntnis der Gattung Lycopodium. *Hedwigia* 49 (1909) 88–92.

Several new species are described, including *Lycopodium magnusianum* Hert., based on material collected by Mrs. Clemens in Mindanao.

Hooker, J. D. A Review of the Known Species of Philippine Islands Species of Impatiens. *Kew Bull.* (1909) 281–289.

Twenty-five species are enumerated, all but two of which are described as new, all being endemic with the exception of the introduced *Impatiens balsamina* Linn. The species are as follows: *Impatiens balsamina* L., and forma *diplocycla* Hk. f., *I. polyactina* Hk. f., *I. burkei* Hk. f., *I. merrillii* Hk. f.,

I. hutchinsonii Hk. f., *I. clemensae* Hk. f., *I. biganensis* Hk. f., *I. caritcana* Hk. f., *I. elmeri* Hk. f., *I. manillensis* Walp., *I. quercetorum* Hk. f., *I. klemmeana* Hk. f., *I. pubisepala* Hk. f., *I. mearnsii* Hk. f., *I. vidalii* Hk. f., *I. barnesii* Hk. f., *I. rizaliana* Hk. f., *I. ahernii* Hk. f., *I. montalbana* Hk. f., *I. ramosii* Hk. f., *I. filicaulis* Hk. f., *I. curranii* Hk. f., *I. cryptogama* Hk. f., *I. cleistogama* Hk. f., and *I. loheri* Hk. f.

Jussieu, A. L. Observations sur la famille des plantes Verbénacées. *Ann. Mus. Paris* 7 (1806) 63–67.

Acgiphila viburnifolia (=*Premna* ?), and *Vitex parviflora* are described from the Philippines.

Kränzlin, F. Zwei neue Orchideen von den Philippinen. *Fedde's Repertorium* 7 (1910) 97, 98.

Cirrhopetalum chryscum Kränzl., and *Trichoglottis solerederi* Kränzl. are described as new.

Kränzlin, F. Einige neue Orchidaceen. *Fedde's Repertorium* 7 (1909) 38–41.

Sarcopodium stella sylrae Loher & Kränzlin is described from Luzon, and *Dendrobium goldschmidtianum* Kränzlin from "Provinz der Philippinen und Formosa."

Kükenthal, G. Cyperaceae-Caricoideae. *Pflanzenreich* 38 (1909) 1–824.

Four genera are recognized, the chief interest centering in *Carex*, of which 798 species are recognized, with numerous subspecies, varieties, and forms. *Uncinia* with 23 species, confined to South and Central America, Mexico, New Zealand, and Australia, with one species extending to New Guinea, is now known to occur in Luzon (*U. rupestris* Raoul var. *capillacea* Kükenthal). Of the genus *Carex*, the following species are definitely recorded from the Archipelago: *Carex rara* Boott. Ceylon, mountains of India, and Borneo; *C. baccans* Nees, India and Ceylon to southern China, Formosa, Java, and Sumatra; *C. filicina* Nees, India and Ceylon, central China, and Java; *C. continua* Clarke, Himalayan region, Burma, and central China; *C. rafflesiana* Boott, var. *scaberrima* (Boeck.) Kükenth., Java, Sumatra, Celebes, Ternate; *C. walkeri* Arn., var. *turrita* (Clarke) Kükenth., the variety endemic, the species in India, Ceylon, and Java; *C. fuirenoides* Gaudich., var. *cirrhulosa* (Nees) Kükenth., the variety endemic, the species in the Marianne Islands; *C. nodiflora* Boeck., endemic; *C. graeffeana* Boeck., Fiji; *C. cryptostachys* Brongn., Malay Peninsula, Waigou, Tonkin, Hongkong, and Formosa, and *C. brunnea* Thunb., India to the Mascarene Islands, Japan, Malaya, New Caledonia, and Australia. *Carex rhynchachaenium* C. B. Clarke is mentioned only as a species unknown to the author, and *C. subtransversa* C. B. Clarke is discussed under *C. brownii* Tuckerm. The above list of thirteen Philippine species has been greatly increased by the more recent collections in the Archipelago.

Moore, S. Le M. Alabastra diversa — Part IV. *Journ. Bot.* 37 (1899) 168–175.

Two Philippine species are described as new, from the collections of John Whitehead, *Eurya amplexicaulis* from Mindoro (more recently described by Mr. Elmer as *E. auriculata*), and *Trichosporum breviflorum* from Negros.

Presl, C. B. Hymenophyllaceae. Eine botanische Abhandlung. (1843) pp. 1–70, *pl. 12.* (Reprint from *Abhandl. Böhm. Ges. Wiss.* V 3:93–163).

The following species are described from the Philippines, all based on specimens collected by Cuming: *Trichomanes asplenioides*, *T. dimidiatum*, *T. saxifragoides*, *T. palmatum*, *T. luzonicum*, *T. acutum*, *T. millefolium*, *T. apiifolium*, *T. eminens*, *Didymoglossum brevipes*, *D. undulatum*, *D. serrulatum*, *D. longisetum*, *Hymenophyllum paniculiflorum*, *Sphaerocionium macrocarpum*, *Cephalomanes atrovirens* and *Abrodictyum cumingii*.

Radlkofer, L. Über die Gattung Allophylus und die Ordnung ihrer Arten. *Sitz. Math.-Phys. Klasse Kgl. Bayer. Akad. Wissensch.* 38[2] (1909) 201–240.

One hundred and fifty-six species are recognized, and an analytical key is given to them. Eighteen species are Philippine, of the forty-nine known from the Indo-Malayan-Polynesian region, and fourteen of these are endemic. The Philippine species are as follows: *Allophylus largifolius* sp. nov., *A. unifoliolatus* Radlk., *A. apiocarpus* sp. nov., *A. hymenocalyx* sp. nov., *A. racemosus* Radlk., *A. ternatus* Radlk., *A. setulosus* Radlk., *A. leptococcus* Radlk., *A. dasythyrsus* sp. nov., *A. malvaceus* sp. nov., *A. filiger* Radlk., *A. macrostachys* Radlk., *A. grossedentatus* F.-Vill., *A. chlorocarpus* sp. nov., *A. timorensis* Blume, *A. dimorphus* Radlk., *A. quinatus* Radlk., and *A. insignis* sp. nov.

Radlkofer, L. Ueber die Sapindaceen Holländisch-Indiens. *Act. Congr. Int. Bot. Amsterdam* 1877 (1878) 70–133 (reprint 1–63).

Contains many notes on the synonymy of Philippine species, some new combinations, and the descriptions of several new species from the Archipelago, *Lepisanthes ? eriolepis*, *Allophylus dimorphus*, and *A. filiger*, the latter two credited to Java, but the specimens on which they were based were really collected in the Philippines (coll. Lobb) and distributed with erroneous localizations.

Radlkofer, L. Nachträge zur Uebersicht der Sapindaceen Hollandisch-Indiens (issued with the reprint of the above, pp. 65–103).

Supplementary to the preceding paper, and containing some additional notes on Philippine species.

Radlkofer, L. Ueber eine von Grisebach unter den Sapotaceen aufgeführte Daphnoidee. *Sitz. Math.-Phys. Klasse Kgl. Bayer. Acad. Wissench.* 14 (1884) 487–250.

In a consideration of the genus *Paramoria*, *P. philippinensis* and *P. vulneraria* are described from the Philippines.

Rehm, H. Ascomycetes novi. *Ann. Mycol.* 5 (1907) 516–545.

A single Philippine species is described as new, *Mollisia copelandi* Rehm, from Mindanao, on leaves of *Caryota*.

Richard, A. Mémoire sur la famille des Rubiacées, contenant la description générale de cette famille et les caractères des genres qui la composent. (July, 1829) 1–226, *pl. 14*. *Mém. Soc. Hist. Nat. Paris* 5 (1834) 81–304, *pl. 11–29*.

Mussaenda philippica, *Sabicea perrottetii*, *Plectronia monstrosa* and *Canthium lycioides* are described from Philippine material, all of which have been overlooked by most recent Philippine authors. According to the date on the title page the separate was issued about five years before it appeared in the "Mémoires."

Ridley, H. N. New Philippine Zingiberaceae. *Leafl. Philip. Bot.* 2 (1909) 569–572. (Article 28.)

A new genus *Elmeria* is described (non *Elmera* Rydb.), with two species, *E. bifida* (*Hornstedtia paradoxa* Ridl.), and *E. pinctorum*. Three species in other genera are also described, *Phrynium philippinense* Ridl., *Alpinia pendulifiora*, and *Plagiostachys philippinensis*.

Ridley, H. N. Zingiberaceae from South Negros. *Leafl. Philip. Bot.* 2 (1909) 603–607. (Article 31.)

Sixteen species are enumerated, the following described as new: *Alpinia musaefolia*, *Amomum lepicarpum* and var. *pubescens*, *Hornstedtia conoidea*, *H. microcheila*, and *H. lophophora*, while the new generic name *Adelmeria* is proposed for *Elmeria* Ridl., non *Elmera* Rydb. See Ridley "The Scitamineae of the Philippine Islands" *Philip. Journ. Sci.* 4 (1909) Bot. 155–199.

Rolfe, R. A. Supplementary List of Philippine Plants. *Journ. Bot.* 23 (1885) 209–216.

A list of 186 Philippine species which were not included by F.-Villar and Naves in the "Novissima Appendix" to the third edition of Blanco's "Flora de Filipinas." The paper contains the following new combinations: *Strombosia philippinensis* (Baill.) Rolfe, *Gomphandra laxiflora* (Miers) Rolfe, *Cupania revoluta* (Turcz.) Rolfe, *C. subundulata* (Turcz.) Rolfe, *Connarus trifoliatus* (Presl) Rolfe as "*trifoliolatus*," *Terminalia mollis* (Presl) Rolfe, *Barringtonia luzonensis* (Miers) Rolfe, *Crypteronia leptostachys* (Planch.) Rolfe, *Urophyllum memecyloides* (Presl) Rolfe, *Microchites schrieckii* (Hueck & Muell. Arg.) Rolfe, and *Symplocos oblongifolia* (Presl) Rolfe.

Stephani, F. Hepaticarum species novae III. *Hedwigia* 32 (1893) 204–214.

Bazzania latifolia is described as new from the Philippines, the type from Siargao Island.

Stephani, F. Three New Liverworts. *Leafl. Philip. Bot.* 2 (1908) 385, 386. (Article 18.)

Anthoceros elmeri, *Plagiochila elmeri*, and *Trichocolea striolata* are described as new from material collected in Luzon.

Sydow, H. et P. Fungi novi Philippinenses. *Ann. Mycol.* 8 (1910) 36–41.

Twenty-two new species of Philippine fungi are described, as follows: *Puccinia mesomorpha*, *Uredo manilensis*, *Meliola hyptidis*, *Valsella pinangae*, *Rosellinia procera*, *Nummularia gracilenta*, *Hypoxylon minutellum*, *H. lilliputianum*, *Xylaria gracilenta*, *Phyllachora aggregatula*, *P. circinata*, *P. lepida*, *Homostegia fusispora*, *Hypocrella botryosa*, *Scyncsia scutellum*, *Lembosia congregata*, *Mollisia ravida*, *Bulgaria pusilla*, *Cytospora calami*, *C. lirella*, *Melasmia exigua*, and *Septogloeum aurcum*.

Trécul, A. Mémoire sur la famille des Artocarpées. *Ann. Sci. Nat. Bot.* III 8 (1847) 38–157, *pls. 1–6*.

In this work the following Philippine species are described for the first time: *Conocephalus acuminatus* Tréc., *C. microphyllus* Tréc., *Artocarpus cumingiana* Tréc., *A. nitida* Tréc., *A. lanceolata* Tréc., *Cudrania obovata* Tréc. The several species previously described by Blanco are not considered.

Virgil, R. M. Diccionario de los nombres vulgares que se dan en Filipinas á muchas plantas usuales y notables del mismo archipiélago, con la correspondencia científica, la clasificación natural, y la indicación de su uso. (1879) VI+50.

The scientific names in many cases are inaccurate and not to be trusted.

Zahlbruckner, A. Lichenes philippinenses. *Leafl. Philip. Bot.* 2 (1908) 435–438. (Article 21.)

Twenty-two species are enumerated including *Sticta elmeri* which is described as new; for a corrected diagnosis of this species see Zahlbruckner, "Neue Flechten – V." *Ann. Mycol.* 7 (1909) 472–478.

THE FLORA OF MOUNT HALCON, MINDORO

By ELMER D. MERRILL

(From the botanical section of the Biological Laboratory, Bureau of Science)

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No. 11, 1903, Biological Laboratory.—Entomological Division, Bulletin No. 1: Preliminary Bulletin on Insects of the Cacao. (Prepared Especially for the Benefit of Farmers.) By Charles S. Banks, Entomologist.

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(Concluded on third page of cover.)

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THE FLORA OF MOUNT HALCON, MINDORO.

By ELMER D. MERRILL.

(From the botanical section of the Biological Laboratory, Bureau of Science.)

Mount Halcon is perhaps the third highest mountain in the Philippines, it is situated in the north central part of Mindoro and near the geographical center of the entire Archipelago. Although it is within 100 miles of Manila and within 15 of Calapan, the capital of Mindoro, it has, so far as we have been able to determine, remained unascended up to the year 1906. In the latter part of that year a biological and zoölogical expedition was organized under the direction and with the support of Maj. Gen. *Leonard Wood*, the object being to explore Mount Halcon, to determine a feasible route to the mountain, to ascend the highest peak and to secure as much information as possible regarding it, as well as to make botanical and zoölogical collections. The expidition was successful in all respects although undertaken at the worst season of the year—that is, in the midst of the rainy season—and the highest point on Halcon was reached on November 22, 1906, twenty-one days after leaving the coast. The reader is referred to my account of the ascent of Halcon [1] for a narrative and geographical account of the trip, a description of Halcon and a summary of previous attempts made to ascend the mountain.

Before this time Halcon was but little known botanically, although the English ornithologist *John Whitehead* had made a small collection in the year 1895 of plants on Dulangan, a spur of the mountain. This collection yielded several species of special interest, some undescribed and

[1] *This Journal, Sec. A, Gen. Sci.* (1907), 2, 179.

others previously known only from Borneo. Bornean types, considering the proximity of the Philippines to that large island, are rather rare in the Archipelago. *Whitehead's* plants have been considered by Rendle.[2]

Most of the species collected by *Whitehead* on Halcon were also brought in by me on the expedition under discussion. *Hugh Cuming* collected in Mindoro, between the years 1836 and 1840. He undoubtedly worked in the vicinity of Calapan and on the Baco River, at the north base of Halcon, although he probably did not penetrate far into the interior of the island. *Cuming,* in most cases, did not give localities for his plants; he was never more definite than to give the province or island, so that we are not absolutely certain as to just what parts of Mindoro he visited. In 1903 and 1905 I made short collecting trips up the Baco River, and in 1905 Mr. *R. C. McGregor*, of this Bureau, collected a considerable number of plants in the same region. In June, 1906, Mr. *M. L. Merritt,* of the Philippine Forestry Bureau, accompanied Lieut. *T. H. Jennings* on his attempt to ascend Halcon. The party reached an altitude of 7,250 feet and brought in 165 numbers of plants representing about 150 species. The plants collected by myself in November, 1906, are represented by 742 numbers and comprise about 600 distinct species. The greater part of this material was gathered within a period of thirty days, from November 2 to December 2, 1906, under very unfavorable conditions. The weather, nearly every day, was more or less rainy, and for thirteen days in succession, while the party was at and above an altitude of 4,500 feet, the rain did not cease day or night. As a result of these conditions much of the collecting was accomplished in the wet, and all specimens were of necessity dried by means of fire. Material once dried could only with difficulty be preserved, and constant alertness was needed to protect our collections against moisture when we were in camp, while packing and moving in the pouring rain, and as we were fording streams. The material secured by Mr. *Merritt* was prepared under scarcely more favorable circumstances.

The present paper is based on the plants collected by Mr. *Merritt* and on those secured by myself, 271 species and varieties being considered; these are distributed into 83 families and 168 genera. Two genera are proposed as new and two families are added to the number previously known from the Philippines, one of these, *Centrolepidaceæ* being quite new to the Archipelago, and one, *Iridaceæ*, was previously known to be represented in the Philippines only by introduced and cultivated species. Seven genera and fifteen species are reported from the Philippines for the first time, while thirty-nine species are described as new. The above summary is based only on the material considered in the present paper. The vascular cryptogams collected on Halcon by me have already been

[2] *Journ. Bot.* (1896), 34, 355–358.

considered by Dr. *E. B. Copeland* under the title *Pteridophyta Halconenses*,[3] 206 species and varieties being represented in the collection, of which twenty were described as new, and eight reported for the first time from the Archipelago. Of the *Orchidaceæ* of the Halcon area, 101 species are known of which about 42 are new. These were all sent to Mr. *Oakes Ames* and are considered by him in a following paper. The mosses collected on the expedition have been enumerated by *V. F. Brotherus*, Helsingfors, Finland, his paper also following this one. No attempt has been made to determine the rather extensive collections of scale-mosses, lichens and fungi collected on the expedition, but it is hoped that arrangements can be perfected with various specialists which will result in having these groups considered at a later date. Nearly all the other material collected by Mr. *Merritt* and myself has been discussed in the present paper, but in one or two families, scantily represented on Halcon, specific identifications have not been made for one reason or another, and at least three species are not mentioned in this paper, the material representing them being insufficient to refer them with certainty to their respective genera.

Halcon is perhaps the most humid mountain in the Philippines, the rainy season continuing practically for nine months of the year, from May to January, without interruption, while the remaining three months are by no means free from precipitation, as we know from Lieutenant *Lee's* experience in the vicinity of Halcon in April, 1904. The enormous amount of rain in the Halcon area is shown by the relatively very large rivers flowing from the range. Although these in the maximum are not more than 25 or 30 miles in length, and perhaps they may be shorter, they have a breadth of from 100 to 300 yards in their lower parts, and a constant flow of a large volume of water. In the rainy season the volume of the latter is greatly augmented, all the rivers being subject to sudden and enormous floods, as is shown by the experience of *Whitehead, Lee* and our own party. *Whitehead* recorded that the Catuyran River, 200 yards wide at the place where his camp was located, rose over 20 feet within a period of less than twelve hours.

Epiphytic orchids, ferns and other plants, mosses, lichens, etc., which in other parts of the Philippines are usually found only at considerable altitudes above the sea, are in the vicinity of Halcon encountered at comparatively low elevations, along the Alag and Binabay Rivers, 65 to 200 meters above sea level, and along the Baco River at approximately sea level, thus showing that the relatively high humidity is not confined to Halcon itself but affects the surrounding low country to a considerable extent. As a result of this high humidity the open grass lands and savannah forests are entirely wanting on the north side of the Halcon Range,

[3] *This Journal, Sec. C, Bot.* (1907), **2**, 119–151.

although open grass country is visible from the high ridges to the south of the mountain. The high forest, *Dipterocarpus* type is fairly well developed, extending up to an altitude of at least 500 meters, but even this type is quite changed by its environment; terrestrial ferns, orchids and herbaceous plants being comparatively abundant and epiphytic plants numerous. The prevailing species of *Dipterocarpus, Shorea,* etc., disappear above an altitude of 500 meters, and *Quercus llanosii*, various species of *Lauracea, Acer philippinum, Aralia, Casuarina sp., Englehardtia spicata, Artocarpus, Unona, Polyalthia, Weinmannia, Elæocarpus* and many other aborescent genera appear, and epiphytic plants become more abundant. No less than twenty-two species of the genera *Hymenophyllum* and *Trichomanes* are known from Halcon.

At and above an altitude of 1,000 meters, the mossy forest type is encountered on the exposed ridges, at first confined entirely to the crest line, but as altitude is gained, extending down the lateral slopes for a greater or less distance. These crest-line forests are characterized by arborescent genera such as *Agathis, Podocarpus, Dacrydium, Phyllocladus, Pinanga, Myrica, Drimys, Illicium, Neolitsea, Homalanthus, Ilex, Elæocarpus, Eurya, Ternstroemia, Adinandra, Mearnsia, Clethra, Vaccinium, Rhododendron, Symplocos,* and others, numerous species of epiphytic orchids, ferns and other plants, and some terrestrial species, notably *Burmannia longifolia*, the ground, tree trunks and branches being densely covered with thick masses of mosses, lichens, etc., forming an ideal habitat for the abundant species of epiphytic and pseudo-epiphytic plants. The trees are more or less stunted and as altitude is gained this character becomes emphasized. Scandent or semiscandent species of *Vaccinium, Diplycosia, Schefflera, Smilax, Calamus* and *Nepenthes* clamber everywhere through the dense ridge thickets and the fern *Oleandra colubrina* Copel., alone forms such dense masses that it is frequently difficult for the traveler to force his way through them. There is a constant change in the vegetation of these ridges as altitude is gained, some genera such as *Drimys, Podocarpus, Nepenthes, Phyllocladus, Agathis, Symplocos,* etc., persisting unaltered from an altitude of 1,000 meters to the summit of the highest peak, but terrestrial and epiphytic orchids, ferns and other plants entirely change, those at the higher altitudes being quite different from those at the lower ones. Mosses and lichens become more abundant and form much thicker and denser masses on the ground and trees, whereas *Sphagnum* appears in the ground cover. There is less diversity in constituent species on the highest ridges above 2,100 meters than at lower altitudes, but the trees and shrubs on them are greatly stunted, being reduced to montane brush which rarely exceeds a height of 3 meters. Epiphytic and terrestrial plants become reduced to comparatively few species and individuals, while mosses and scale mosses correspondingly increase in abundance and diversity of forms.

On the main ridge at an altitude of 2,400 meters the montane brush of the exposed ridges becomes reduced to a mere heath, characterized by open lands with a scant cover of grasses and sedges, with scattered dwarfed undershrubs and bushes and some very characteristic herbaceous plants, a mixture of northern or continental, Bornean and Australian types. These heath lands cover considerable areas on the south slopes of the main range of Halcon, but do not extend down to the north slope. The characteristic species are *Lycopodium halconense*, Copel, *L. cernuum* Linn., forma, *Gleichenia dicarpa* R. Br., *Dipteris conjugata* var. *alpina* Christ, *Miscanthus sinensis* And., *Isachne beneckei* Hack., *I. myosotis* Nees, *Schoenus melanostachys* R. Br., *Cladium latifolium* Merr., *Gahnia javanica* Mor., *Centrolepis philippinensis* Merr., *Eriocaulon brevipedunculatum* Merr., *Dianella ensifolia* DC., *Liriope brachyphylla* Merr., *Patersonia lowii* Stapf., *Drosera spathulata* Labill., *D. peltata* Sm., *Rubus rolfei* Vid., *Halorrhagis halconensis* Merr., *H. micrantha* R. Br., *Didiscus saniculæfolius* Merr., *Vaccinium banksii* Merr., *V. villarii* Vid., *V. whitfordii* Merr., *Rapanea retusa* Merr., *Utricularia orbiculata* Wall., *Hedyotis montana* Merr., *Leptospermum amboinense* Bl., *Rhododendron quadrasianum* Vid., and *Adinandra* sp.

The botanical exploration of Halcon has added representatives of two families new to the Archipelago to our knowledge to the Philippine flora, seven genera new to the Islands, fifteen species previously described from surrounding regions, and many new to science. Considering the proximity of Borneo to the Philippines, and the connecting chains of islands, the Sulu Archipelago at the south, Balabac, Palawan, the Calamianes, and the Mindoro chain extending to the north, Bornean types in the Philippine flora are comparatively rare, but it is not at all surprising to find a considerable number of characteristic Bornean plants on Halcon, although *Copeland*[4] in the 206 species and varieties of vascular cryptogams known from Halcon considered but one *Ophioglossum intermedium*, to be of probable Bornean origin. *Dacrydium falciforme Pilger*, *Patersonia lowii* Stapf, and *Didiscus saniculæfolius* Merr., are known only from Mindoro and Borneo, *Schoenus melanostachys* R. Br., from Mindoro, Borneo and Australia, *Burmannia longifolia* Becc. from Mindoro, Borneo and Malayan Peninsula, *Symplocos adenophylla* Wall., from Mindoro, Borneo, Banca, Singapore and Penang, while *Hedyotis eucapitata* Merr., is closely related to a species known only from North Borneo. On the other hand there is a rather remarkable assemblage of Australian types on Halcon, all at high altitudes. Among these may be mentioned *Schoenus melanostachys* R. Br., Australia, Borneo and Mindor, the genus being largely developed in Australia, with few species occurring in the Northern Hemisphere, *Centrolepis philippinensis* Merr.,

[4] *Loc. cit.*, 121.

perhaps the most remarkable find in the Philippines in the history of recent botanical exploration of the Archipelago, as this small family is almost entirely Australian, six genera being generally recognized, of which four, *Juncella*, *Brizula*, *Aphelia* and *Hepyrum*, are confined to Australia, New Zealand and Tasmania, and a fifth, *Gaimardia* of two species, confined to New Zealand, Cape Horn and the Falkland Islands. The sixth genus, *Centrolepis*, is represented by about twenty species, of which one is found in southern Asia (Cambodia), one on Mount Halcon and the remainder in south Australia and Tasmania. *Dianella caerulea*, the genus being a characteristic Australian one, extends from Australia through New Guinea to Luzon. *Patersonia lowii* Stepf, known from Borneo and Mindoro, is essentially an Australian type, two species of the genus being found on Mount Kinabalu, North Borneo, one extending to Mount Halcon, Mindoro, the remaining species, about nineteen, being confined to Australia. *Halorrhagis halconensis* Merr., the fourth species of the genus to be found in the Philippines, is also an Australian type, the genus being largely developed in Australia and for the greater part confined to that continent. *Didiscus saniculaefolius* Merr., of Mindoro and Borneo, is also an Australian type, twelve species of the genus being Australian, one New Caledonian, and one Mindoro and Bornean. *Cladium latifolium* Merr., is one of the comparatively few species of the genus found outside of Australia. The Australian element in the Philippines has previously been known to be rather large and characteristic, and it is considerably augmented by the species enumerated above.

I have advanced elsewhere[5] the belief that Mindoro is probably the one part of the group which has remained continuously above water for a longer period of time that any of the surrounding islands, and a part of it at least may have been so from the time that it was connected with the great land-mass of the ancient Malayan continent. The geological structure of the island, especially that part of it in the Halcon area, seems to be quite similar to that of Mount Kinabalu, North Borneo, so far as I can determine from available descriptions of the latter, and entirely different from that of the islands in closest proximity to it, namely Luzon and others. The presence only in Mindoro of the one large mammal in the Philippines (*Bubalus mindorensis*) is evidence in favor of the above hypothesis. Much is known of the avifauna of the island and in this character Mindoro is apparently related with Borneo through Palawan, rather than with its nearer neighbor, Luzon. The presence of a decided Bornean and Australian element in the flora at the higher altitudes on Halcon also indicates previous and close relationships with the great land-masses to the East and South, but I find that this botanical

[5] *This Journal, Sec. A, Gen. Sci.* (1907), 2, 201.

evidence is not confined to the higher altitudes of Mindoro, for the characteristic Malayan or Indo-Malayan genera represented by *Chrysophyllum roxburghii* and *Ochtocharis javanica*, both species of low elevations, are at present known in the Philippines only from this island. However, as other Bornean and Australian types are known in the Philippines only in Luzon, the botanical evidence alone is not conclusive.

In the present paper and in those by *Copeland*, *Brotherus* and *Ames* on the Halcon flora, considerably over 600 species are considered, for the greater part collected on two short expeditions, both made under very unfavorable conditions for collecting and preserving botanical material because of the prevailing rains, Mr. *Merritt's* expedition having been made in June, and my own in November. Considering that in this region plants flower throughout the year, different species at different seasons, it seems very probable that we at present know considerably less than one-half the species actually growing on Halcon, and that future exploration will yield much material and many data of value. Halcon then, like Kinabalu, must still be considered to be very imperfectly known botanically, the former rather better than the latter, for in *Stapf's* paper on the flora of the latter only about 450 species are enumerated.

PINACEÆ.

AGATHIS Salisb.

Agathis philippinensis Warb. Monsunia 1 (1900) 185, *t.* 8. *f. E.*

In forests 700 to 2,500 m. alt., abundant, mature cone only collected.

Widely distributed in the Philippines, from northern Luzon to southern Mindanao. Endemic.

TAXACEÆ.[6]

DACRYDIUM Soland.

Dacrydium falciforme (Parl.) Pilger in Engl. Pflanzenreich 18 (1903) 45. *Podocarpus falciformis* Parl. in DC. Prodr. 16[2] (1868) 685.

In forests at 1,800 m. alt. (No. 5744); also collected by *Merritt* in June, 1906, at 160 m. alt. (No. 4425).

Borneo.

This species was previously collected on Halcon (Dulangan) by *Whitehead*, and reported by *Rendle*.[7] The above specimens exactly match fragments of No. 1697 *Beccari*, from Mount Mattang, Sarawak, Borneo, kindly supplied me by Dr. *Beccari*, except that the leaves of the Halcon specimens are slightly smaller than in the Borneo plant. An interesting Bornean type in the Philippine flora.

Dacrydium elatum (Roxb.) Wall. ex Hook. Lond. Journ. Bot. 2 (1843) 144, *t.* 2; Pilger l. c. 51. *Juniperus elata* Roxb., Fl. Ind. 3 (1832) 838.

In forests on exposed ridges at 1,300 m. alt. (No. 5789); also collected by *Merritt* at 1,600 m. alt. (No. 4419).

[6] By F. W. Foxworthy, Bureau of Science, Manila.

[7] *Journ. Bot.* (1896), 34, 355.

Tonkin to Singapore, Sumatra, Borneo and the Viti Islands.

This species is widely distributed, at least in the southern Philippines, on the higher mountains. NEGROS, Mount Silay (4543 *P. del Villar*) June, 1906; (4227 *Everett*) February, 1906. PANAY, Mount Madiaas (*Yoder*) April, 1905. MINDANAO, Mount Malindang (4547, 4548, 4731 *Mearns & Hutchinson*) May, 1906. It was first collected in the Philippines by *Whitehead*, on Mount Halcon in 1895, and reported by *Rendle*.[8]

Dacrydium sp. near *D. Beccarii* Parl.

In thickets, exposed ridges at 2,600 m. alt. (No. 5714), sterile specimens. Possibly a young form of the preceding.

PODOCARPUS L'Hérit.

Podocarpus imbricatus Blume var. **cumingii** (Parl.) Pilg. in Engl. Pflanzenreich. 18 (1903) 56.

In thickets on exposed ridges at 2,500 m. alt. (No. 5563); also collected by *Merritt* at 2,200 m. alt. (Nos. 4446, 4471).

The variety widely distributed on the higher mountains of the Philippines, endemic; the species from Burma to the Malayan Archipelago.

Podocarpus blumei Endl. Sn. (1847) 208; Pilger l. c. 60.

In forests at 1,800 m. alt. (No. 5728).

Previously known in the Philippines only from Mount Mariveles, Luzon.

Java to New Guinea.

Podocarpus amarus Blume Enum. Pl. Jav. (1827) 88; Pilger l. c. 68.

In forests at 1,800 m. alt. (No. 5703). Not previously reported from the Philippines.

Java and Sumatra to east Australia.

Podocarpus neriifolius D. Don. in Lamb. Pin. (1824) 21; Pilger l. c. 80.

In forests along the Alag River at and below 10 m. alt. (No. 5768). Sterile material.

Previously known in the Philippines only from Luzon.

British India to southern China through Malaya to New Guinea.

Podocarpus rumphii Blume Rumphia 3 (1847) 214; Pilger l. c. 81.

In forests at about 300 m. alt. (No. 5553). Only sterile material but probably this species which is new to the Philippines.

Celebes to the Moluccas and New Guinea.

Podocarpus glaucus Foxworthy n. sp. § *Stachycarpus?*

Arbor parva 5 ad 6 m. alta, ramulis congestis, foliis congestis, ascendente-patentibus, coriaceis, nitidis, glabris, subtus pallidis, oblongis, 9 ad 17 mm. longis, 3.5 ad 5.5 cm. latis, obtusis, basi sensim angusto-decurrentibus; flores masculi spicati, spicis cylindraceis, 1 ad 1.5 cm. longis, circa 3 mm. latis, dense multifloribus.

A small tree 5 to 6 m. tall, much branched, the branches terete, glabrous, gray or yellowish, the branchlets very numerous, short, crowded towards the ends of the branches. Leaves crowded towards the ends of the twigs, erect-spreading, often appearing subopposite on account of their contiguity, coriaceous, glabrous, smooth, shining, paler beneath and the younger ones very glaucous, oblong, elliptic-oblong or spatulate,

[8] *Loc. cit.*

9 to 17 mm. long, 3.5 to 5.5 mm. wide, the apex rounded or obtuse, the base gradually narrowed and somewhat decurrent, the midrib not prominent above, very prominent beneath, the margins thickened; petioles broad, 1 to 2 mm. long. Staminate spikes solitary in the upper leaf-axils, few, cylindrical, 1 to 1.5 cm. long, 3 mm. in diameter, densely many flowered, glaucous when young. Pistillate flowers and fruit not seen.

Borders of thickets on the margins of open heaths at 2,400 m. alt. (No. 5672).

Podocarpus pilgeri Foxworthy, nom. nov. *P. celebicus* Warb. Mons. 1 (1900) 192; Pilger l. c. 78, non *P. celebica* Hemsl. in Kew Bull. (1896) 39.

In forests at 2,100 m. alt. (No. 5754).

The specimens are sterile but match closely material with fruit, collected on Mount Malindang, MINDANAO, by *Mearns & Hutchinson*, May, 1906, No. 4673, which I have referred to the form described by *Warburg*, both agreeing closely with a fragment of the type kindly supplied me by Dr. *Engler*. Both *Warburg* and *Pilger* overlooked the fact that *Hemsley* had previously utilized the specific name *celebica*, and *Hemsley's* species is not included by the later author in his recent monograph of the family.

Podocarpus sp. § *Eupodocarpus*.

In forests at 900 m. alt. (No. 5615). Material too imperfect for accurate identification at this time.

PHYLLOCLADUS Rich.

Phyllocladus protractus (Warb.) Pilger in Engl. Pflanzenreich 18 (1903) 99. *P. hypophylla* var. *protracta* Warb. Monsunia. 1 (1900) 194.

In forests, exposed ridges at 1,300 m. alt. (No. 5788).

Widely distributed on the higher mountains of the Philippines from northern Luzon to southern Mindanao. The specimens reported from Mount Dulangan, a spur of Halcon, by *Rendle*,[9] collected by *Whitehead*, as *P. hypophylla* are probably referable to *Warburg's* species.

Moluccas and New Guinea.

PANDANACEÆ.

FREYCINETIA Gaudich.

Freycinetia multiflora Merrill n. sp. § *Oligostigma*.

Scandens, ramis ca. 7 mm. crassis; foliis lanceolatis, 20 ad 40 cm. longis, 1.5 ad 2 cm. latis, apice acutis vel acuminatis, supra basin et versus apicem denticulatis; inflorescentiae terminales; spadices ♀ quini vel sexi, oblongo-cylindrici, 8 ad 10 cm. longi, 1.5 cm. crassi; pedunculis 3 cm. longis, scabriusculis; stigmata 2 vel 3.

Scandent, the branches about 7 mm. thick. Leaves lanceolate, 20 to 40 cm. long, 1.5 to 2 cm. wide, the apex acute or acuminate, the base slightly narrowed, clasping, the margins below and towards the apex serrulate, in the median portion entire, the midrib glabrous on both surfaces or beneath with very few teeth in the upper portion. Inflorescence

[9] *Journ. Bot.* (1896), 34, 355.

terminal; pistillate spadices 5 or 6, oblong-cylindrical, 8 to 10 cm. long, about 1.5 cm. thick, the peduncles 3 cm. long, ferruginous, strongly scabrous. Fruits very numerous, the free portions subpyramidal, strongly ridged. Stigmas 2, rarely 3.

Scandent in forests at 900 m. alt. (No. 5647).

A species possibly as closely related to *Freycinetia luzonensis* Presl, as to any other, differing from that species in its longer leaves and more numerous and much larger spadices. No. 2994 *Ahern's collector* from the Province of Rizal, Luzon, is apparently the same.

Freycinetia globosa Merrill, n. sp. § *Pleiostigma*.

Gracilis, scandens, ramulis 2 ad 3 mm. latis, foliis late lanceolatis vel oblongo-lanceolatis, 2.5 ad 7 cm. longis, 5 ad 15 mm. crassis, apice breviter acuminatis, basi abrupte angustatis, denticulatis; inflorescentiae terminales, spadices ♀ terni, fructiferi globosi, ca. 2 cm. diametro, pedunculis glabris, 1 cm. longis; fructus ca. 1 cm. longus; semina 2.5 mm. longa, anguste linearia; stigmata 4.

Slender, scandent, the branches reddish-brown, glabrous, 2 to 3 mm. thick. Leaves broadly lanceolate or oblong lanceolate, 2.5 to 7 cm. long, 5 to 15 mm. wide, shortly acuminate, the base rather abruptly, narrowed into a 5 mm. long clasping petiole, not auricled, the margins slightly denticulate throughout, the teeth small, often obscure; nerves about 15, parallel, nearly as prominent as the midrib. Inflorescence terminal, pistillate spadices globose, red, fleshy, about 2 cm. in diameter, the peduncles glabrous, about 1 cm. long; fruits nearly 1 cm. long, fleshy, ovoid; seeds numerous, white, narrowly linear, 2.5 mm. long.

Scandent in forests at 1,150 m. alt. (No. 5791).

A species apparently related to *Freycinetia ensifolia* Merr., from Mount Mariveles and to *F. sphaerocephala* Gaudich., differing from the former in its relatively broader, shorter leaves and from the latter in its longer, quite differently shaped and less strongly denticulate leaves which are not auriculate at the base.

GRAMINEÆ.

MISCANTHUS Anders.

Miscanthus sinensis Anders. Oefv. Vet. Akad. Forhandl. Stockh. (1855) 166; Merr. in Philip. Journ. Sci. 1 (1906) Suppl., 323.

In open heaths at 2,400 m. alt. (No. 5704).

On most Philippine mountains.

Japan and China to Cochin China, Borneo and Celebes.

POLLINIA Trin.

Pollinia sp. near *P. monantha* Nees; Merr. in Philip. Journ. Sci. 1 (1906) Suppl., 327.

In an old clearing at 700 m. alt. (No. 5627).

Apparently identical with specimens from Luzon that *Hackel* has indicated in lit. as an undescribed species.

PANICUM Linn.

Panicum sarmentosum Roxb. Fl. Ind. 1 (1820) 308; Merr. in Philip. Journ. Sci. 1 (1906) Suppl., 360.

In old clearings at 750 m. alt. (No. 5558).

Widely distributed in the Philippines.

India to southern China and Malaya.

Panicum palmæfolium Koenig in Naturforsch. 23 (1788) 208; Merr. l. c. 361.

In an old clearing at 900 m. alt. (No. 5585).

Widely distributed in the Philippines.

Tropical Africa to India, Japan and Malaya.

ISACHNE R. Br.

Isachne beneckei Hack. in Oesterr. Bot. Zeitschr. 51 (1901) 459; Merr. in Philip. Journ. Sci. 1 (1906) Suppl., 350.

In an open heath at 2,400 m. alt. (Nos. 6203, 6221).

In the Philippines previously known only from Luzon.

Java.

Isachne myosotis Nees in Hook. Kew Journ. 2 (1850) 98; Merr. l. c. 349.

In an open heath at 2,400 m. alt. (No. 6167); also collected by *Merritt*, No. 4405, at 1,500 m. alt. June, 1906.

Endemic to the Philippines.

ICHNANTHUS Beauv.

Ichnanthus pallens (Sw.) Munro in Benth. Fl. Hongk. (1861) 414; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 263.

In an old clearing and in forests at 900 m. alt. (No. 5538); on semishaded cliffs overhanging the Alag River at 380 m. alt. (No. 5498).

Previously known in the Philippines only from Luzon.

Tropics of both hemispheres.

LOPHATHERUM Brongn.

Lophatherum gracile Brongn. in Duperry Voy. Coqu. Bot. (1829) 50. *t. 8;* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 368.

In an old clearing at 700 m. alt. (No. 5543).

Previously known in the Philippines only from Luzon.

British India to southern China and Japan and Malaya.

BAMBUSA Schreb.

Bambusa sp. near *B. pygmæa* Miq.

In sphagnum in dense thickets at 2,600 m. alt. (No. 6222).

A remarkably small species, full-grown plants never exceeding 1.5 m. in height, and frequently less than 1 m. tall. I have the same form from similar habitat in northern Luzon (Pauai, *Merrill* (No. 4733), November, 1905). Unfortunately both numbers are without flowers or fruits.

CYPERACEÆ.

KYLLINGA Rottb.

Kyllinga intermedia R. Br. Prodr. (1810) 219; Clarke in Philip. Journ. Sci. Bot. 2 (1907) 78.

At 1,500 m. alt. (No. 4404 *Merritt*) June, 1906.

Previously known in the Philippines only from northern Luzon.

Formosa, the Philippines, north and east Australia and (?) the Fiji Islands.

CYPERUS Linn.

Cyperus diffusus Vahl. Enum. 2 (1806) 321; Clarke in Philip. Journ. Sci. Bot. 2 (1907) 83.

In an old clearing along the Alag River at 100 m. alt. (No. 5692).

Previously known in the Philippines from Luzon and Mindanao.

India to Malaya and New Guinea.

TORULINIUM Desv.

Torulinium confertum Desv. in Hamilt. Prodr. Ind. Occ. (1825) 15; Clarke in Philip. Journ. Sci. Bot. 2 (1907) 89.

With the preceding (No. 5693).

Widely distributed in the Philippines.

Cosmopolitan in the Tropics.

MAPANIA Aubl.

Mapania humilis (Hassk.) F.-Vill. Nov. App. (1883) 309; Clarke in Philip. Journ. Sci. Bot. 2 (1907) 109.

In forests along the Alag River at 200 m. alt. (No. 6130).

Previously known in the Philippines from Luzon, Mindoro and Mindanao.

Malayan peninsula and archipelago.

CLADIUM R. Br.

Cladium latifolium Merrill n. sp.

Planta robusta usque ad 1 m. alta, caespitosa, glabra, foliis rigidis, coriaceis, glabris, ecostatis, basi equitantibus, inferioribus sensim reductis, planis, lineari-lanceolatis, 2.5 ad 80 cm. longis, 1 ad 1.6 cm. latis, margine glabris, apice sensim acuminatis; paniculae oblongae, circiter 10 cm. longae, 4 cm. latae, densiflorae, spiculis numerosis, 3-floris, purpurascentibus, 6 ad 7 mm. longis.

Densely caespitose, perennial, the culms about 1 m. high, glabrous. Leaves equitant at the base, the lower ones gradually reduced and the lowermost almost scale-like, all radical except one which is borne below the middle of the culm, 2.5 to 80 cm. long, 1 to 1.6 cm. wide, plane, glabrous throughout, rigid, coriaceous, ecostate, the margins smooth, the apex gradually acuminate or merely acute, the sheathing lower portions often purplish, otherwise green, the one culm-leaf about 4 cm. long. Culm erect, terete, striate, glabrous, 3 to 4 mm. in diameter. Panicle oblong, about 10 cm. long, 4 cm. in diameter, densely flowered, the branches in alternate fascicles, each fascicle subtended by a broad, inflated often purplish bract 1 to 2.5 cm. long, the apex contracted and produced as

an oblong appendage about 1 cm. long. Spikelets purple, mostly sessile, rather crowded, usually 3-flowered, the flowers perfect, 6 to 7 mm. long; three lower glumes empty, ovate to oblong ovate, 2.5 to 4 mm. long, short acuminate, the three succeeding glumes oblong-ovate, 4 mm. long, short sharp acuminate, each with a perfect flower, the seventh glume usually empty. Nut immature, trigonous, with a trigonous glabrous beak, the style 3-cleft. Stamens 3; anthers lanceolate, 2.2 mm. long, mucronate-acuminate.

On an open heath at 2,400 m. alt. (No. 5562) (sterile). The type of the species is No. 2386 *Foxworthy* from Mount Banajao, Province of Tayabas, Luzon, March, 1907, alt. 2,250 m. The second species of the genus to be found in the Philippines.

Undoubtedly most closely related to the Hongkong *Cladium ensigerum* Hance, but differing from that species in its smooth leaf-margins and much smaller spikelets. An Australian type.

SCHOENUS Linn.

Schoenus melanostachys R. Br. Prodr. (1810) 231; Benth. Fl. Austr. 7 (1878) 370; Stapf in Trans. Linn. Soc. Bot. II. 4 (1894) 245.

In open heaths at 2,400 m. alt. (No. 6173).

North Borneo and Australia.

This species, new to the Philippines, is widely distributed in Australia, where the genus is largely developed, and has also been found on Mount Kinabalu in British North Borneo at an altitude of 1,700 m. It must therefore be considered both an Australian and a Bornean representative in the Philippine flora. *Schoenus apogon* R. & S., has been found in northern Luzon by *Loher*[10]

GAHNIA Forst.

Gahnia javanica Moritzi Verz. Zoll. Pfl. (1845–46) 98; Clarke in Philip. Journ. Sci. Bot. 2 (1907) 103.

In rather open thickets, exposed ridge at 2,250 m. alt. (No. 6162).

Previously known in the Philippines from Mount Banajao, Luzon, and Mount Apo, Mindanao.

Yunnan and Penang to New Guinea and the Viti Islands.

SCLERIA Berg.

Scleria chinensis Kunth Enum. 2 (1837) 357; Clarke in Philip. Journ. Sci. Bot. 2 (1907) 105.

At 1,700 m. alt. (No. 4439 *Merritt*) June, 1906.

Previously known in the Philippines from Luzon, Negros and Mindanao.

China to Singapore, Malaya and Queensland.

CAREX Linn.

Carex filicina Nees in Wight Contrib. (1834) 123; Clarke in Philip. Journ. Sci. Bot. 2 (1907) 107.

In exposed ridge-thickets at 2,250 m. alt. (No. 6,200); also collected by *Merritt* at 1,300 m. alt., in June, 1906 (No. 4384).

Previously known in the Philippines only from the mountains of northern and central Luzon.

India to China.

[10] Clarke, *This Journal*, Sec. C (1907), 2, 102.

HYPOLYTRUM L. C. Rich.

Hypolytrum latifolium L. C. Rich. in Pers. Syn. 1 (1805) 70; Clarke in Philip. Journ. Sci. Bot. 2 (1907) 108.

In forests at 500 m. alt. (No. 4345 *Merrill*) June, 1906.

Widely distributed in the Philippines.

British India to Formosa, Malaya, Queensland and the Viti Islands.

PALMÆ.

PINANGA Blume.

Pinanga elmerii Becc. in Webbia (1905) 323.

In forests at 900 m. alt. (No. 5555).

Previously known only from the mountains of northern and central Luzon.

Pinanga sp.

In forests at 1,100 m. alt. (No. 5680); also collected by *Merrill* at an altitude of 1,500 m. in June, 1906 (No. 4468).

Pinanga maculata Porte, was observed in the forest at various places but all the specimens seen were without fruits or flowers.

Other than species of *Pinanga*, no other palms, except *Calamus*, were observed on the trip. *Calamus* is represented on Halcon by several species, but no specimens were found with fruit or flowers.

ARACEÆ.

ARISAEMA Linn.

Arisaema polyphylla (Blanco) Merr. in Govt. Lab. Publ. 27 (1905) 90.

In forests at 1,800 m. alt. (No. 6155).

Endemic in the Philippines.

SPATHIPHYLLUM Schott.

Spathiphyllum commutatum Schott. in Oest. Bot. Wochenbl. (1857) 158.

In forested ravines along a small stream at 700 m. alt. (No. 5486).

Luzon to Mindanao.

Celebes and Amboina.

CENTROLEPIDACEÆ.

CENTROLEPIS Labill.

Centrolepis philippinensis Merrill n. sp.

Perennis, dense cæspitosa, multifoliata, foliis setaceis, ad 1 cm. longis, basi pilosis, pedunculo 1 ad 2 cm. longo, glumis 2, inæqualibus, lanceolatis, 1 ad 5 mm. longis, spiculis solitariis, 4-floris; stamen; ovarium 2-loculare.

Perennial, densely cæspitose forming close mats or tufts, the stems somewhat branched, the individual plants 3 to 4 cm. high, the usually hemispherical tufts frequently 10 cm. or more in diameter. Leaves very numerous, setaceous, glabrous above, about 1 cm. long, the lower portions pilose with weak white hairs. Peduncles 1 to 2 cm. long, glabrous, terminal, each bearing 1 spikelet about 5 mm. long. Spikelets 4-flowered,

the glumes unequal, lanceolate, blunt, one 4 mm. long, one 5 mm. long. Flowers 4, hermaphrodite, each with one hyaline oblong-obovate acute bract about 4 mm. long. Stamen 1; filament 3 mm. long; anther oblong, 1-celled, 1.5 mm. long. Ovary 2-celled, the ovules superposed; styles two, 2 to 2.5 mm. long.

In open heaths at 2,400 m. alt. (No. 6160).

Perhaps the most interesting discovery in recent botanical exploration of the Philippines, the family and genus being new to the Philippine flora, both being largely developed in Australia and New Zealand. Of the six genera at present recognized in the family, four, *Juncella*, *Brizula*, *Aphelia*, and *Alepyrum* are confined to Australia, New Zealand and Tasmania, a fifth genus of two species, *Gaimardia*, is represented in New Zealand, Cape Horn and the Falkland Islands, while the sixth genus, *Centrolepis*, is represented by about twenty species, of which one is found in Cambodia, and all the others, except the one described here, in south Australia and Tasmania. Following *Hieronymus'* treatment of the family in *Engler und Prantl's* Natürlichen Pflanzenfamilien, the present species would perhaps fall in the genus *Alepyrum*, but as *Alepyrum* Hiern., is invalidated by *Alepyrum* R. Br., it has been thought best to describe the present species under *Centrolepis*.

ERIOCAULONACEÆ.

ERIOCAULON Linn.

Eriocaulon brevipedunculatum Merrill, n. sp.

Planta densissime cæspitosa, 5 ad 8 cm. alta, caulibus brevissimis, simplicibus, foliis congestis, anguste lanceolatis, acuminatis, 2 ad 2.5 cm. longis, 3 ad 4 mm. latis, glabris, pedunculis perbrevibus 0.5 ad 1 cm. longis; capitula semiglobosa, 5 ad 6 mm. lata, bracteis involucrantibus latiusculis, membranaceis, obtusis, ad 3 mm. longis; flores normaliter evoluti; perigonia 3-mera.

Densely cæspitose, 5 to 8 cm. tall, forming dense tufts. Stems short, simple; leaves very numerous, densely disposed throughout the entire length of the stem, the lower ones marcescent, narrowly lanceolate, acuminate, glabrous, 2 to 2.5 cm. long, 3 to 4 mm. wide, spreading, shining, flaccid. Peduncles solitary, the peduncles 0.5 to 1 cm. long. longis; capitula semiglobosa, 5 ad 6 mm. lata, bracteis involucrantibus membranaceous, obtuse, about 3 mm. long, obovate. Staminate flowers 3-merous; sepals free, spatulate, slightly ciliate at the apex, about 2.5 mm. long; petals narrowly ovate, acuminate, 1 mm. long, the gland prominent; stamens 6, the filaments about 1 mm. long. Pistillate flowers 3-merous; sepals free, narrowly oblong or spatulate, obtuse, slightly ciliate above, about 2.5 mm. long; petals equaling the sepals, somewhat narrower; style about 1.5 mm. long, the three style-arms nearly 2 mm. long.

In an open heath at 2,400 m. alt. (No. 6214).

A species well characterized by its densely cæspitose habit and short peduncles, the heads being solitary and included in the densely disposed leaves, not exserted.

COMMELINACEÆ.

CYANOTIS Don.

Cyanotis moluccana (Roxb.) *Commelina moluccana* Roxb. Hort. Beng. (1814) 81; Fl. Ind. 1 (1820) 172, (ed. Wall. 1: 176.) *Cyanotis uniflora* Hassk. Commel. Ind. (1870) 104; Clarke in DC. Monog Phan. 3 (1881) 242; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 34.

In open wet places near Subaan (No. 6227).

Widely distributed in the Philippines.

Malayan Archipelago.

FORRESTIA Lesson.

Forrestia philippinensis Merr. in Govt. Lab. Publ. 35 (1906) 5.

In forests along small streams at 300 m. alt. (No. 6152).

Endemic to the Philippines, the type from the Baco River near the base of Mount Halcon.

LILIACEÆ.

DIANELLA Lam.

Dianella ensifolia (L.) DC. in Red. Lil. (1802) *t. 1.*

In open heaths at 2,400 m. alt. (No. 5504).

On the higher mountains in the Philippines from northern Luzon to southern Mindanao.

British India to southern China, Malaya, Australia, Polynesia, and the Hawaiian Islands.

Dianella caerulea Sims. Bot. Mag. *t. 505.*

In forests (4469 *Merrill*) June, 1906.

Not previously reported from the Philippines, but apparently represented by the following specimens: LUZON, Province of Benguet (6030 *Elmer*); (4441, 4683 *Merrill*); Province of Bataan, Mount Mariveles (226 *Whitford*); Province of Pampanga, Mount Arayat (76 *Bolster*); Province of Laguna, Mount Maquiling (5125 *Merrill*).

New Guinea and Australia.

LIRIOPE Lour.

Liriope brachyphylla Merrill n. sp.

Glabra, usque ad 20 cm. alta, foliis confertis, membranaceis, glabris, anguste oblongis, 2.5 ad 3.5 cm. longis; scapi 1 ad 3, simplices; flores rosei, racemosi, ad bracteas solitarii; ovarium superum, 3-loculare, loculis pluri-ovulatis (ad 15).

A glabrous perennial herb. Leaves membranous, narrowly oblong, 2.5 to 3.5 cm. long, 3 to 6 mm. wide, somewhat narrowed and hyaline-sheathing below, the apex acute, all crowded at the base of the scape. Scapes 1 to 3 from each rosette of leaves, 20 cm. high or less, leafless, simple, glabrous, 10 to 15-flowered, the flower bearing portion 1 to 5 cm. long. Bracteoles linear-lanceolate, 3 to 3.5 mm. long, the flowers solitary in the axil of each bract, the pedicels about 3 mm. long. Perianth 5 to 6 mm. long, pale pink or salmon colored, the lobes 6, equal, lanceolate, acute or blunt, free or very slightly united at the very base, 3-nerved, about 1.5 mm. wide. Stamens 6; filaments 2 mm. long;

anthers 1 mm. long. Ovary free, superior, ovoid, 3-celled, each cell about 15-ovuled; style simple. Capsule 3-valved, ovoid, membranous, glabrous, 4 mm. long. Seeds many, narrowly ovoid, 0.8 mm. long, reticulate.

On seepy slopes, open heath lands at 2,400 m. alt. (No. 5710).

The second species of the genus known, the other, *Liriope graminifolia* (Linn.) Baker, being known from Japan to northern Luzon, China and Cochin China. *L. brachyphylla* is distinguished from *L. graminifolia* by its comparatively short leaves, smaller size, solitary, not fascicled flowers and many ovules.

SMILAX Tourn.

Smilax china Linn. Sp. Pl. (1753) 1459.?

On exposed ridges in thickets 1,300 to 2,600 m. alt. (Nos. 6140, 6211, 6126).

The same form is represented by Nos. 4497, 4749 *Merrill* from northern Luzon. *Smilax china* has previously been credited to the Philippines by *F.-Villar.* Because of the lack of pistillate flowers I am not certain of the correctness of the above identification, but the specimens agree well with the description.

Japan to southern China and Formosa.

Smilax vicaria Kunth Enum. 5 (1850) 262.

In an old clearing at 900 m. alt. (No. 5579).

Endemic to the Philippines.

AMARYLLIDACEÆ.

CURCULIGO Gaertn.

Curculigo glabra Merrill n. sp.

Glabra; foliis usque ad 50 cm. longis, 13 cm. latis, breviter acuminatis, basi acutis; petiolo usque ad 40 cm. longo; pedunculo ad 20 cm. longo; baccis 8 mm. longis.

Glabrous throughout. Leaves up to 50 cm. long, 13 cm. wide, membranous, the apex short acuminate, the base acute, somewhat inequilateral, the nerves prominent; petioles up to 40 cm. in length, glabrous, somewhat inflated below. Peduncles about 20 cm. long, recurved above. Flowers not seen; bracts ovate, acuminate, 7 to 10 nerved; pedicels 1 cm. long. Fruits many, narrowly ovoid, not beaked, about 8 mm. long, fleshy and smooth when fresh, rugose when dry, somewhat crowded in a 6 to 8 cm. long head; seeds many, 1.5 mm. in diameter; the somewhat persistent perianth lobes 6 mm. long.

In forests at 275 m. alt. (No. 5750).

Well characterized by being entirely glabrous throughout.

DIOSCOREACEÆ.

DIOSCOREA Linn.

Dioscorea nummularia Lam. Encycl. 2 (1789) 331.

In an old clearing at 700 m. alt. (No. 5657).

Apparently widely distributed in the Philippines.

Malaya.

STENOMERIS Planch.

Stenomeris dioscoreæfolia Planch. in Ann. Sc. Nat. III, 18 (1852) 320.
In an old clearing at 700 m. alt. (No. 5775).
Endemic to the Philippines.

IRIDACEÆ.

PATERSONIA R. Br.

Patersonia lowii Stapf. in Trans. Linn. Soc. Bot. II. 4 (1894) 241. *pl. 20. f. 7–9.*
Open heaths at 2,400 m. alt. (No. 5507). Common, but very few specimens in flower in November.
Borneo.
The above is the first indigenous representative of this family to be found in the Philippines, several genera of the *Iridaceæ* being credited to the Philippines by *F.-Villar* and other authors, but all based on introduced and cultivated species. *Patersonia lowii* has previously been known only from Mount Kinabalu, North Borneo, its occurrence in the Philippines being an addition to the comparatively small Bornean element already known in the Archipelago.

ZINGIBERACEÆ.

ALPINIA Linn.

Alpinia brevilabris Presl Rel. Haenk. 1 (1830) 110. *t. 17.*
In forests at 2,000 m. alt. (No. 4458 *Merrill*) June, 1906.
Widely distributed in the Philippines. Endemic.

Alpinia sp. near *A. parviflora* Rolfe.
In forests at 900 m. alt. (No. 4361 *Merrill*) June, 1906.
Material too imperfect and scanty for accurate identification.

MARANTACEÆ.

PHACELOPHRYNUM K. Sch.

Phacelophrynum bracteosum (Warb.) K. Sch. in Engl. Pflanzenreich. 11 (1902) 123.
In forests along the Alag River at 100 m. alt. (No. 6132).
Widely distributed in the Philippines, endemic.

BURMANNIACEÆ.

BURMANNIA Linn.

Burmannia longifolia Becc. Malesia 1 (1878) 244; Rendle in Journ. Bot. 34 (1896) 355.
Terrestrial in the very mossy ridge forests 1,300 to 1,900 m. alt. (No. 5741).
Previously collected on "Dulangao," or more correctly "Dulangan," a spur of Mount Halcon, by *Whitehead*, and reported by *Rendle*, l. c.
Malayan Peninsula and Borneo.

Burmannia sp. near *B. elementis* Schltr.
In dense forests at 900 m. alt. (No. 5598). The third species of the genus to be found in the Philippines.

CASUARINACEÆ.

CASUARINA Linn.

Casuarina sp.

Gregarious over an area of about 100 acres at the head of a rivine, 700 m. alt. (No. 5779).

PIPERACEÆ.

PEPEROMIA Ruiz & Pav.

Peperomia recurvata Miq. Syst. Pip. (1843–44) 107.

On mossy trees and terrestrial, 1,200 to 1,800 m. alt. (Nos. 6107, 6147, 6184).

Malaya.

PIPER Linn.

Piper rhombophyllum C. DC. Prodr. 16[1] (1869) 352.

In forests 350 to 1,500 m. alt. (Nos. 5645, 5773); also collected by *Merritt* at 1,300 m. alt. (No. 4293).

Endemic to the Philippines.

Piper sp.

In forests at 1,800 m. alt. (No. 5592).

Piper sp.

In forests, altitude not given (*Merritt* No. 4474) June, 1906.

CHLORANTHACEÆ.

CHLORANTHUS Swartz.

Chloranthus brachystachys Blume Fl. Jav. Chloranth. (1828) 13. *t. 2.*

In forests at 700 m. alt. (No. 5644); also collected by *Merritt* at 1,200 and 1,650 m. alt. (Nos. 4380, 4416).

Widely distributed in the Philippines.

British India to southern China and Malaya.

Chloranthus officinalis Blume Enum. Pl. Jav. (1830) 79.

In forests at 900 m. alt. (No. 5574).

Widely distributed in the Philippines.

Distribution of the preceding species.

MYRICACEÆ.

MYRICA Linn.

Myrica esculenta Buch.-Ham. in G. Don. Fl. Nepal. (1825) 56; Chevalier Monog. Myric. (1901) 120. var. *farquahariana* (Wall.) Chev. l. c. *Myrica rubra* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 41, non S. & Z.

In forests at 1,700 m. alt. (No. 4433 *Merritt*) June, 1906.

An exceedingly variable form, identical with material previously reported from Mount Mariveles as *Myrica rubra*, the monograph by *Chevalier* not being available at the time the identification was made. For variation in the leaf-form of this species, see *Whitford*, Vegetation of the Lamao Forest Reserve II, Philip. Journ. Sci. 1 (1906) pl. *44. f. A. 1–3.*

British India to Malaya., the var. *farquahariana* in the Malayan Peninsula.

Myrica javanica Blume Bijdr. (1826) 517; Fl. Jav. Myric. 7. *t. 1;* Chev. Monog. Myric. (1901) 129.

In dense ridge-thickets at 2,600 m. alt. (No. 5708).

Previously known in the Philippines from Mount Apo, Mindanao.

Java.

JUGLANDACEÆ.

ENGLEHARDTIA Leschen.

Englehardtia spicata Blume Bijdr. (1826) 528.

In forests at 1,350 m. alt. (No. 5760).

Not common in the Philippines.

British India to Cochin China and Java.

FAGACEÆ.

QUERCUS Linn.

Quercus llanosii A. DC. Prodr. 16^2 (1864) 97.

In forests at 700 m. alt. (No. 5695).

Widely distributed in the Philippines.

Endemic.

ULMACEÆ.

GIRONNIERA Gaudich.

Gironniera celtidifolia Gaudich. Voy. Bonite Bot. (1844–66) *t. 85.*

In forests below 200 m. alt. (Nos. 4325, 4320 *Merritt*) June, 1906.

Not common in the Philippines.

Endemic.

MORACEÆ.

FICUS Linn.

Ficus hauili Blanco Fl. Filip. (1837) 684.?

In old clearings at 700 m. and in forests at 1,800 m. (Nos. 5748, 6127).

Common and widely distributed in the Philippines.

Endemic?

Ficus rubrovenia Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 44.

In forests at 200 m. alt. (No. 4326 *Merritt*) June, 1906.

Previously known only from Luzon.

In addition to the above species, *Ficus mindorocnsis* Merr., was abundant in forests below 200 m. alt., and *F. minahassae* Miq., was abundant along streams up to an altitude of 1,000 m.

ARTOCARPUS Forst.

Artocarpus sp.

In forests at 750 m. alt. (No. 5557).

Material fragmentary, from fallen branches of a large tree, quite different from any of the other species represented in our herbarium.

LORANTHACEÆ.

LORANTHUS Linn.

Loranthus halconensis Merrill n. sp. § *Dendropthoë*.

Foliis oblongo-lanceolatis coriaceis verticillatis usque ad 15 cm. longis; floribus ad 2.5 cm. longis, 6-meris, puberulis, dense fasciculatis; fasciculis axillaribus, pedunculis ad 1 mm. longis, 3-floris.

Scandent, glabrous except the puberulent inflorescence, the branches stout, terete, light gray. Leaves in whorls of 6, oblong lanceolate, coriaceous, glabrous, brown when dry, 10 to 15 cm. long, 3.5 to 5 cm. wide, acute or obtuse, the base acute, the midrib stout, the lateral nerves 5 to 6 on each side of the midrib, obscure, the reticulations obsolete; petioles 1 cm. long or less. Inflorescence on the branches below the leaves in the axils of fallen leaves, fasciculate, puberulent, 5 to 6 or more peduncles in a fascicle, each about 1 mm. long and bearing three flowers, the pedicels about 1 mm. long. Flowers yellow, about 2.5 cm. long, not inflated. Calyx densely puberulent, cylindrical, truncate, 3 mm. long, the basal bract broadly ovate, small. Corolla 6-merous, the lobes united for the lower 1.5 to 3 mm., puberulent outside, linear, 1.5 mm. wide, the reflexed portion above the insertion of the stamens lanceolate, acute, 6 mm. long. Filaments 1.5 mm. long; anthers 3 mm. long.

Parasitic on *Ficus minahassae* along the Alag River at 100 m. alt. (No. 5664). Well characterized by its whorled leaves, densely fascicled flowers from the larger branches and 6-merous corolla.

Loranthus mearnsii Merrill n. sp. § *Dendropthoë*.

Foliis oppositis vel subalternis, elliptico-ovatis, obtusis, basi acutis, 5 ad 8 cm. longis, glaberrimis; racemis solitariis, axillaribus, ferrugineo-puberulis, 3–5-floris; floribus usque ad 2.7 cm. longis; calyce 4-dentato; corolla irregulariter 4-lobata, tubo gibbo angulato.

Glabrous except the inflorescence. Branches brownish gray, terete, glabrous, lenticellate. Leaves coriaceous, glabrous, opposite or subalternate, elliptical-ovate, the apex obtuse, sometimes rounded, the base acute, 5 to 8 cm. long, 3 to 5 cm. wide; lateral nerves 3 to 4 on each side of the midrib, ascending; petioles 1 cm. long, or less. Racemes few, solitary, from the leaf-axils or from axils of fallen leaves, few-flowered, the rachis, pedicels and calyces ferruginous puberulent; pedicels 2 mm. long, the basal bract of the calyx ovate, acute or acuminate about as long as the calyx tube. Calyx tube cylindrical, 2 mm. long, the limb 1.5 mm. long, spreading, 4-toothed. Corolla 2.5 cm. long, green except the tips of the lobes which are red, the tube somewhat inflated, 4-angled, about 10 mm. long, the lobes 4, irregular, the reflexed portion above the inser-

tion of the anthers linear, 11 mm. long. Filaments 5 mm. long; anthers basifixed, 4 mm. long.

Parasitic on various trees in forests at 1,800 m. alt. (No. 5733).

Loranthus sp.

On trees in forests at 1,700 m. alt. (4434 *Merritt*) June, 1906. Apparently an undescribed species, but with immature fruits only.

BALANOPHORACEÆ.

BALANOPHORA Forst.

Balanophora sp.

On roots of trees in forests at 1,800 m. alt. (No. 6156). Material too scanty and imperfect for specific identification.

POLYGONACEÆ.

POLYGONUM Linn.

Polygonum chinense Linn. Sp. Pl. (1753) 363.

Abundant on recent "slides" at 1,900 m. alt. (No. 5780).

Throughout the Philippines at higher altitudes.

India to Japan and Malaya.

MENISPERMACEÆ.

STEPHANIA Lour.

Stephania hernandifolia (Willd.) Walp. Repert. 1 (1842) 96.

In forests at 1,800 m. alt. (No. 5701).

Widely distributed in the Philippines.

Tropical Africa, Asia, through Malaya to Australia.

MAGNOLIACEÆ.

DRIMYS Forst.

Drimys piperita Hook. f. Icon. Pl. *t. 896.*

On forested ridges at 1,300 m. alt. (No. 6134), and in thickets on exposed ridges at 2,600 m. alt. (No. 6206); also collected by *Merritt* at 1,300 and 1,600 m. alt. (Nos. 4383, 4407).

On most of the higher mountains of the Philippines.

Borneo, New Guinea and New Caledonia.

ILLICIUM Linn.

Illicium sp.

In forests at 1,600 m. alt. (No. 4411 *Merritt*) June, 1906.

Material very scanty and with fruit only. Perhaps most closely related to *Illicium cronium* King from Perak, although clearly distinct from that species, *ex descriptione*. The genus is new to the Philippine flora and its occurrence in the Philippines must be considered as evidence of previous connection with the Asiatic continent, the genus being represented in North America, India, China and Japan, and with three species extending southward to the Malayan Peninsula.

ANONACEÆ.

UNONA Linn. f.

Unona mindorensis Merrill n. sp. § *Stenopetalum*.

Foliis oblongo-lanceolatis acuminatis 10 ad 17 cm. longis, basi acutis; pedunculis axillaribus solitariis ad 1.2 cm. longis; petalis 6, subæqualibus, ovato-lanceolatis, acutis, 1.5 ad 1.7 cm. longis, pubescentibus; ovulis 3 uniserialibus; carpellis maturis ovatis, acutis, ad 1.5 cm. longis.

A small tree about 6 m. high; branches slender brownish gray, slightly pubescent, terete. Leaves submembranous, oblong lanceolate, 10 to 17 cm. long, 2.5 to 4.5 cm. wide, the base acute, the apex gradually acuminate, dull above, somewhat paler and slightly shining beneath, glabrous or nearly so; nerves about 9 on each side of the midrib, ascending, distinct beneath, the reticulations few, indistinct; petioles stout, rugose, 5 mm. long or less. Peduncles axillary, solitary, about 1.2 cm. long, slightly pubescent and with one or two small basal bracts. Flowers greenish-white. Sepals 3, pubescent, triangular ovate, acute, about 3.5 mm. long. Petals 6, free, spreading in flower, ovate-lanceolate, acute, pubescent, the outer three about 1.7 cm. long, 7 mm. wide, the inner three 1.5 cm. long, 5 mm. wide. Stamens many, glabrous, 2 mm. long, the connectives truncate, overlapping. Ovaries about 12, densely hirsute, oblong, 3 mm. long; ovules 3, parietal in one row; styles 1.5 mm. long. Carpels ovoid, about 1.5 cm. long, acute, narrowed below into a short stout stipe, brown when dry, slightly pubescent.

In forests at 300 m. alt. (No. 5568). A closely related species is represented by No. 4060 *Merrill*, from the Baco River, near the base of Halcon, March, 1905.

OXYMITRA Blume.

Oxymitra sp. near *O. glauca* Hk. f. et Th.

In forests at 180 m. alt. (No. 5629). Specimens with fruit only, but undoubtedly referable to this genus.

PHAEANTHUS Hook. f. et Th.

Phaeanthus cumingii Miq. Fl. Ind. Bat. 1[2] (1859) 51.

In forests at 700 m. alt. (No. 5648).

Widely distributed in the Philippines. Endemic.

Phaeanthus acuminatus Merr. in Govt. Lab. Publ. 35 (1906) 11.

In forests at 150 m. alt. (No. 4321 *Merritt*) June, 1906.

Known only from Mindoro and Palawan.

GONIOTHALAMUS Blume.

Goniothalamus elmeri Merr. in Govt. Lab. Publ. 29 (1905) 13.

In forests at 900 m. alt. (No. 4354 *Merritt*) June, 1906.

Widely distributed in the Philippines. Endemic.

MYRISTICACEÆ.

HORSFIELDIA Willd.

Horsfieldia merrillii Warb. in Perk. Frag. Fl. Philip. (1904) 49.

In forests at 100 m. alt. (No. 5772).

Known only from Mindoro.

MONIMIACEÆ.

KIBARA Endl.

Kibara ellipsoidea Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 56.

In forests at 450 m. alt. (No. 4313 *Merritt*) June, 1906.

Described from material collected on Mount Mariveles, Luzon. Nearly or quite the same species is represented by material collected near Lake Lanao, Mindanao, by Mrs. *Clemens*. Endemic to the Philippines. Mangyan, "*Barao-barao*."

LAURACEÆ.

NEOLITSEA (Benth.) Merr.

Neolitsea zeylanica (Nees) Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 56.

In forests at 1,800 m. alt. (No. 5666); also collected by *Merritt* in June, 1906, in forests at 950 m. alt. (No. 4369).

CRYPTOCARYA R. Br.

Cryptocarya acuminata Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 192.

In forests at 450 m. alt. (No. 4342 *Merritt*) June, 1906.

Known only from Mindoro.

NEPENTHACEÆ.

NEPENTHES Linn.[11]

Nepenthes sp.

On bowlders in the river bed (Alag River) at 350 m. alt. (No. 5790).

Nepenthes sp.

In thickets along the Binabay River at 200 m. alt. (No. 5785).

Nepenthes sp.

In thickets on exposed ridges 1,500 to 2,600 m. alt. (No. 5774).

DROSERACEÆ.

DROSERA Linn.

Drosera spathulata Labill. Nov. Holl. Pl. Spec. 1 (1804) 79. *t. 106, f. 1*; Diels in Engler's Pflanzenreich 26 (1906) 83. *f. 31, A, B.*

In open heaths at 2,400 m. alt. (No. 5784), locally abundant.

Previously collected in the Philippines by *Cuming*, locality not given, probably Luzon.

Southern Japan and China, Borneo, Australia and New Zealand.

[11] As most of our Philippine *Nepenthes* material, including one number from Halcon, collected by *Merritt*, is in the hands of *Dr. Macfarlane*, who is monographing the family, no attempt has been made to identify specifically the specimens here cited.

Drosera peltata Smith in Willd. Sp. Pl. 1 (1797) 1546; Diels l. c. 111.

With the preceding locally rare (No. 6207).

Previously known in the Philippines only from northern Luzon.

British India to central China, and Japan, through Malaya to Australia and Tasmania.

SAXAFRAGACEÆ.

HYDRANGEA Linn.

Hydrangea lobbii Maxim. Mem. Acad. Petersb. VII. 10 (1867) 15.

In an old clearing at 750 m. alt. (No. 5491); also in forests at 1,800 m. alt. (No. 5731), the latter referred here with some doubt.

Previously known only from the mountains of northern and central Luzon and from Panay.

Endemic in the Philippines.

PITTOSPORACEÆ.

PITTOSPORUM Banks.

Pittosporum resiniferum Hemsl. in Kew Bull. (1904) 344.

In forests at 150 m. alt. (No. 5609); found also by *Merritt* in June, 1906, at 1,700 m. alt. (Nos. 4421, 4436).

Previously known only from the mountains of central and northern Luzon; reported with doubt from Celebes by *Koorders*.

The habit of this species is very interesting, it being pseudoepiphytic, quite similar to most species of *Ficus* of the section *Urostigma*.

Pittosporum odoratum Merr. in Govt. Lab. Publ. 35 (1906) 16.

In forests at 700 m. alt. (No. 5654).

Previously known only from the mountains of central and northern Luzon.

CUNONIACEÆ.

WEINMANNIA Linn.

Weinmannia hutchinsonii Merrill n. sp.

Arbor ad 10 m. alta; ramulis fuscis, teretis, lenticellatis, glabris, junioribus pubescentibus; foliis imparipinnatis, 4 ad 5-jugatis; foliolis subsessilibus, lanceolatis, acuminatis, 3 ad 7 cm. longis, 0.7 ad 1.5 cm. latis, grosse crenato-serratis; racemis numerosis, fasciculatis terminalibus vel axillaribus, pubescentibus; floribus pedicellatis, 4-meris.

A tree about 10 m. high. Branches terete, glabrous, brown, lenticellate, somewhat compressed below the nodes, rather slender, the younger parts somewhat pubescent. Leaves opposite, unequally pinnate, about 13 cm. long, the common rachis 5 to 7 cm. long, pubescent; leaflets 4 to 5 pairs, lanceolate, coriaceous, glabrous, 3 to 7 cm. long, 0.7 to 1.5 cm. wide, the apex long, bluntly acuminate, the base inequilateral, acute or acuminate, the margins coarsely crenate-serrate; nerves about 12 on each side of the midrib, slender, the reticulations numerous; petiolules

wanting. Inflorescence terminal and axiliary of many racemes, 10 cm. long or less, pubescent. Flowers white, 4-merous, pedicellate, the pedicels 1.5 mm. long, pubescent. Sepals 1 mm. long, acute, pubescent. Petals elliptical, rounded, 1.5 mm. long, very slightly pubescent. Filaments 1 mm. long, glabrous; anthers 0.5 mm. long. Ovary 2-celled, pilose.

In forests at 700 m. alt. (No. 5753).

The second species of the genus to be found in the Philippines, a third, apparently undescribed one, closely allied to the above is represented in our herbarium from Lake Lanao, Mindanao, coll. *Clemens*.

ROSACEÆ.

RUBUS Linn.

Rubus rolfei Vid. Phan. Cuming. Philip. (1885) 171.

In open heaths and thickets at 2,400 to 2,550 m. alt. (No. 5715).

Previously known only from the mountains of Luzon and from Mount Canlaon, Negros.

Rubus moluccanus Linn. Sp. Pl. (1753) 1197.

In forests at 1,800 m. alt. (No. 5595); also collected by *Merritt*, in forests at 900 m. alt. (No. 4362).

Throughout the Philippines at higher altitudes.

British India to southern China and Malaya.

Rubus fraxinifolius Poir., is abundant below 1,500 m. alt.

PHOTINIA Lindl.

Photinia luzonensis Merr. in Govt. Lab. Publ. 17 (1904) 18.

In thickets bordering an open heath at 2,400 m. alt. (No. 6205).

Previously known only from Mount Mariveles, Luzon.

LEGUMINOSÆ.

DESMODIUM DC.

Desmodium ormocarpoides DC. Prodr. 2 (1825) 327.

In open slough along the Alag River at 100 m. alt. (No. 6223).

Previously known in the Philippines from Luzon.

British India to Java.

Desmodium capitatum (Burm.) DC. l. c. 336.

Near Subaan in open grass lands, 10 m. or less above sea level (No. 6224).

Widely distributed in the Philippines.

British India to Malaya.

PITHECOLOBIUM Mart.

Pithecolobium prainianum Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 61.

In forests at 300 m. alt. (No. 5702).

Previously known only from the mountains of Luzon.

RUTACEÆ.

EVODIA Forst.

Evodia reticulata Merrill n. sp.

Frutex 2 ad 3 metralis, foliis trifoliatis, rariter unifoliatis, oppositis vel suboppositis, foliolis 5 ad 9 cm. longis, coriaceis, nitidis, supra glabris, subtus ad nervos fulvo-pubescentibus, dense reticulatis, obovatis vel elliptico-ovatis, apice obtusis truncatis vel retusis, paniculis axillaribus, ad 7 cm. longis, dense fulvo-pubescentibus; flores 4-meri, 3 mm. longi, in ramulis ultimi ordinis congesti.

A shrub 1 to 3 m. high. Branches stout, the older ones nearly glabrous, light gray, the younger ones densely fulvous-pubescent. Leaves opposite or subopposite, trifoliate, rarely unifoliate, the petioles 1.5 to 2 cm. long, at first densely pubescent, becoming glabrous and rugose; leaflets coriaceous, shining, densely closely reticulate, glabrous above, fulvous-pubescent on the nerves and midrib beneath, obovate to elliptical ovate, the base subacute or obtuse, that of the lateral ones somewhat inequilateral, the apex obtuse, truncate or somewhat retuse, 5 to 9 cm. long, 3 to 5.5 cm. wide; nerves prominent, 9 to 11 on each side of the midrib; petiolule of the middle leaflet about 1 cm. long, of the lateral ones 2 to 3 mm. long, pubescent. Panicles in the upper axils, densely fulvous-pubescent, about 7 cm. long, many flowered; pedicels 1 to 2 mm. long, the bracts and bracteoles minute. Flowers white, crowded at the apices of the ultimate branches, 4-merous, 3 mm. long. Sepals broadly ovate, acute very slightly pubescent, less than 1 mm. long. Petals 4, elliptical ovate, acute, 2.5 mm. long, glabrous. Ovary glabrous, 4-lobed; style about 1.5 mm. long; stigma capitate.

In open heaths and in thickets at 2,400 m. alt. (No. 5711).

A species recognizable by its coriaceous leaves which are densely rather prominently reticulate and pubescent on the nerves and midrib beneath.

POLYGALACEÆ.

POLYGALA Linn.

Polygala venenosa Juss. ex Poir, in Lam. Encycl. 5 (1804) 493.

In forests at about 1,200 m. alt. (No. 6166). Found here also by *Merrill* at 900 m. alt. (No. 4351) June, 1906.

Known in the Philippines from Negros and from Mount Apo, Mindanao. Java, Sumatra and from near Mount Kinabalu, North Borneo.

EUPHORBIACEÆ.

ANTIDESMA Linn.

Antidesma leptocladum Tul. Ann. Sc. Nat. III. 15 (1851) 199.

In forests at 1,800 m. alt. (No. 5717).

Widely distributed in the Philippines. Endemic?

DAPHNIPHYLLUM Blume.

Daphniphyllum glaucescens Blume Bijdr. (1826) 1153.
In forests at 700 m. alt. (No. 5658).
The same form has been collected in Benguet Province, Luzon, by *Elmer* (No. 6290). The genus is new to the Philippines.
British India to southern China, Corea, etc., south to Java.

CLAOXYLON Juss.

Claoxylon sp.
In forests along the Alag River at 160 m. alt. (No. 6519). The same form collected by *Merritt*, 250 to 900 m. alt. (Nos. 4329, 4364, 4332), material in poor condition.

Claoxylon sp.
In forests at 1,800 m. alt. (No. 5668), fruit and pistillate flowers only.

MACARANGA Thouars.

Macaranga hispida (Bl.) Muell. Arg. in DC. Prodr. 15^2 (1862) 990.
In forests at 700 m. alt. (No. 5646).
Widely distributed in the Philippines.
Moluccas.

HOMALANTHUS Juss.

Homalanthus populneus (Geisel.) Pax in Engl. and Prantl Nat. Pflanzenfam. 3^5 (1890) 96.
In forests at 2,200 m. alt. (No. 4452 *Merritt*) June, 1906.
Widely distributed in the Philippines.
Ceylon to Java.

Homalanthus populneus (Geisel.) Pax in Engl. and Prantl Nat. Pflanzen-
In an old clearing at 900 m. alt. (No. 5593).
Widely distributed in the Philippines. Endemic.

CELASTRACEÆ.

EVONYMUS Linn.

Evonymus javanicus Blume Bijdr. (1826) 1146.
In forests at 800 m. alt. (No. 5659).
Widely distributed in the Philippines.
Malaya.

ICACINACEÆ.

STEMONURUS Blume.

Stemonurus sp.
In forests at 250 m. alt. (No. 4327 *Merritt*) June, 1906. A single, rather imperfect specimen, apparently representing an undescribed species.

AQUIFOLIACEÆ.

ILEX Linn.

Ilex fletcheri Merrill n. sp.

Ramis teretis glabris griseis, ramulis angulatis minute puberulis; foliis oblongo-ellipticis vel lanceolato-ellipticis, acuminatis, basi acutis, integris, 1.5 ad 3.5 cm. longis, nitidis, coriaceis, venis obscuris; cymis axillaribus, brevibus, paucifloribus, corollae tubo breve, segmentis oblongis, circiter 2 mm. longis, 1 mm. latis, obtusis.

A shrub 3 m. high or less, glabrous throughout, except the slightly puberulent branchlets and inflorescence. Branches terete, gray, glabrous, branchlets angular, slender, dark reddish brown, minutely puberulent. Leaves oblong-elliptical to lanceolate-elliptical, 1.5 to 3.5 cm. long, 0.5 to 1.8 cm. wide, coriaceous, glabrous, shining, paler beneath, the base acute, the apex broadly acuminate or acute and minutely apiculate; nerves very obscure, nearly obsolete, the margins entire; petioles 1 to 3 mm. long. Cymes axillary, few-flowered, 5 mm. long, or less, or the inflorescence reduced to a few-flowered fascicle, puberulent the pedicels about 2 mm. long. Calyx about 1 mm. long, the teeth not prominent. Corolla tube very short, the lobes 4, oblong, about 2 mm. long, 1 mm. wide, obtuse. Filaments 1 mm. long; anthers ovoid, 0.5 mm. long. Fruit red, globose, glabrous, smooth, 2.5 mm. in diameter.

In the mossy forest on exposed ridges at 1,800 m. alt. (Nos. 5716, 5755); also collected by *Merritt* at 2,200 m. alt., in June, 1906 (Nos. 4475, 4448).

A species characterized by its small entire leaves, puberulent branchlets and inflorescence and few-flowered cymes or fascicles, the flowers on the younger branches rarely solitary. Named in honor of Mr. *Horace L. Fletcher*, who accompanied the members of the Halcon expedition to Calapan.

ACERACEÆ.

ACER Linn.

Acer philippinum Merr. in Govt. Lab. Publ. 35 (1906) 36.

This species was abundant in forests at 600 to 1,700 m. alt., but was not collected, all the specimens observed being with leaves only. The species was described from specimens collected on Mount Mariveles, Luzon, and has since been collected on Mount Data, Luzon, by the author.

Endemic in the Philippines.

BALSAMINACEÆ.

IMPATIENS Linn.

Impatiens sp.

In forests at 1,300 m. alt. (No. 4391 *Merritt*) June, 1906. Material very imperfect, but different from any other species of the genus known to me.

RHAMNACEÆ.

ALPHITONIA Reiss.

Alphitonia excelsa Reiss. ex Endl. Gen. (1836–50) 1098. *A. moluccana* T. & B.

In forests at 700 m. alt. (No. 5532). The fresh bark has a strong odor of oil of wintergreen.

Widely distributed in the Philippines.

Borneo to Polynesia and Australia.

VITACEÆ.

LEEA Linn.

Leea aculeata Blume Bijdr. (1825) 197.

In forests along the Alag River at 100 m. alt. (No. 5605).

This specimen agrees well with *Blume's* short description and moreover with *Blanco's* description of *Ticoria aculeata*[12] which *Blanco* himself later reduced to *Leea aculeata* Blume. It also agrees well with specimens in our herbarium collected on Mount Arayat by *Bolster*, a topotype of *Blanco's* species.

Widely distributed in the Philippines.

Malaya.

ELAEOCARPACEÆ.

ELAEOCARPUS Linn.

Elaeocarpus argenteus Merr. in Govt. Lab. Publ. 29 (1905) 26.

On ridges in forests at 2,200 m. alt. (No. 4462 *Merrill*) June, 1906.

Previously known only from Mount Santo Tomas, Luzon.

Elaeocarpus pendulus Merr. l. c.

On ridges in forests at 1,800 m. alt. (No. 5727), flowers immature; on exposed ridges at 2,600 m. alt. (No. 6204), fruit.

Previously known only from Mount Santo Tomas and Mount Mariveles, Luzon.

Elaeocarpus merrittii Merrill, n. sp. § *Monocera*.

Ramulis tenuis, foliis ovatis vel oblongo-ovatis, acuminatis, 6 ad 9 cm. longis, longe petiolatis, crenato-serratis, subtus in axillis venarum glandulosis, racemis axillaribus, usque ad 10 cm. longis, pauciforibus; flores 9 mm. longi, 5-meri; petala dense sericea, apice fimbriata; stamina 20; drupa 1 ad 1.3 mm. longa, ellipsoidea vel oblongo-ovoidea, 1-sperma.

A tree 10 m. high or less, nearly glabrous. Branches slender, terete, dark brownish red when dry, the younger ones slightly deciduously pubescent. Leaves submembranous, ovate or oblong-ovate, 6 to 9 cm. long, 2.5 to 4 cm. wide, the base rounded, the apex rather long acuminate, the margins slightly crenate-serrate, slightly appressed-pubescent beneath and along the midrib above, the axils of the veins beneath with prominent glands; nerves about 6 on each side of the midrib, prominent beneath;

[12] Flora Filip. (1837), 83.

petioles 2 to 2.5 cm. long, slender, glabrous or nearly so. Racemes axillary or from axils of fallen leaves, few-flowered, 10 cm. long or less, glabrous or slightly pubescent. Flowers white, the pedicels 1 cm. long, densely appressed sericeous. Sepals 5, lanceolate, acuminate, 8 to 9 mm. long, 2.5 mm. wide, appressed silvery pubescent outside. Petals oblong, equaling the sepals, very densely silvery appressed, sericeous throughout, the apex cleft into 5 to 7 linear *laciniae* 2 mm. long. Stamens 20; filaments 2.5 mm. long; anthers linear 3 mm. long, one cell with a short mucro less than 0.5 mm. long. Ovary ovoid, densely sericeous, 3-celled; style 5 mm. long. Fruit elliptical or oblong-ovoid 1 to 1.3 cm. long, dark blue when mature, 1-celled, 1-seeded, the pericarp slightly fleshy.

In forests at 900 m. alt. (No. 5582) type, also (No. 5616) from the same altitude and at 1,600 m. alt. (No. 4427 *Merritt*), June, 1906.

Elaeocarpus sp.

In forests at 1,300 and 1,600 m. alt. (Nos. 4387, 4409 *Merritt*) June, 1906. The specimens are with fruit only and apparently represent an undescribed species.

Elaeocarpus sp.

In forests at 700 m. alt. (No. 6148). Specimen with fruit only, but quite distinct from any of the genera at present represented in our herbarium.

TILIACEÆ.

HALCONIA Merrill, n. gen.

Bracteolae 6. Sepala 4, crassa, valvata. Petala 5. Stamina ∞, libera; antherae ovatae, versatiles. Ovarium 2-loculare, loculis ∞-ovulatis; stylus nullus. Capsula 2-locularis, dissepimento contrarie compressa, coriacea, apice apiculata, loculicide 2-valvis; semina ignota. Arbor. Folia subintegra penninervia et basi trinervia. Cymae axillares.

Halconia involucrata Merrill n. sp.

A tree about 8 m. high, the branches terete, brownish gray, glabrous, the younger parts stellate-lepidote pubescent. Leaves oblong, subcoriaceous, 7 to 10 cm. long, 3.5 to 5 cm. wide, slightly stellate pubescent above, beneath pale and densely minutely lepidote and with scattered stellate hairs, the margins subentire or slightly crenate, the apex acute or rounded, the base rounded or slightly cordate, strongly 3-nerved, the lateral nerves very prominent beneath, ascending, including the basal ones 4 to 5 on each side of the midrib; petioles 1 to 2.5 cm. long. Cymes axillary 14 cm. long or less, few-flowered, the flowers in groups of threes at the ends of the ultimate branchlets, each group subtended by 6, oblong, stellate-lepidote bracteoles. Sepals 4, free, elliptical-oblong, ultimately nearly 1 cm. long, densely lepidote-stellate. Petals 4, oblong,

densely lepidote-stellate, about 6 mm. long, the apex truncate and obscurely 3-toothed. Stamens indefinite, free, the filaments 1.5 mm. long or less, anthers about 0.3 mm. long. Ovary ovoid, densely hirsute, 2-celled, each cell many ovuled. Capsules flattened at right angles to the dissepiment, suborbicular in outline, truncate and apiculate at the apex, about 1.5 cm. long, 2 cm. wide, coriaceous, glabrous, at least in age, 2-valved, 2-celled, dehiscing to the base. Seeds unknown.

In forests at 700 m. alt. (No. 5527).

I place the genus here proposed in the *Tiliæ*, between *Gracffia* Seem., and *Trichospermum* Blume, differing from both in its 4-merous flowers and from the latter in the presence of bracteoles.

DILLENIACEÆ.

SAURAUIA Willd.

Saurauia latibracteata Choisy in Zoll. Syst. Verz. Ind. Archip. (1854–55) 148; Merr. in Govt. Lab. Publ. 35 (1906) 41.

In forests 100 to 700 m. alt. (Nos. 5690, 5528).

Widely distributed in the Philippines. Endemic.

Saurauia elegans (Choisy) F.-Vill. Nov. App. (1880) 19; Merr. l. c. 42.

In forested ravines at 700 m. alt. (No. 5655).

Previously known only from the mountains of northern and central Luzon.

Saurauia philippinensis Merrill n. sp.

Subglabra, foliis oblongo-ovatis vel oblongo-lanceolatis, glabris, 10 ad 18 cm. longis, acuminatis; pedunculi axillares, fasciculati vel solitarii, 1-, raro 2-flori; ovarium globosum, pilosum, 3-stylum.

A shrub or small tree 7 m. high or less, nearly glabrous throughout. Branches slender, brownish, lenticellate, glabrous or nearly so. Leaves oblong-ovate to oblong-lanceolate or lanceolate, rarely somewhat oblanceolate glabrous, chartaceous, 10 to 18 cm. long, 3 to 5 cm. wide, the apex rather sharply acuminate, the base acute or acuminate, the margins rather sharply serrate; nerves 12 to 14 on each side of the midrib; petioles 1.5 to 3 cm. long. Flowers white, the peduncles solitary or fascicled in the axils of the leaves and in the axils of fallen leaves on the larger branches, the peduncles slender, somewhat strigose, 2 cm. long or less, with a small bracteole at about the middle, 1, rarely 2-flowered. Sepals elliptical to elliptical ovate, acute or rounded, 4 mm. long, the margins slightly ciliate. Petals glabrous, 7 mm. long, 4 to 5 mm. wide, cleft at the apex. Stamens 20; filaments 2 mm. long, anthers about 2.2 mm. long. Ovary somewhat pilose; styles 3, 4 mm. long, slightly united below.

In forests at 700 m. alt. (No. 5529); from the same locality I refer here No. 5633, alt. 200 m., and also No. 4394 *Merritt*, June, 1906, alt. 1,300 m. In Mindanao the species is represented by No. 4693 *Mearns* and *Hutchinson*, Mount Malindang, May, 1906, alt. 1,400 m., and in Basilan by No. 4011 *Hutchinson*, February, 1906, alt. 540 m.

THEACEÆ.

THEA Linn.

Thea sp.

In forests at 350 m. alt. (No. 4328 *Merritt*) June, 1906. Material very imperfect and with fruits only, the identity of the genus therefore not certain.

TERNSTROEMIA Nutt.

Ternstroemia sp.?

In forests at 1,600 m. alt. (No. 4473 *Merritt*) June, 1906. Material very scanty and with fruits only.

ADINANDRA Jack.

Adinandra sp. near *A. dumosa*.

In forests 1,600 to 2,200 m. alt. (Nos. 4410, 4453 *Merritt*) June, 1906.

Adinandra sp. near *A. luzonica* Merr.

In forests at 500 m. alt. (No. 4344 *Merritt*) June, 1906. Material very scanty and with undeveloped flowers only.

Adinandra sp.?

In open heaths at 2,400 m. alt. (No. 5745).

EURYA Thunb.

Eurya japonica Thunb. Fl. Jap. (1784) 191. *t.* 25.

In forests 1,400 to 1,800 m. alt. (Nos. 5671, 6188); also collected by *Merritt* at 1,600 m. alt. (No. 4431).

On many of the higher mountains of the Philippines.

Corea and Japan, China, central Asia, through Malaya to the Fiji Islands.

Eurya acuminata Wall., var. **euprista** Dyer in Hook. f. Fl. Brit. Ind. 1 (1872) 285.

In forests at and below 300 m. alt. (Nos. 5749, 6146).

On many Philippine mountains.

British India to Malaya and the Fiji Islands.

RHIZOPHORACEÆ.

GYNOTROCHES Blume.

Gynotroches axillaris Blume Bijdr. (1825) 219.

In forests at 200 m. alt. (No. 4323 *Merritt*) June, 1906.

Widely distributed in the Philippines, but nowhere abundant.

Malayan Peninsula and Archipelago.

MYRTACEÆ.

MEARNSIA Merrill n. gen.

Calycis tubus anguste campanulatus, ovario adnatus; limbi segmenta 4, persistentia. Petala 4, calycis lobis longiora, patentia. Stamina 8, 1-seriata, libera, filamentis elongatis, filiformibus; antherae versatiles, loculis parallelis longitudinaliter dehiscentibus. Ovarium in fundo calycis inferum, 2-loculare; stylus filiformis, stigmate parvo; ovula in loculis

∞, multo-seriata. Capsula in calyce persistente inclusa ad apicem dehiscens, 2-loculare. Semina ∞, auguste-oblonga. Arbor. Folia opposita, pennivenia. Flores in pedunculos laterales cymosi vel racemosi.

Mearnsia halconensis Merrill n. sp.

Arbor ad 10 m. alta; foliis oppositis, oblongo-lanceolatis, coriaceis, acuminatis, glabris, ad 6 cm. longis; cymis lateralibus, paucifloribus, staminibus longe exsertis.

A tree about 10 m. high, nearly glabrous throughout. Branches terete, rough, gray, or brownish, the younger branchlets brownish, glabrous, obscurely 4-angled, the growing tips appressed-pubescent. Leaves opposite, oblong-lanceolate, coriaceous, glabrous, 5 to 6 cm. long, 1.5 to 2 cm. wide, entire, the margins slightly recurved, cartilaginous, the apex sharply acuminate, the base acute, glandular-punctate beneath; lateral nerves numerous, ascending, not very distinct; petioles stout 1 to 2 mm. long. Inflorescence from the branches below the leaves, the short few-flowered cymes or racemes solitary or fascicled, the rachis appressed-pubescent, 5 mm. long or less, the bracts deciduous, narrowly ovate, 2 mm. long, the pedicels 1 mm. long or nearly obsolete. Calyx tube narrowly campanulate, sparingly appressed pubescent, about 3 mm. long, the lobes 4, broadly ovate, obtuse or acute, 1.5 mm. long, persistent. Petals 4, free, deciduous, glabrous, red, orbicular, 3.5 mm. in diameter, apex broad, rounded, base narrow. Stamens 8, 1-seriate, free, exserted, glabrous; filaments red, nearly 2 cm. long; anthers ovoid, 0.6 mm. long, versatile, 2-celled. Ovary inferior, 2-celled, the ovules many-seriate; style slender, exserted, slightly exceeding the stamens. Capsule about 7 mm. long, ovoid, slightly compressed, 4-ridged, coriaceous, crowned by the persistent calyx tube and teeth, 2-celled, many seeded, dehiscing by a single slit at the apex only and inside the persistent calyx tube. Seeds narrowly oblong, about 2 mm. long.

On exposed ridges at 1,400 m. alt. (No. 5792.)

The genus here proposed is apparently related to *Backhousia* Hook. et Harv., and to *Metrosideros* Banks, but appears to me to be very distinct from both and from all other described genera in this family. It is dedicated to Maj. Edgar A. Mearns, surgeon, United States Army, with whom the author made the ascent of Mount Halcon.

LEPTOSPERMUM Forst.

Leptospermum amboinense Blume Bijdr. (1826) 1100.

In open heaths and thickets at and above 2,400 m. alt. (Nos. 5746, 5747).

On most of the higher mountains of the Philippines.

Malacca through Malaya to Australia.

EUGENIA Linn.

Two species of *Eugenia* are represented in *Merritt's* material, from forests below 900 m. alt., but the specimens are too fragmentary for accurate determination.

GUTTIFERÆ.

GARCINIA Linn.

Garcinia binucao (Blanco) Choisy Guttif. Ind. 34; Vesque in DC. Monog. Phan. 8 (1893) 454.

In forests at 175 m. alt. (No. 4322 *Merritt*) June, 1906.

DIPTEROCARPACEÆ.

SHOREA Roxb.

Shorea squamata (Turcz.) Benth. & Hook. f. Gen. Pl. 1 (1862) 193.

In forests at 700 m. alt. (No. 5751).

Widely distributed in the Philippines.

Borneo.

Dipterocarpus grandiflorus Blanco, and *Shorea guiso* Blume were both abundant from near Subaan to the Alag River ascending to an altitude of about 400 m.

BEGONIACEÆ.

BEGONIA Linn.

Begonia incisa A. DC. in Ann. Sc. Nat. IV. 11 (1859) 129; Podr. 15[1] (1864) 321.

In forested ravines at 700 m. alt. (No. 5685).

Widely distributed in the Philippines; endemic.

Begonia pseudolateralis Warb. in Perk. Frag. Fl. Philip. (1904) 51.

Along the Alag River at 200 m. alt. (No. 6154).

Previously known from Luzon and Mindoro.

Begonia sp.

In forests at 1,200 to 1,800 m. alt. (Nos. 5515, 5607).

Begonia sp.

In forests at 1,700 m. (No. 6135).

MELASTOMATACEÆ.

MELASTOMA Burm.

Melastoma polyanthum Blume in Flora 2 (1831) 481; Cogn. in DC. Monog. Phan. 7 (1891) 354.

In forests at 1,600 m. alt. (No. 4397).

Widely distributed in the Philippines.

British India to Malaya and northern Australia.

SARCOPYRAMIS Wall.

Sarcopyramis sp.

In mossy forests 900 to 2,200 m. alt. (No. 5793); also Nos. 4386, 4461 *Merritt*, June, 1906.

This genus is generally considered to be monotypic, the only species recognized by most botanists being *S. nepalensis* Wall. extending from the Himalayan region to Java and Sumatra. The species here in question is also found on Mounts Data and Santo Tomas, northern Luzon, and in the intermediate tablelands (Nos. 4608, 4491 and 4809 *Merrill*) and also on Mount Apo, Mindanao

(*Copeland*). Dr. *C. B. Robinson*, of the New York Botanical Garden, has indicated the Philippine form, *in lit.*, as a new species, but as his description has not as yet been published, I do not consider myself free here to publish his specific name.

SONERILA Roxb.

Sonerila woodii Merrill, n. sp.

Caulis erectus vel adscendens, simplex, sparse glanduloso-setulosis; foliis consimilis, ovato-oblongis, acuminatis, basi oblique subrotundatis vel subacutis, margine setuloso-serratis; flores 3-meri; calyx ad 6 mm. longus; petala pallide violacea, usque ad 10 mm. longa; antherae lanceolatae, ad 6 mm. longae.

Erect, unbranched, 10 to 30 cm. high, the stems and petioles glandular-setose or hirsute, terete. Leaves opposite, subequal, membranous, oblong-ovate, 5 to 10 cm. long, 2 to 3 cm. wide, the apex acuminate, the base inequilateral, rounded or subacute, the margins sharply serrulate, very slightly puberulent and with few scattered setose hairs; petioles 1.5 to 3.5 cm. long, glandular-pubescent; nerves about 3 on each side of the midrib, ascending, distinct, reddish, the reticulations lax. Flowers pink, nearly 2 cm. in diameter when spread. Calyx somewhat cylindrical, 6 mm. long, slightly glandular-pubescent, the three teeth small. Petals 3, 10 mm. long, 5.5 mm. wide, oblong-ovate, abruptly acuminate, the base contracted, inequilateral. Stamens 3; filaments 5 mm. long; anthers lanceolate, 6 mm. long. Style about 10 mm. long. Capsule obconical, trigonous, 6 to 7 mm. long.

In forests 900 to 1,300 m. alt. (No. 5794); also collected by *Merritt* in June, 1906 (No. 4352). Dedicated to Maj. Gen. *Leonard Wood*, through whom the exploration of Mount Halcon was made possible.

MEDINILLA Gaudich.

Medinilla myrtiformis Triana in Trans. Linn. Soc. 28 (1871) 86; Cogn. in DC. Monog. Phan. 7 (1891) 583.

In forests at 700 m. alt. (No. 5682); also collected by *Merritt* at 900 m. alt. in June, 1906 (No. 4356).

On most of the higher mountains of the Philippines.

Amboina.

Medinilla ramiflora Merr. in Govt. Lab. Publ. 29 (1905) 35.

In forests 1,300 to 1,500 m. alt., frequently pseudoepiphytic (No. 5724); also collected by *Merritt* in June, 1906 (No. 4388).

Medinilla astronioides Triana l. c. 88; Merr. l. c. 37.

In forested ravines at 700 m. alt. (No. 6149).

Previously known only from Luzon.

Medinilla merrittii Merrill, n. sp.

Ramis teretiusculis; foliis elliptico-ovatis, glabris, coriaceis, oppositis, petiolatis, 7-nervis, nervulis transversalibus validis; cymis axillaribus, paucifloribus; floribus 5-meris; calyx campanulato, 1 cm. longo.

Scandent, glabrous throughout; branches light gray, terete, the ultimate ones brownish, slender. Leaves opposite, elliptical-ovate, abruptly short caudate-acuminate, the base broad, rounded, coriaceous, 11 to 15 cm. long, 6 to 9 cm. wide; nerves 7, prominent, the transverse nervules distinct; petioles 2.5 cm. long. Cymes solitary or fascicled on the branches below the leaves, the peduncle about 1 cm. long, bearing 3 subsessile flowers. Flowers about 2 cm. long, 5-merous. Calyx campanulate, truncate, nearly 1 cm. long, 0.8 cm. in diameter. Petals 2.5 cm. long, 1.4 cm. wide. Stamens 10.

In forests at 450 m. alt. (No. 4336 *Merritt*) June, 1906.

Medinilla verticillata Merr. in Govt. Lab. Publ. **29** (1905) 34.

In forests at 700 m. alt. (No. 5660).

Previously known only from northern Luzon.

Medinilla magnifica Lindl. in Paxt. Flower Gard. **1** (1850) 55. *t. 12.*

In forests at 500 m. alt. (No. 4341 *Merritt*) June, 1906.

Rather widely distributed in the Philippines but not abundant. Endemic.

Medinilla involucrata Merr. in Govt. Lab. Publ. **35** (1906) 51.

In forests at 250 m. alt. (No. 5634); also collected by *Merritt* at about the same altitude in June, 1906 (No. 4331).

Previously known from Mindoro and Mindanao.

Medinilla cordata Merr. in Govt. Lab. Publ. **29** (1905) 37.

On exposed ridges at 2,400 m. alt. (No. 5757); also collected by *Merritt* at 2,150 m. alt. (No. 4445). Specimens not typical, and may prove to be distinct from the Luzon plant.

Previously known from Luzon only.

Medinilla halconensis Merrill n. sp.

Ramis ramulis petiolis pedunculis bracteis calycibus foliisque dense plumoso-stellato-tomentosis; ramulis teretibus; foliis petiolatis, ellipticoovatis, acutis vel acuminatis, nervis 5, lateralibus oppositis, cymis terminalibus, bracteis et bracteolis persistentibus; floribus 5-meris.

Branches slender, terete, densely stellate-plumose tomentose. Leaves submembranous, elliptical ovate, 4 to 9 cm. long, 2 to 4.5 cm. wide, opposite, above nearly glabrous, beneath densely stellate-tomentose, the base acute, the apex short acuminate or acute; nerves 5, petioles densely stellate-tomentose, 1 to 1.5 cm. long. Inflorescence a terminal 3 to 5-flowered cyme, 3 cm. long or less, densely stellate-tomentose throughout; bracts linear to lanceolate, 1 to 1.5 cm. long; bracteoles elliptical-ovate, white, acute, 2 cm. long, 1.3 cm. wide, densely stellate-tomentose. Calyx about 8 mm. long, tubular, inflated in fruit, the limb persistent, obscurely 5-toothed, stellate-pubescent.

Scandent on tree trunks in forests at 1,050 m. alt. (No. 5642); also collected by *Merritt* at 900 m. alt., June, 1906 (No. 4366).

Medinilla microphylla Merrill n. sp.

Frutex scandens; ramis ramulis petiolis bracteis calycibus foliisque praecipue ad nervos stellato-tomentosis; ramis teretibus; foliis oppositis, oblongo-ovatis, 5-nervis, 2 ad 4.5 cm. longis; cymis terminalibus, pauciforibus, bracteis roseis persistentibus; floribus 4-meris.

Scandent along tree trunks, the stems and branches terete, slender, the younger parts densely stellate-plumose-tomentose. Leaves submembranous, oblong-ovate, 2 to 4.5 cm. long, 1 to 2 cm. wide, nearly glabrous above, beneath densely stellate-plumose-tomentose on the nerves, base acute, apex short-acuminate; nerves 5; petioles 0.5 mm. long, or less. Inflorescence terminal, usually reduced to a single flower subtended by about 6 pink bracts. Bracts narrowly elliptical-ovate, base and apex acute, 3-nerved, stellate-pubescent, 1.8 cm. long, 1 cm. wide. Fruit subglobose, somewhat stellate-pubescent, nearly 1 cm. long, the calyx persistent, 6 mm. long, the tube 2 mm., the lobes ovate, acute, 4 mm. long.

In forests at 900 m. alt. (No. 5599).

Medinilla sp.

In forests at 1,800 m. alt. (No. 5667), specimens in fruit only.

Medinilla sp.

In forests at 900 m. alt. (No. 4368 *Merritt*) June, 1906, material in poor condition.

Medinilla sp.

In forests at 1,300 m. alt. (No. 4382 *Merritt*) June, 1906. The last three species enumerated are all distinct from each other and different from any of the species represented at present in our herbarium, but the specimens are incomplete and are accordingly not described here.

ASTRONIA Blume.

Astronia meyeri Merr. in Govt. Lab. Publ. 35 (1906) 51.

In forests at 550 m. alt. (No. 4347 *Merritt*) June, 1906.

Previously known from Mount Mariveles, Luzon.

MEMECYLON Linn.

Memecylon preslianum Triana in Trans. Linn. Soc. 28 (1871) 157.

In forests at 100 m. alt. (No. 5604).

Widely distributed in the Philippines. Endemic.

HALORRHAGACEÆ.

HALORRHAGIS Forst.

Halorrhagis halconensis Merrill n. sp.

Planta robusta suffruticosa erecta ad 60 cm. alta; foliis oppositis vel ad ramos juniores verticillatis, elliptico-ovatis, ad 3 cm. longis, 1 ad 1.5 cm. latis; inflorescentiae ad apices caulis dense racemoso-pani-

culatae; flores hermaphroditi 3 ad 3.5 mm. longi in bractearum axillis solitarii.

Robust, erect, sligtly branched, about 60 cm. high, the stems terete, scabrid, the older ones reddish brown, the younger parts rather densely clothed with long brittle white hairs. Leaves elliptical-ovate 2 to 3 cm. long, 1 to 1.5 cm. wide, those on the older parts opposite, those on the younger branches in whorls of four, crowded, rigid, coriaceous, scabrid, sessile or short-petioled, the base rounded, the apex acute, the margins strongly acuminate-denticulate, both surfaces with scattered coarse white hairs. Inflorescence terminal, crowded, consisting of many simple racemes forming a terminal panicle up to 10 cm. in length and 4 or 5 cm. in diameter, the individual racemes 4 cm. long or less, ascending, the lower ones subtended by leaves. Bracts narrowly lanceolate, 3 mm. long, 1-flowered, the bracteoles acicular, 1 mm. long; pedicels about 1 mm. long, strigose. Calyx tube 4-angled, narrowly ovate, slightly strigose, not rugose nor pellucid-punctate but slightly strigose-hispid, the lobes erect, lanceolate, about 1.5 mm. long, acuminate, glabrous. Petals boat-shaped, slightly aculeate-hispid on the keel, 2.2 mm. long. Stamens 8; anthers 1.5 to 1.7 mm. long.

In open heaths at 2,400 m. alt. (No. 5700).

The fourth species of this characteristic Australian genus to be found in the Philippines, readily recognizable by its crowded, opposite and verticillate, very large leaves (for the genus), and terminal racemoso-paniculate inflorescence.

Halorrhagis micrantha (Thunb.) R. Br. ex Sieb. et Zucc. Fl. Jap. Nat. 1 (1843) 25; Merr. in Philip. Journ. Sci. (1906) Suppl. 1: 216.

With the preceding (No. 5787).

Known in the Philippines from Canlaon Volcano, Negros, and Mount Apo, Mindanao.

Bengal to Japan, Malaya, Australia and New Zealand.

ARALIACEÆ.

BOERLAGIODENDRON Harms.

Boerlagiodendron trilobatum Merrill, n. sp.

Frutex glaber 2 ad 5 m. altus; ramulis tenuis, lenticellatis; foliis glabris, submembranaceis, longe petiolatis, ad 20 cm. longis, profunde 3-lobatis, lobis acuminatis, sinuato-serratis; umbellis terminalibus, multifloribus; ovario 5-lobato.

A slender shrub, simple or sparingly branched, nearly glabrous, 2 to 5 m. high. Branches slender, terete, lenticellate. Leaves alternate, submembranous, glabrous, paler beneath, shining, about 20 cm. long, 3-lobed, the sinus reaching nearly ½ to the base of the leaf, narrow, the lobes narrowly oblong, sharply acuminate, irregularly rather coarsely sinuate-serrate, the base broadly acute, 5-nerved; petioles 13 cm. long with

a prominent stipule at the base. Inflorescence terminal, short pedunculate, umbellate, about 10 cm. in diameter, the primary peduncles about 15, 2 cm. long, bearing a small umbel at the apex and usually 2 secondary peduncles 1.5 to 2 cm. long, these bearing a dense globose head of small white flowers. Calyx tubular 3 mm. long, truncate. Petals 5, valvate, oblong, acute, 3 mm. long. Stamens 5; filaments 2 mm. long; anthers 1.8 mm. long. Ovary 5-celled. Fruit dimorphous, of the primary umbels white, fleshy, globose, not ridged, 3-celled, 4 to 5 mm. in diameter, the seeds aborted; of the secondary umbels oblong-ovoid, 7 mm. long, strongly 5-ridged, 5-celled, fertile.

In forests at about 150 m. alt. (No. 5620). A closely related form is represented by No. 669 *Ahern* from Surigao, Mindanao.

SCHEFFLERA Forst.

Schefflera foetida Merrill n. sp. § *Heptapleurum*.

Scandens, glabra; foliis 6-foliatis; foliolis ovatis vel oblongo-ovatis, acuminatis, coriaceis, 4 ad 6 cm. longis; paniculis terminalibus, ramulis divergentibus; ovario 4-rariter 5-loculare.

Glabrous throughout, scandent up to 7 m., all parts when crushed with a very rank odor; branches gray, the tips very dark colored when dry, terete. Leaves alternate, the petioles 5 to 10 cm. long, digitately 5-foliate; leaflets ovate to oblong-ovate, coriaceous, shining, 4 to 6 cm. long, 2 to 3.5 cm. wide, acuminate, the base rounded or subacute, sometimes inequilateral, the midrib prominent, the lateral nerves very faint; petiolules 1 to 3 cm. long. Panicles terminal, about 12 cm. long, short-peduncled, branched along the rachis, the branches few, spreading, the primary ones (in anthesis) sometimes 10 cm. long, the umbels racemosely disposed their peduncles 1.5 to 2 cm. long, each umbel 6 to 9-flowered, the pedicels 5 to 7 mm. long. Calyx broadly funnel shaped, truncate, about 1.2 mm. long. Petals united, forming an apiculate calyptra which falls as a whole, 2 mm. long. Stamens 4, very rarely 5; filaments 4 mm. long; anthers ovoid, 1.2 mm. long. Ovary 4-celled, the top conical; stigmas 4.

On forested ridges at 1,800 m. alt. (No. 5762). No. 4423 *Merritt*, from an altitude of 1,600 m. is apparently the same, the flower buds being very immature. No. 5678 of my own collection appears also to be a very large diffuse form of the same species but it is with fruits only and has much larger more acuminate leaves and very much larger panicles than the type.

Schefflera sp.

In forests at 900 m. alt. (No. 5696) Undeterminable, with fruits only.

Schefflera insularum (*Heptapleurum insularum* Seem.) is abundant along the Alag and Binabay Rivers, and has previously been collected on the Baco River near the base of Halcon.

ARTHROPHYLLUM Blume.

Arthrophyllum sp.

In forests at 700 m. alt. (No. 5597), flowers immature, apparently representing an undescribed species.

ARALIA Linn.

Aralia glauca Merrill n. sp.

Arbor ad 10 m. alta, ramis ramulis foliisque inermibus; foliis bipinnatis 40 ad 50 cm. longis, pinnis 5-jugatis 20 ad 30 cm. longis; foliolis 4 ad 7-jugatis, oblongo-ovatis, acuminatis 6 ad 11 cm. longis, subtus pallidis; paniculis terminalibus 50 cm. vel ultra longis et latis, ramis elongatis ad 40 cm. longis, ramulis racemose dispositis, 4 ad 6 cm. longis; ovario 5-loculare.

A spineless tree about 10 m. high, the branches thickened, the ultimate ones 1.5 to 2 cm. in diameter, lenticellate, striate when dry, glabrous or nearly so, the large bipinnate leaves crowded at the apices of the branches, the inflorescence of several large spreading terminal panicles. Leaves about 50 cm. long, the pinnæ 5-jugate, opposite, the rachis glabrous terete, enlarged at the nodes which are prominently jointed, the petiole 20 to 25 cm. long, glabrous; pinnæ 20 to 30 cm. long, the lowest pair shorter; leaflets 4 to 7-jugate, opposite, oblong-ovate to oblong-lanceolate, glabrous, subcoriaceous, dull, the lower surface glaucous, 6 to 11 cm. long, 2 to 4 cm. wide, the base rounded or cordate, gradually narrowed above to the rather prominently acuminate apex, the margins distantly irregularly sinuate-crenate, the teeth frequently apiculate, nerves 5 to 6 on each side of the midrib, rather prominent beneath; petiolules 1 to 4 mm. long. Panicles at least 50 cm. long and about as wide, several from the apex of the same branch, the branches racemosely disposed, about 40 cm. long, the rachis thick, about 20 cm. long, slightly hirsute, branches slightly ferruginous-pubescent, the branchlets and pedicels rather densely so; branchlets racemosely disposed, slender, 4 to 6 cm. long, numerous, each supplied with many scattered lanceolate acuminate bracts or bracteoles 2 to 3 mm. long the flowers umbellately disposed, usually 2 umbels towards the apex of each branchlet and frequently solitary flowers in the axils of the upper bracts below the umbels. Umbels 15 to 20-flowered, the pedicels 5 mm. long or less. Flowers (immature) white, petals 1.5 mm. long. Calyx 1.5 mm. long, the lobes 5, broadly ovate, acute, 0.3 mm. long. Stamens 5; anthers 1 mm. long. Ovary 5-celled; styles 5, free, 1 mm. long.

In forests at 700 m. alt. (No. 6177), locally rather abundant and recognizable by being entirely unarmed.

The very spiny *Aralia hypoleuca* Presl is abundant on recent "slides" on Halcon at an altitude of about 1,800 m. It is widely distributed in the Philippines and has been reduced by *Forbes* and *Hemsley* to the very widely distributed *Aralia spinosa* Linn.

UMBELLIFERÆ.

DIDISCUS DC.

Didiscus saniculaefolius (Stapf) *Trachymene saniculaefolia* Stapf in Trans. Linn. Soc. Bot. II. 4 (1894) 167; Hook. Icon. IV. 4 (1895) *pl. 2308*.

In open heaths at 2,400 m. alt. (No. 6174), locally abundant, but found only in the open heaths associated with *Gleichenia*, *Lycopodium*, *Dipteris*, *Vaccinium*, *Leptospermum*, *Isachne*, *Drosera*, *Patersonia*, etc.

While the above specimens differ slightly from the description and figure given by *Stapf*, still I can detect no constant characters by which the Philippine form can be distinguished from the Bornean, and without comparison with the type material I do not care to describe the Halcon plant as a new species. The genus is new to the Philippine flora, and its discovery is another link in the chain of evidence regarding possible previous land connections with Borneo on the one hand, and with Australia on the other. *Didiscus saniculaefolius* was previously known only from Mount Kinabalu, North Borneo, being related to the Australian *D. humilis*. Of the genus, about fourteen species are recognized, twelve in Australia, one in New Caledonia and one in Mindoro and Borneo; of the genus *Trachymene*, in which the above species was placed by *Stapf*, about twelve species are recognized, all the others confined to Australia.

CLETHRACEÆ.

CLETHRA Linn.

Clethra lancifolia Turcz. in Bull. Soc. Nat. Mosc. 36[2] (1863) 231.

In forests at 700 m. alt. (No. 5575); also collected by *Merritt* in June, 1906 at 2,200 m. alt. (No. 4455).

Previously known only from the mountains of Luzon and Negros.

ERICACEÆ.

RHODODENDRON Linn.

Rhododendron quadrasianum Vid. Rev. Pl. Vasc. Philip. (1886) 170.

Terrestrial and epiphytic, mossy ridge-forests at 1,350 m. alt. (No. 6158); also collected by *Merritt* in forests at 1,600 m. alt. (No. 4455).

On most of the higher mountains of the Philippines from northern Luzon to southern Mindanao. Endemic in the Philippines.

Rhododendron rosmarinifolium Vid. l. c. 172.

In open heaths at 2,400 m. alt. (No. 5736).

Previously known only from the mountains of northern Luzon; the Halcon specimens not quite typical, the leaves shorter and broader than in specimens from northern Luzon. This is probably the form reported from "Dulangao" (a spur of Halcon) by *Rendle*, as the Bornean *Rhododendron cuneifolium* Stapf, and appears to be rather intermediate between *R. rosmarinifolium* and *R. cuneifolium*, but nearer the former.

GAULTHERIA Linn.

Gaultheria cumingiana Vid. Phan. Cuming. Philip. (1885) 184.

Subscandent in ridge forests 1,800 to 2,200 m. alt. (No. 5725).

Previously known only from the mountains of Luzon and Formosa.

DIPLYCOSIA Blume.

Diplycosia merrittii Merrill, n. sp.

Frutex pseudoepiphyticus scandens, inflorescentiis exceptis, glabra; foliis coriaceis oblongo vel elliptico-ovatis, rariter oblongo-lanceolatis, breviter acuminatis, 6 ad 10 cm. longis, basi acutis nervis utrinque 2 vel 3, subtus prominentibus; flores axillares, fasciculati; corolla ovoidea, 6 ad 7 mm. longa.

A scandent pseudoepiphytic shrub often 6 m. high, glabrous except the inflorescence. Branches gray or brown, terete, the younger ones angular. Leaves coriaceous, oblong-ovate to elliptical-ovate, rarely oblong-lanceolate, 6 to 10 cm. long, 2 to 5 cm. wide, the base acute, the apex slightly acuminate, the margins obscurely denticulate, recurved, paler and glandular punctate beneath; nerves 2 to 3 on each side of the midrib, ascending, impressed above, rather prominent, the reticulations nearly obsolete; petioles stout, 4 to 8 mm. long, rugose. Flowers pink, fascicled, 2 to 8 in each axil, the pedicels slender, slightly pubescent, 1 to 1.5 cm. long, the apical bracts two, orbicular-ovate, 1.3 mm. long. Calyx very slightly pubescent, 3.5 mm. long, the lobes ovate or narrowly ovate, acute, 2 mm. long. Corolla ovoid, narrowed below, 6 to 7 mm. long, the lobes 5, ovate, broadly acuminate, 2 mm. long, reflexed. Stamens 10, glabrous; filaments 3 mm. long; anthers oblong, 1.5 mm. long. Ovary glabrous, style 2 mm. long. Fruit ovoid or subglobose, soft, fleshy, 1 cm. in diameter, black when mature.

In ridge forests at 1,400 m. alt. (No. 5670) (type), very abundant, the fruit edible but nearly tasteless; also collected by *Merritt* in June, 1906, at an altitude of from 1,600 to 1,700 m. (Nos. 4413, 4415, 4437). The same form has been collected in Palawan, Victoria Peak (666 *Foxworthy*) March, 1906.

Of the Philippine species of this genus, apparently most closely related to DIPLYCOSIA LUZONICA (A. Gray) (*Gaultheria luzonica* A. Gray), from Mount Banajao and Mount Santo Tomas, Luzon. I have before me a single leaf from the type of *Gray's* species, kindly supplied by Dr. *J. N. Rose* of the U. S. National Museum. No. 5932 *Elmer* from Mount Santo Tomas seems to match it exactly. The species proposed above differs from this in its larger, differently shaped leaves, much longer pedicels and more prominently nerved leaves, the venation in the two species being quite different. I have seen no flowers of *Gaultheria luzonica*.

VACCINIUM Linn.

Vaccinium mindorense Rendle in Journ. Bot. 34 (1896) 355.

Epiphytic, mossy ridge forests 1,950 to 2,200 m., and terrestrial above 2,200 m. alt. (No. 5676); also collected by *Merritt* at 1,600 m. in June, 1906 (No. 4414).

The type of the species was from Mount Dulangan, a spur of Halcon. It is also apparently represented by specimens from Mount Madiaas, Panay (*A. E. Yoder*), April, 1905, and from Mount Apo, Mindanao (*Copeland*), October, 1904.

Vaccinium banksii Merr. in Govt. Lab. Publ. 35 (1905) 54.

In an open heath at 2,400 m. alt. (No. 5506).

Previously known only from Canlaon Volcano, Negros.

Vaccinium villarii Vid. Rev. Pl. Vasc. Filip. (1886) 166.

With the preceding species (No. 5502).

Extending from the high table lands of northern Luzon to Mount Apo, Mindanao. Endemic in the Philippines.

Vaccinium hutchinsonii Merrill n. sp.

Epiphyticum, glabrum, foliis late elliptico-ovatis, abrupte subcaudato-acuminatis, coriaceis, 8 ad 11 cm. longis, 5.5 ad 7 cm. latis, basi acutis; flores usque ad 17 mm. longi, rubri, in racemos bracteatos axillares dispositi, filamentis pause setoso-pilosis.

A scandent epiphytic or pseudoepiphytic shrub about 5 m. high. Branches glabrous, light gray or brown, the younger ones somewhat angular. Leaves broadly elliptical-ovate, coriaceous, glabrous, the base acute or acuminate, the apex abruptly subcaudate-acuminate, shining, entire, 8 to 11 cm. long, 5.5 to 7 cm. wide; nerves about 7 on each side of the midrib, mostly basal, ascending, distinct, the reticulations distinct; petioles 1 to 1.5 cm. long. Racemes axillary, glabrous, 8 to 14 cm. long, the bracts oblong-lanceolate, reddish, membranous, deciduous, glabrous, acuminate, 2 cm. long, 5 mm. wide; pedicels rather distant, solitary in the axil of each bract, about 1.5 cm. long. Calyx globose, rugose, 3 to 4 mm. in diameter, the teeth 5, triangular-ovate, acute, 1 mm. long. Corolla red, tubular-campanulate, glabrous, 14 mm. long, gradually wider above. Stamens 10; filaments 6 to 7 mm. long, with few stiff hairs below; anthers narrowly oblong, 5 to 6 mm. long, the terminal tubes half the length of the anthers. Ovary glabrous; style glabrous, 15 mm. long.

Epiphytic or pseudoepiphytic in mossy ridge forests at 2,000 m. alt. (No. 5524).

Most closely related to *Vaccinium barandanum* Vid., from northern Luzon, differing in its much broader, relatively shorter and differently shaped more numerously veined leaves, shorter flowers and slightly setose-pilose filaments. Named in honor of *W. I. Hutchinson* of the Philippine Forestry Bureau, my companion in the ascent of Halcon.

Vaccinium halconense Merrill n. sp.

Scandens, epiphyticum; foliis oblongo-elliptico-ovatis vel obovatis, acutis vel breviter acuminatis, basi acutis, 6 ad 9 cm. longis, coriaceis; racemis axillaribus, rhachidibus pedicellis fructibusque ferrugineo-pilosis.

A scandent shrub or subarborescent, 5 to 10 m. high, epiphytic or pseudoepiphytic. Branches reddish brown, glabrous, terete, the growing tips slightly pubescent. Leaves coriaceous, oblong-elliptical-ovate or somewhat obovate, 6 to 9 cm. long, 2 to 3.5 cm. wide, glandular-punctate beneath and paler than above, slightly shining, the base acute, the apex acute or shortly acuminate; nerves about 3 on each side of the midrib, mostly basal, ascending, not very distinct; petioles stout, 5 mm. long or less, glabrous or slightly pubescent. Racemes axillary, 5 to 7 cm. long, the rachis, pedicels and fruits ferruginous-pilose but not densely so; pedicels about 1 cm. long. Fruits globose, about 8 mm. in diameter.

On exposed ridges, epiphytic on *Podocarpus*, at 1,350 m. alt. (No. 5665); also collected by *Merritt* in June, 1906, at 1,600 m. alt. (No. 4422).

A species distinguishable from all other Philippine representatives of the genus known to me by its pilose racemes and fruits.

Vaccinium pyriforme Merrill n. sp.

Epiphyticum, glabrum, scandens; foliis elliptico-oblongis vel anguste elliptico-obovatis, integris, obtusis, 1.5 ad 2 cm. longis, ad 5 mm. latis, glabris, coriaceis; racemis axillaribus, paucifloribus, 1.5 cm. longis; fructibus pyriformibus.

A slender scandent epiphyte, glabrous throughout. Stems slender, reddish brown, angular. Leaves elliptical-oblong or narrowly elliptical-obovate, the apex obtuse, the base acute, 1.5 to 2 cm. long, about 5 mm. wide, coriaceous, shining, pale when dry, entire, the nerves few, indistinct; petioles 1 to 2 mm. long. Racemes axiliary, few flowered, 1.5 cm. long, the rachis about 1 cm. long, the pedicels 5 mm. long. Flowers unknown. Fruit pyriform, glabrous, about 4 mm. long, the apex subtruncate and somewhat pubescent inside the persistent obscure calyx teeth.

Epiphytic in forests at 1,600 m. alt. (No. 4424 *Merritt*) June, 1906. A species characterized by its small entire leaves, axillary racemes and pyriform fruit.

Vaccinium whitfordii Merrill n. sp.

Frutex glaber; foliis coriaceis, anguste obovatis vel elliptico-obovatis, basi acutis, apice obtusis, obscure crenatis, usque ad 1 cm. longis; flores axillares, solitarii, rubri, ad 8 mm. longi; filamentis pilosis.

An erect shrub 0.7 to 3 m. high, terrestrial, or sometimes epiphytic, nearly glabrous throughout. Branches slender, gray or brown, angular, the younger ones somewhat puberulent. Leaves 1 cm. long or less, narrowly obovate or elliptical-obovate, coriaceous, glabrous, the apex obtuse, the base acute, the margins somewhat crenate especially above; nerves obsolete or nearly so; petioles about 1 mm. long. Flowers axillary, solitary, the pedicels slightly pubescent, 2 to 3 mm. long. Calyx 3.5 mm. long, the tube ovoid, the lobes spreading, narrowly ovate, glabrous, 1 mm. long. Corolla narrowly urceolate, red, glabrous, 7 to 8 mm. long, 4 mm. wide below, narrowed above and 2 mm. wide below the mouth, the lobes 5, ovate reflexed, acute, 1 mm. long. Stamens 10; filaments 3 to 4 mm. long, thickened below, pilose; anthers oblong, 1.5 mm. long. Style thick, 8 mm. long. Fruit subglobose, or ovoid, glabrous, 5 mm. in diameter.

On open heaths at 2,400 m. alt. (No. 5798), a shrub about 70 cm. high. Also found in the District of Lepanto, Luzon, at 1,500 m. alt. (No. 5741 *Klemme*) November, 1906, a shrub up to 3 m. in height, and on Mount Silay, Negros (No. 1534 *Withford*) May, 1906, epiphytic in the latter place.

A species characterized by its small crenate leaves and solitary axillary flowers.

Vaccinium sp.

Epiphytic in the mossy forest at 1,800 m. alt. (6133). Sterile material, apparently representing an undescribed species.

MYRSINACEÆ.

ARDISIA Swartz.

Ardisia elmeri Mez in Philip. Journ. Sci. 1 (1906) Suppl. 273.

In forests at 1,800 m. alt. (No. 6138); also collected by *Merritt* in June, 1906, in forests 2,100 to 2,200 m. alt. (Nos. 4444, 4457).

Previously known only from northern Luzon.

Ardisia racemoso-panniculata Mez l. c. 271.

In forests at 450 m. alt. (No. 4334 *Merritt*), June, 1906.

Previously known only from Mount Apo, Mindanao. *Merritt's* specimen is not quite typical and is very fragmentary, but I consider it referable to this species.

Ardisia saligna Mez in Engler's Pflanzenreich 9 (1902) 143.

In forests at 300 m. alt. (No. 5567).

Previously known from Luzon and Polillo.

Ardisia boissieri A. DC.; Mez l. c. 129.

In forests at 1,450 m. alt. (No. 5669); also collected by *Merritt* at about 1,000 m. alt. (Nos. 4371, 4355).

Endemic in the Philippines and frequently confused with *A. humilis*. The specimens cited above are all with fruit and accordingly the identification must be considered as somewhat doubtful.

Ardisia serrata (Cav.) Pers. Syn. 1 (1805) 233; Mez l. c. 137.

In forests at 1,800 m. alt. (Nos. 5675, 5732, 6145); also collected by *Merritt* in June, 1906, at 1,300 m. alt. (No. 4372).

Widely distributed in the Philippines.

Borneo.

Ardisia serrata (Cav.) Pers., var. brevipetiolata Merrill n. var.

Foliis breviter (3 mm.) petiolatis, basi anguste rotundato-cordatis.

In forests at 550 m. alt. (No. 4346 *Merritt*) June, 1906. The type is No. 4049 *Merrill* from the Baco River, near the base of Halcon, March, 1905. More abundant and better material may prove this form to be worthy of specific rank.

Ardisia sp.?

An undershrub less than 1 m. high, in forests at 250 m. alt. (No. 5743), specimens in fruit only, and possibly not this genus.

LABISIA Lindl.

Labisia pumila (Blume) F.-Vill. Nov. App. (1883) 123; Mez in Engler's Pflanzenreich 9 (1902) 171 ("Benth. et Hook.") var. genuina Mez l. c.

In forests at 450 m. alt. (No. 4335 *Merritt*) June, 1906.

A monotypic genus extending from Cochin China and the Malayan Peninsula to Java, Sumatra and Borneo, the variety *genuina* in Java, Penang, Singapore and Cochin China.

Reported from Luzon by *F.-Villar*, but not found in the Philippines by any other botanists or collector until discovered by *Merritt*.

DISCOCALYX Mez.

Discocalyx sp.

In forests at 1,400 m. alt. (No. 5608), specimens with immature fruit only, apparently undescribed.

Discocalyx sp.

In forests at 1,800 m. alt. (No. 5508).

RAPANEA Aubl.

Rapanea retusa Merrill n. sp.

Frutex glaber ad 3 m. alta; foliis oblongo-oblanceolatis, coriaceis, apice retusis, basi cuneatis, 2 ad 5 cm. longis, subtus valde glanduloso-punctatis; flores 4-meri, 2 mm. longi, fasciculati; petalis ovatis, acutis, punctatis usque ad $\frac{1}{4}$ connatis.

An erect much branched shrub about 3 m. high, glabrous throughout. Branches brown or gray, the younger ones glandular-punctate. Leaves oblong-oblanceolate, to narrowly elliptical-oblanceolate, 2 to 5 cm. long, 0.5 to 1.5 cm. wide, coriaceous, shining above, both surfaces glandular-punctate, the lower one more prominently so, margins entire, the apex retuse, the base cuneate; petioles 3 to 8 mm. long; nerves and reticulations obscure. Flowers fasciculate in the leaf-axils, usually about 5 in a fascicle, the pedicels glabrous, glandular-punctate, 3 to 4 mm. long. Calyx lobes 4, ovate, acute, nearly 1 mm. long, glandular-punctate. Corolla 2 mm. long, the lobes 4, narrowly-ovate, acute, glandular-punctate, united for the lower $\frac{1}{4}$. Anthers suborbicular-ovate, about 1.2 mm. long. Fruit globose, about 3 mm. in diameter, slightly glandular-punctate or nearly epunctate, crowned by the style which is apparently sessile and coarsely lobed.

In open heaths at 2,400 m. alt. (Nos. 5734, 5735); both specimens in fruit; also collected by *Merritt* in July, 1906, at from 1,600 to 2,200 m. alt. (Nos. 4426, 4449), both specimens with staminate flowers.

Apparently a distinct species, characterized by its 4-merous flowers, and oblong-oblanceolate, retuse, glabrous, glandular-punctate leaves, but in the absence of pistillate flowers I am not sure of its affinity, but it appears to belong in the group with *Rapanea myrtillina*, *M. platystigma*, etc., this group being developed in New Zealand, Australia, etc., with a single species extending as far north as New Guinea.

EMBELIA Burm.

Embelia halconensis Merrill n. sp. (§ *Pattara?*)

Frutex vel arbor erecta, glabra; foliis oblongo-ovatis, integris, 5 ad 7 cm. longis; racemis axillaribus, solitariis, 3 ad 4 cm. longis, basi squamis imbricatis destitutis; flores 5 et 6-meri, petalis basi breviter connatis; filamentis quam petalis brevioribus.

A shrub or tree glabrous throughout, reaching a height of 10 m. Branches dark gray, slender, lenticellate. Leaves oblong-ovate, entire,

the apex broadly rather obscurely acuminate, the base acute, 5 to 7 cm. long, 1.5 to 3 cm. wide, coriaceous, somewhat shining, glandular-punctate beneath; nerves 5 to 6 on each side of the midrib, obscure; petioles 6 to 8 mm. long. Racemes axillary, solitary, the basal bracts wanting, 3 to 4 cm. long, few flowered, the pedicels 4 to 5 mm. long, each subtended by small basal bract, the flowers white. Sepals 6, rarely 5, ovate, acute, about 1 mm. long. Petals 6, rarely 5, symmetrical oblong-ovate, obtuse, 2 to 2.5 mm. long, epunctate, united for the lower 0.5 mm. Filaments 1 mm. long; anthers broadly ovoid, 0.5 mm. long. Ovary rudimentary in staminate flowers, ovoid, glabrous.

In ridge-forests at 1,800 m. alt. (No. 5771).

Rather an anomalous species for this genus because of its usually 6-merous flowers and with its petals manifestly united below. Careful dissection of many flowers shows them to be mostly 6-merous, but sometimes 5-merous on the same branches and even in the same racemes.

PRIMULACEÆ.

LYSIMACHIA (Tourn.) Linn.

Lysimachia ramosa Wall. Cat. (1828) n. 1490; Knuth in Engler's Pflanzenreich. 22 (1905) 271.

In forests at 2,000 m. alt. (No. 4443 *Merritt*) June, 1906.

Previously known in the Philippines only from the mountains of northern Luzon.

Himalayan region to Java and the northern Philippines.

SAPOTACEÆ.

PALAQUIUM Blanco.

Palaquium sp. aff. *P. luzoniensi* Vid.

In forests along the Alag River at 100 m. alt. (No. 5767).

Previously known only from Luzon and Mindoro.

Palaquium sp. aff. *P. luzoniensi* Vid.

In forests at 1,100 m. alt., fragmentary imperfect material from fallen branches of a large tree.

SYMPLOCACEÆ.

SYMPLOCOS Linn.

Symplocos adenophylla Wall. Cat. (1828) No. 4427; Brand in Engl. Pflanzenreich 6 (1901) 48.

In exposed ridge-thickets at 2,450 m. alt. (No. 5752); also collected by *Merritt* in June, 1906, at from 1,500 to 2,200 m. alt. (Nos. 4406, 4428, 4440, 4447).

Specimens of the above were sent to Dr. A. *Brand*, who has identified them as above. No specimens with mature flowers were collected, only with immature buds and mature fruits, the fruit being slightly longer than in the type specimens. The species is new to the Philippines.

Penang, Singapore, Banca and North Borneo.

APOCYNACEÆ.

ALYXIA R. Br.

Alyxia monilifera Vid. Rev. Pl. Vasc. Filip. (1886) 182.

In ridge thickets at 2,500 m. alt. (No. 5713).

Previously known only from Mount Mariveles and Mount Banajao, Luzon.

ASCLEPIADACEÆ.

Seven species of *Dischidia* and *Hoya* are represented in the material collected by the author on Halcon, but as much of our material of these genera is at present in the hands of Dr. *Schlechter* for identification, no attempt is here made to determine the species.

VERBENACEÆ.

CALLICARPA Linn.

Callicarpa caudata Maxim. in Bull. Acad. Pétersb. 31 (1887) 76.

In forests at 800 m. alt. (No. 5556).

On the higher mountains from northern Luzon to southern Mindanao. Endemic.

The Halcon specimen has pure white fruits, while specimens from northern Luzon have purple fruits.

CLERODENDRON Linn.

Clerodendron sp.

In forests at 1,800 m. alt. (No. 5516).

Apparently an undescribed species, but without flowers, the persistent calyx and bracts purplish. The same species is represented by No. 5713 *Klemme* from Balbalasan, District of Lepanto, Luzon, alt. 1,600 m., also without flowers.

LABIATÆ.

SCUTELLARIA Linn.

Scutellaria luzonica Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 315.

On ledges along the Binabay River at 200 m. alt. (No. 5640), a form with much larger leaves than the type.

Luzon and Formosa.

GOMPHOSTEMMA Wall.

Gomphostemma philippinarum Benth. in DC. Prodr. 12 (1848) 551.

In old clearings at 900 m. alt. (No. 5581).

Throughout the Philippines at higher altitudes. Endemic.

SOLANACEÆ.

SOLANUM Linn.

Solanum parasiticum Blume Bijdr. (1826) 697; Prain ex King in Journ. As. Soc. Beng. 74[2] (1905) 330.

Epiphytic in forests at 100 m. alt. (No. 6157).

This is the form that has been reported from the Philippines as *Solanum blumei* Nees (873 *Cuming*), but judging from the descriptions it is nearer *S. parasiticum* Bl. I refer here the following specimens: PHILIPPINES (837 *Cuming*). MINDANAO, Davao (329 *Copeland*); Lake Lanao, Camp Keithley (428 *Clemens*).

Malayan Peninsula, Java and Sumatra.

Solanum nigrum Linn. Sp. Pl. (1753) 329.
In old clearings at 900 m. alt. (No. 5571).
Widely distributed in the Philippines; a weed.
Tropical and temperate regions generally.

SCROPHULARIACEÆ.

VANDELLIA Linn.

Vandellia grandiflora Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 237.
In forests at 1,500 m. alt. (No. 4401 *Merritt*) June, 1906.
Previously known only from the highlands of northern Luzon.

TORENIA Linn.

Torenia polygonoides Benth. Scroph. Ind. (1835) 39.
In an old clearing at 1,050 m. alt. (No. 5495).
Widely distributed in the Philippines but nowhere abundant.
British India to the Malayan Peninsula and Borneo.

GESNERIACEÆ.

TRICHOSPORUM Don.

Trichosporum philippinense (Clarke) O. Ktz. Rev. Gen. Pl. (1891) 478.
In forests at 1,300 m. alt. (No. 6141), ascending to 2,200 m.; also collected by *Merritt* in June, 1906, at 1,300 m. alt. (No. 4379).
Previously known only from Luzon.

Trichosporum rubrum Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 227.
In forests at 1,400 m. alt. (No. 5769); also collected by *Merritt* in June, 1906, at 2,200 m. alt. (No. 4450).
Previously known only from northern Luzon, with a closely related if not identical form from Canlaon Volcano, Negros.

DICHROTRICHUM Reinw.

Dichrotrichum chorisepalum Clarke in DC. Monog. Phan. 5 (1883) 53.
In forests at 1,800 m. alt. (No. 6142).
Previously known from the mountains of Luzon, Negros and Mindanao.

CYRTANDRA Forst.

Cyrtandra cumingii Clarke in DC. Monog. Phan. 5 (1883) 263.
In forests at 1,500 m. alt. (No. 5578).
Widely distributed in the Philippines. Endemic.

Cyrtandra parvifolia Merrill n. sp.

Ramis gracilibus, glabris, junioribus plus minus ferrugineo-hirsutis; foliis oppositis, lanceolatis vel oblongo-lanceolatis, basi acutis, plus minus repando-crenatis vel subintegris, 2 ad 4.5 cm. longis; pedicellis axillaribus, solitariis, elongatis, medio bibracteolatis bracteolis minutis; calyce persistente; corolla circa 1.5 cm. longa.

A slender shrub 1 to 3 m. high. Branches light gray or brownish, glabrous, slender, terete, the younger ones more or less ferruginous-hirsute. Leaves opposite, lanceolate to oblong-lanceolate, 2 to 4.5 cm.

long, 0.5 to 1.5 cm. wide, the base inequilateral, acute, the apex acute or somewhat acuminate, the tip blunt, the margins slightly repand-crenate or subentire, submembranous, glabrous above, paler and somewhat ferruginous-hirsute on the midrib beneath or quite glabrous; nerves 4 to 5 on each side of the midrib; petioles 1 cm. long or less, ferruginous-hirsute. Flowers axillary, solitary, long-pedicelled, about 1.5 cm. long, the pedicels sparingly hirsute, 1 to 2 cm. long, slender, bibracteolate at about the middle, the bracts narrow, 2 mm. long or less. Calyx glabrous or nearly so, the tube broad, about 3 mm. long, the teeth about 4 mm. long, broadened at the base, narrowed abruptly and linear-lanceolate above, persistent and slightly accrescent in fruit. Corolla about 1.5 cm. long, glabrous, the lobes narrowly-ovate, obtuse, 5 to 6 mm. long. Samens 2; anthers broad, about 1.2 mm. long. Style slightly hirsute. Fruits ovoid, fleshy, dark purple, glabrous, about 5 mm. long.

In forests at 1,800 m. alt. (Nos. 5718, 5777). The same species, but with shorter petioles and somewhat narrower leaves has been collected on Mount Malindang, Mindanao, at an altitude of 1,700 m. (No. 4753 *Mearns and Hutchinson*) May, 1906. A sterile specimen from Canlaon Volcano, Negros, collected by *Banks* in March, 1902, with more strongly sinuate leaves is probably referable here.

Cyrtandra sp.

In forests at 900 m. alt. (No. 4350 *Merritt*) June, 1906.

A characteristic, apparently undescribed species, with very long petioles, but the material rather imperfect.

Cyrtandra sp.

In forests at 1,400 m. alt. (No. 5770), an undershrub 1 to 1.5 m. high.

LENTIBULARIACEÆ.

UTRICULARIA Linn.

Utricularia orbiculata Wall. Cat. (1828) No. 1500.

On seepy slopes, open heath at 2,400 m. alt. (No. 6168); flowers pale purple. Not previously reported from the Philippines.

Southeastern Asia, through the Malayan Peninsula to Mount Kinabalu, North Borneo.

Utricularia sp.

On rocks along the Alag River at 150 m. alt. (No. 5547). Possibly referable to the preceding, but the material very imperfect.

ACANTHACEÆ.

JUSTICIA Linn.

Justicia luzonensis C. B. Clarke in Govt. Lab. Publ. 35 (1905) 91.

In damp shaded ravines along the Alag River at 150 m. alt. (No. 5622). Previously collected on the Baco River, near the base of Mount Halcon by *Merrill* (No. 1778), April, 1903, and by *McGregor* (No. 156) March, 1905.

Known only from Luzon and Mindoro.

ERANTHEMUM Linn.

Eranthemum curtatum C. B. Clarke in Govt. Lab. Publ. 35 (1905) 89.

In thickets near the Alag River at 100 m. alt. (No. 6153). Previously collected on the Baco River, near the base of Mount Halcon by *Merrill* (No. 1779) April, 1903, and by *McGregor* (No. 144) March, 1905.

Known only from Luzon, Mindoro and Ticao.

STROBILANTHES Blume.

Strobilanthes halconensis Merrill n. sp.

Subglabrus; foliis oppositis, inaequalibus, usque ad 19 cm. longis, 8 cm. latis, longe subcaudato-acuminatis; spicis 5 ad 8 cm. longis; bracteis aculeatis, 5 mm. longis, in paribus distantibus; corolla 2 cm. longa; filamentis pilis longis ornatis.

Erect or ascending, much branched, glabrous except the somewhat aculeate bracts and sepals, 1 to 2 m. high. Leaves opposite, unequal, 5 to 19 cm. long, 1.5 to 8 cm. wide, ovate-lanceolate, the apex rather slenderly subcaudate-acuminate, the base acute, the margins subentire or obscurely crenate-dentate; nerves about 6 on each side of the midrib; petioles 2 cm. long or less. Spikes many, axillary, solitary, 5 to 8 cm. long; bracts in pairs, rather distant, ovate, obtuse, 5 mm. long, aculeate-hispid. Calyx segments 5 mm. long, oblong, obtuse, aculeate at the apices. Corolla white, 2 cm. long; stamens 4; filaments clothed with stout, brittle, jointed hairs.

In thickets bordering the forest at an altitude of 900 m. (No. 5586). Also collected by *Merritt* (No. 4370), at 920 m. alt. in June, 1906.

Perhaps as closely related to *Strobilanthes merrillii* Clarke, as to any other Philippine species, but distinct.

STAUROGYNE Wall.

Staurogyne debilis (Andres) C. B. Clarke in herb. *Ebermaiera debilis* Andres in Journ. Linn. Soc. Bot. 9 (1867) 452, in nota; Vidal Rev. Pl. Vasc. Filip. (1886) 203. *Ebermaiera elongata* Nees in DC. Prodr. 11 (1847) 721 var. β only. *Erythracanthus elongatus* Nees l. c. 78, var. β only.

On ledges along the Binabay River at 200 m. alt. (No. 5554).

Luzon, Negros and Mindanao.

RUBIACEÆ.

HEDYOTIS Linn.

Hedyotis hispida Retz. Obs. 4 (1779-91) 23.

In an old clearing at 100 m. alt. (No. 5694).

Previously recorded from the Philippines only by *F.-Villar*, Nov. App. (1883) 107, also represented in our herbarium by specimens from Rizal Province, Luzon, 1108 *Ramos*; 3312 *Ahern's collector*.

British India to southern China, the Malayan peninsula and archipelago.

Hedyotis elmeri Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 127.

No. 4381 *Merritt*, June, 1906, altitude not given.

Endemic in the Philippines.

Hedyotis congesta R. Br. in Wall. Cat. No. 844.
In an old clearing at 700 m. alt. (No. 5531).
Widely distributed in the Philippines.
Malayan peninsula and archipelago.

Hedyotis eucapitata Merrill n. sp.

Frutex vel suffrutex 0.6 ad 1.4 m. altus, ramis ramulisque gracilibus aut crassiusculis, puberulis, foliis oblongo-ovatis vel lanceolato-ovatis, acutis vel acuminatis, 3 ad 7 cm. longis, pubescentibus, nervis 3 ad 5 utrinque, stipulis liberis, 4 ad 5 mm. longis, fimbriatis, pubescentibus; inflorescentiae axillares, pedunculo 2 ad 4 cm. longo, puberulo; floribus capitato-congestis, bracteis foliaceis plus minusve involucratis.

Suffrutescent or woody, erect, much branched, 0.6 to 1.4 m. high. Branches slender or somewhat thickened, brown, pubescent, becoming glabrous. Leaves membranous, oblong-ovate to ovate-lanceolate, 3 to 7 cm. long, 1 to 2.5 cm. wide, the apex acute or sharp-acuminate, the base acute, both surfaces pubescent with weak scattered hairs, dull; nerves 3 to 5 on each side of the midrib, ascending, distinct; petioles pubescent, 0.5 to 1.5 cm. long; stipules pubescent, laciniate, the laciniæ setiform, pubescent, 4 to 7 mm. long. Inflorescence axillary, the peduncles pubescent, 2 to 4 cm. long, slender, each bearing a single terminal head of sessile flowers, 1 cm. in diameter or less, the bracts foliaceous, forming an involucre, the bracts and flowers more or less hispid-pubescent, the pedicels 1 mm. long or less. Calyx tube about 1 mm. long, the lobes 4, linear or linear-lanceolate, 2.5 mm. long, the mature capsule 2 to 2.5 mm. long.

In forests at 1,800 m. alt. (No. 5726); also collected by *Merritt* at 1,600 m. alt. (Nos. 4417, 4430).

A species evidently closely related to *Hedyotis macrostegia* Stapf, from Mount Kinabalu, North Borneo, differing from that species in its pubescent, fewer nerved leaves, much shorter stipules, and other characters. It is distinguished from all other Philippine species of the genus by its long peduncled capitate solitary axillary inflorescence.

Hedyotis whiteheadii Merrill n. sp.

Frutex 2 ad 2.6 m. altus, ramis ramulisque crassiusculis tetragonis, glabris, foliis rigide coriaceis, ovatis, acutis, glabris, nitidis, 1.5 ad 3 cm. longis, basi late rotundatis aut subtruncatis; inflorescentiae axillares, pauciflorae, cymosae; corolla alba, 6 mm. longa.

An erect branched shrub glabrous throughout, 2 to 2.6 m. high. Branches stout, tetragonous, green or brown, smooth. Leaves ovate, usually broadly so, 1.5 to 3 cm. long, 1 to 1.8 cm. wide, the base broad, rounded or subtruncate, gradually narrowed above to the acute apex, rigid coriaceous, shining, the margins often recurved; nerves 3 to 4 on each side of the midrib, not prominent; petioles stout, 2 mm. long or less; stipules 3 to 4 mm. long, usually trifid. Inflorescence axillary, few flowered, cymose, the peduncles 1.5 cm. long or less, the branches few,

the bracts and bracteoles foliaceous, the former oblong-ovate, 0.8 mm. long, the latter oblong, about 3 mm. long; pedicels 2 mm. long. Calyx tube ovoid, 2 mm. long, the lobes 4, narrowly oblong, blunt, 1.5 mm. long. Corolla 6 mm. long, the tube broadened above, 3 mm. long, the lobes somewhat ciliate on the margins, 3 mm. long, oblong. Filaments 1.5 mm. long; anthers 1.4 mm. long. Style included 2 mm. long.

In dense thickets on exposed ridges at 2,500 m. alt. (No. 5783).

Named in honor of *John Whitehead* who first attempted to ascend Halcon.

Hedyotis montana Merrill n. sp.

Frutex 1 m. altus, ramis ramulisque teretis vel obscure tetragonis, dense puberulis, foliis rigide coriaceis, oblongo-ovatis, acuminatis, glabris, nitidis, 3 ad 4 cm. longis, dense confertis, basi acutis; inflorescentiae axillares et terminales, pauciflorae, cymosae; corolla purpurea, 11 mm. longa.

An undershrub about 1 m. high. Branches stout, terete or obscurely tetragonous, brown, rather densely puberulous. Leaves oblong-ovate, rigid, coriaceous, shining, 3 to 4 cm. long, 1.5 cm. wide or less, the margins recurved, the apex rather prominently acuminate, the base acute; nerves 3 to 4 on each side of the midrib, prominent beneath, ascending; petioles 1.5 to 3 mm. long; stipules short, trifid. Cymes axillary and terminal, all borne near the apices of the branchlets appearing like an interrupted terminal inflorescence, the peduncles puberulent, 1 cm. long or less, each bearing about 6 congested flowers, the bracts foliaceous, narrowly ovate, 4 mm. long, the bracteoles smaller; pedicels 0.5 to 1.5 mm. long. Calyx tube ovoid, 1.5 mm. long, the lobes 4, narrowly oblong, blunt, 2 mm. long. Corolla purple, 11 mm. long, the tube about 8 mm. long, the lobes 3 to 4 mm. long, narrowly oblong, blunt, slightly ciliate on the margins. Filaments 0.5 mm. long; anthers 2 mm. long. Style slightly exserted, 9 mm. long.

On an open heath at 2,400 m. alt. (No. 5782).

Closely related to the preceding species, differing in its puberulent branches, longer narrower leaves which are acuminate at the apex and acute at the base and with prominent nerves, and much larger purple flowers.

OPHIORRHIZA Linn.

Ophiorrhiza venosa Merrill n. sp.

Herba vel suffruticosa, simplex vel pauciramosa, usque ad 60 cm. alta, foliis longe petiolatis, membranaceis, oblongo-ellipticis, basi et apice acuminatis, glabris, nervis 15 ad 20 utrinque, prominentibus, petiolo 3 ad 5 cm. longo; stipulis acuminato-lanceolatis, 3 mm. longis; cymae terminales, ferrugineo-puberulae.

An erect herbaceous or suffrutescent plant, simple or slightly branched, about 60 cm. high, glabrous except the inflorescence. Stems stout. Leaves oblong-elliptical, 13 to 20 cm. long, 4.5 to 7 cm. wide, membranous,

green above, pale beneath, somewhat shining, glabrous throughout, base and apex acuminate; nerves 15 to 20 on both sides of the midrib, very prominent and brownish beneath, spreading, anastomosing near the margins; petiole 3 to 5 cm. long, the lamina somewhat decurrent-acuminate; stipules lanceolate-acuminate, about 3 mm. long. Cymes terminal, ferruginous puberulent, the peduncle 4 to 5 cm. long, the branches 4 cm. long or shorter. Calyx 2.5 to 3 mm. long, the teeth 5, short, acute. Corolla white, 8 mm. long, the tube cylindrical, slightly inflated below, 6 mm. long, the lobes 5, elliptical-oblong, obtuse, 2 mm. long.

In humid forests at 150 m. alt. (No. 5628).

A species characterized by its glabrous, long petioled leaves, the nerves subparallel, very numerous and prominent.

Ophiorrhiza oblongifolia DC. Prodr. 4 (1830) 415.

In forests at 1,200 m. alt. (No. 5496), small leaved form; at about the same altitude (No. 4385 *Merritt*) June, 1906, a large leaved form.

Widely distributed in the Philippines. Endemic.

ARGOSTEMMA Wall.

Argostemma solaniflorum Elmer Leaflets Philip. Bot. 1 (1906) 2.

In forests at 1,350 m. alt. (Nos. 6105, 6186); also collected by *Merritt* (Nos. 4470, 4390).

Previously known only from northern Luzon.

UNCARIA Schreb.

Uncaria philippinensis Elmer Leaflets Philip. Bot. (1906) 38.

In thickets at 700 m. alt. (No. 5530).

Previously known from Luzon and Mindoro.

NAUCLEA Linn.

Nauclea sp.

In forests at 450 m. alt. (4337 *Merritt*) June, 1906. Undeterminable, the material being very fragmentary and in poor condition.

MUSSAENDA Linn.

Mussaenda anisophylla Vidal Phanerog. Cuming. Philip. (1885) 178.

In thickets at 250 m. alt. (No. 4330 *Merritt*) June, 1906.

Apparently widely distributed in the Philippines. Endemic.

UROPHYLLUM Wall.

Urophyllum glabrum Jack ex Roxb. Fl. Ind. ed. Carey, 2: 186.

In forests at 300 m. alt. (No. 5603).

From Burma through the Malayan Peninsula to the Malayan Archipelago.

Urophyllum bataanense Elmer Leaflets Philip. Bot. (1906) 40; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 129.

In forests at 1,500 m. alt. (Nos. 6144, 6179); also collected by *Merritt* as low as 450 m. alt. (Nos. 4318, 4339, 4389).

Previously known only from Luzon.

Urophyllum sp.
In forests at 400 m. alt. (No. 5580). Material imperfect, mature fruits only.

Urophyllum sp.?
In forests at 900 m. alt. (No. 5573). A form represented in our herbarium by several specimens from Mindanao, but unfortunately no flowers are available.

RANDIA Houst.

Randia sp.?
In forests at 1,800 m. alt. (No. 5522). Specimens with immature fruits.

IXORA Linn.

Ixora sp.
In forests at 550 m. alt. (No. 5569). A very characteristic species with pure white fruits and setiform much elongated stipules, apparently undescribed, but the specimens are without flowers.

PSYCHOTRIA Linn.

Psychotria sarmentosa Blume Bijdr. (1826) 964.
Mount Halcon, without data (No. 5683).
Previously known in the Philippines from Luzon.
British India to Malaya.

Psychotria tacpo (Blanco) Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 312.
Without data (No. 6150).
Widely distributed in the Philippines. Endemic.

Psychotria diffusa Merrill in Philip. Journ. Sci. 1 (1906) Suppl. 134.
In forests, 900 to 1,800 m. alt. (Nos. 6176, 6170); also No. 4435 *Merritt*, June, 1906, alt. 1,700 m.
Previously known only from Luzon.
In addition to the above species of the genus, no less that six others are represented by the following numbers, from Halcon, all of them differing from the material at present in our herbarium. Unfortunately all the specimens are with fruit only, and accordingly no attempt is here made to describe them. Nos. 4324, 4349, 4365, 4396, 4456 *Merritt*; Nos. 6131, 6159, 5576 *Merrill*.

LASIANTHUS Jack.

Lasianthus copelandi Elmer Leaflets Philip. Bot. (1906) 10.
In forests at 300 m. alt. (No. 5778).
Previously known only from Negros, a species very closely related to *L. appressus* Hook. f., of the Malayan Peninsula.

Lasianthus obliquinervis Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 136.
In forests at 1,400 m. alt. (No. 6189).
Previously known from Luzon and Negros.

Lasianthus tashiroi Matsum. in Tokyo Bot. Mag. 15: 37.
In forests at 1,400 m. alt. (Nos. 5739, 5776).
I have based the identification of the above numbers largely on a Formosan specimen, No. 1301 *Kawakami*, so determined by *Hayata*.
Formosa.

HYDNOPHYTUM Jack.

Hydnophytum formicarium Jack in Trans. Linn. Soc. 14 (1823) 124.
Epiphytic, in forests along the Alag River below 100 m. alt. (No. 6182).
Malayan Peninsula, Cochin China, Sumatra and Borneo.

Hydnophytum nitidum Merrill n. sp.

Tuber diametro ad 25 cm.; cuales ramique lignescentes teretes vel ramuli juniores leviter compressi, foliis oblongo-ellipticis, coriaceis, nitidis, obtusis, 3 ad 6 cm. longis, subsessilibus; flores breviter tubulosi, sessiles, ad articulationes fasciculati; corolla 3.5 mm. longa.

Tuber about 25 cm. in diameter, glabrous; the stems glabrous, brown or gray, terete, the younger branchlets reddish-brown and slightly compressed, 60 to 80 cm. long, branched. Leaves oblong-elliptical, 3 to 6 cm. long, 1 to 2.5 cm. wide, coriaceous, glabrous, the upper surface shining, the lower dull, margins slightly recurved, the apex rounded, the base subacute or rounded, the midrib prominent, the lateral nerves three or four on each side of the midrib, obscure or nearly obsolete; petiole very short or wanting. Flowers fasciculate, sessile at the nodes, few, white. Calyx truncate, glabrous. Corolla 3.5 mm. long, the tube cylindrical 2 mm. long, barbulate with tufts or hairs at the throat between the insertion of the stamens, the lobes 4, narrowly ovate, acute, 1.5 mm. long. Stamens 4, filaments wanting; anthers 0.8 mm. long. Style 3 mm. long, slightly cleft at the apex.

Epiphytic in the mossy forest at 1,400 m. alt. (No. 6181); also collected by *Merritt* at an altitude of about 800 m. (No. 4358).

A species characterized by its coriaceous shining elliptical-oblong leaves and small flowers, apparently belonging in the group with *H. formicarum* Jack, following *Beccari's* classification.[13]

NERTERA Banks & Soland.

Nertera depressa Banks & Soland. ex Gaertn. Fruct. 1 (1788) 124 *t. 26.*
On bowlders along shaded streams at 700 m. alt. (No. 5614); also collected by *Merritt* on exposed ridges at 2,250 m. alt. (No. 4459).
On many of the higher mountains of the Philippines.
Widely distributed in Malaya, Australia and South America.

CAPRIFOLIACEÆ.

SAMBUCUS Linn.

Sambucus javanica Reinw. ex Blume Bijdr. (1826) 657.
In old clearings at 900 m. alt. (No. 5572).
Widely distributed in the Philippines.
British India to Japan and Malaya.

[13] Malesia 2 (1884–85), 123–175.

CAMPANULACEÆ.

PENTAPHRAGMA Wall.

Pentaphragma philippinensis Merril n. sp.

Foliis amplis, membranaceis ovatis vel oblongo-ovatis, acuminatis, basi acutis inaequilateralibus, 20 ad 30 cm. longis, 10 ad 22 cm. latis, supra glabris, subtus plus minus tomentellis; floribus ad 4 cm. longis 5-meris; calycis lobis ovatis, 1.5 ad 2 cm. longis, tubo 5-angulato.

An erect unbranched suffrutescent herb 1 m. high or less, the stems thick, glabrous or nearly so, yellowish when dry. Leaves ovate or oblong-ovate, membranous, 20 to 30 cm. long, 10 to 22 cm. wide, glabrous above, beneath paler and somewhat tomentose, the margins rather finely crenate-dentate, the apex acuminate, base inequilateral, acute; nerves 5 to 6 on each side of the midrib, prominent, ascending, the reticulations lax; petioles 5 to 10 cm. long. Racemes axillary, few or many flowered, not unilateral, the peduncles short, the bracts membranous about 2 cm. long. Flowers white or greenish white when fresh, yellowish when dry, 5-merous, the pedicels 2 to 3.5 cm. long. Calyx tube 1.5 to 2 cm. long, oblong, narrowed below, 5-angled, glabrous, the lobes 5, ovate, acute, two nearly 2 cm. long and 1.3 cm. wide, three 1.5 cm. long and 0.7 mm. wide. Corolla lobes 5, glabrous, equal, oblong-ovate, acute, about 1 cm. long, 0.5 cm. wide, the tube short. Stamens 5, filaments 2 mm. long, the anthers about the same length. Ovary 5-celled, ovules very numerous; style 5 to 6 mm. long; stigma oblong-ovoid, 5-ridged.

In forests along the Alag River at 100 m. alt. (No. 6136), ascending to 1,500 m. alt.; also collected by *Merritt*, in June, 1906 (No. 4333). In addition to the above specimen, the following are referable here, all from Mindanao: Province of Misamis, Mount Malindang (4702 *Mearns & Hutchinson*) May, 1906; Province of Surigao (354 *Bolster*) May, 1906; Lake Lanao, Camp Keithley (229 Mrs. *Clemens*) February, 1906.

Apparently most closely related to *P. macrophylla* Oliv., from New Guinea, differing from that species, as described in its smaller leaves, longer bracts and 5-angled, not terete, calyx tube.

The genus is new to the Philippines, the known species being *P. begoniaefolium* Wall., from Burma and the Malayan Peninsula, *P. scortechinii* King & Gamb., and *P. ridleyi* King & Gamb., from the Malayan Peninsula and Singapore, *P. aurantiaca* Stapf, from Mount Kinabalu, North Borneo, *P. macrophylla* Oliv., from New Guinea and *P. grandiflorum* Kurz from the Moluccas.

COMPOSITÆ.

MIKANIA Willd.

Mikania scandens (Linn.) Willd. Sp. Pl. 3 (1800) 1743. *Willughbeya scandens* O. Kuntze.

In thickets at 100 m. alt. (No. 5699).

Throughout the Philippines.

Cosmopolitan in the Tropics.

PLUCHEA Cass.

Pluchea scabrida DC. Prodr. 5 (1836) 453.
In an old clearing at 300 m. alt. (No. 5565).
Luzon to Mindanao. Endemic in the Philippines.

DICHROCEPHALA DC.

Dichrocephala latifolia DC. Prodr. 5 (1836) 372.
In an old clearing at 300 m. alt. (No. 5584).
Previously known in the Philippines only from Luzon.
Tropical Africa, to China and Japan.

LAGENOPHORA Cass.

Lagenophora billardieri Cass. Dict. Sc. Nat. 25 (1826) 111.
In forests at 2,000 m. alt. (No. 4442 *Merritt*) June, 1906.
Previously known in the Philippines only from the mountains of northern and central Luzon.
British India to Japan, Malaya and northern Australia.

SENECIO Linn.

Senecio mindoroensis Elm. Leaflets Philip. Bot. 1 (1906) 155.
In an old clearing at 300 m. alt. (No. 5570); also collected by *Merritt* (No. 4402) in June, 1906, at 1,500 m. alt., the latter specimens not typical.
Luzon to Mindanao. Endemic in the Philippines.

BIDENS Linn.

Bidens pilosa Linn. Sp. Pl. ed. 2 (1763) 832.
In an old clearing at 300 m. alt. (No. 5566).
Widely distributed in the Philippines.
Temperate and tropical regions of the World.

AINSLIAEA DC.

Ainsliaea reflexa Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 242.
In mossy ridge forests at 2,400 m. alt. (No. 5781).
Previously known only from the mountains of Luzon.

LACTUCA Linn.

Lactuca thunbergiana (A. Gray) Maxim. in Bull. Acad. Pétersb. 19 (1874) 530.
In crevices of bowlders and ledges along the Alag River 100 to 300 m. alt. (No. 6143).
From northern Luzon to southern Mindanao, but usually at much greater altitudes.
Japan, southern China and Formosa.

CREPIS Linn.

Crepis japonica (DC.) Benth. Fl. Hongk. (1861) 194.
In an old clearing at 300 m. alt. (No. 5583).
Japan, southern China and India through Malaya to northern Australia.
Widely distributed in the Philippines.

PREVIOUS PUBLICATIONS OF THE BUREAU OF GOVERNMENT LABORATORIES—Concluded.

(Concluded from second page of cover.)

No. 32, 1905.—Biological Laboratory: I. Intestinal Ilæmorrhage as a Fatal Complication in Amœbic Dysentery and Its Association with Liver Abscess. By Richard P. Strong, M. D. II. The Action of Various Chemical Substances upon Cultures of Amœbæ. By J. B. Thomas, M. D., Baguio, Benguet. *Biological and Serum Laboratories:* III. The Pathology of Intestinal Amœbiasis. By Paul G. Woolley, M. D., and W. E. Musgrave, M. D.

No. 33, 1905, Biological Laboratory.—Further Observations on Fibrin Thrombosis in the Glomerular and in Other Renal Vessels in Bubonic Plague. By Maximilian Herzog, M. D.

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1890.—Memoria descriptiva de los manantiales minero-medicinales de la Isla de Luzon, estudiados por la comisión compuesta de los Señores D. José Centano, Ingeniero de Minas y Vocal Presidente, D. Anacleto del Rosario y Sales, Vocal Farmacéutico, y D. José de Vera y Gómez, Vocal Médico.

1893.—Estudio Descriptivo de algunas manantiales minerales de Filipinas ejecutado por la comisión formada por D. Enrique Abella y Casariego, Inspector General de Minas, D. José de Vera y Gómez, Médico, y D. Anacleto del Rosario y Sales, Farmacéutico; precidido de un prólogo escrito por el Excmo. Sr. D. Angel de Avilés, Director General de Administración Civil.

1893.—Terremotos experimentados en la Isla de Luzón durante los meses de Marzo y Abril de 1892, especialmente desastrosos en Pangasinán, Unión y Benguet. Estudio ejecutado por D. Enrique Abella y Casariego, Iuspector General de Minas del Archipiélago.

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1905.—Sixth Annual Report of the Chief of the Mining Bureau. H. D. McCaskey.

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[1] The first four bulletins in the ornithological series were published by The Ethnological Survey under the title "Bulletins of the Philippine Museum." The other ornithological publications of the Government appeared as publications of the Bureau of Government Laboratories.

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THE ASCENT OF MOUNT HALCON, MINDORO

By E. D. Merrill

(From the Botanical Division, Bureau of Science)

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(Concluded on third page of cover.)

THE ASCENT OF MOUNT HALCON, MINDORO.[1]

By Elmer D. Merrill.

(*From the botanical section of the Biological Laboratory, Bureau of Science.*)

The Philippine Archipelago is essentially mountainous. Many of the high peaks have been ascended by white men, although accurate accounts as to when, by whom and under what circumstances the explorations were made are to be found in but few instances. On making local inquiries in regard to the ascent of mountains one usually hears vague rumors of previous attempts to climb them, entailing great difficulties, privations and not infrequently loss of life. Usually, however, it is quite impossible to verify many of these rumors for, as a rule, natives living in the vicinity of the mountains have very little information regarding them, and because of prevailing superstitions it frequently is difficult to induce them to accompany a party when the known object of the expedition is to ascend a high mountain.

Mountain climbing in the Tropics, especially in such tropical countries as the Philippines, can scarcely be classed as a sport, and here as in other parts of Malaya, the higher mountains have usually not been ascended by persons for the pure love of mountain climbing, but by those who have had some special object in view, such as the study of the fauna, flora or geology of the region. In other words, the high peaks of the Philippines, as in the Malayan region generally, have been ascended mostly for what was to be secured on them.

Mount Apo in southeastern Mindanao is the highest in the Philippines, yet the first recorded ascent which I have been able to find is that of *J. Montano,* a Frenchman, who reached the summit in October, 1880.[2] Montano, however, states that an attempt was made by the Spaniards in 1852 under the direction of *Oyanguren,* which failed after the loss of twenty men, and that in 1870, *Real,* then the governor of Davao, made another, but unsuccessful endeavor, to reach the summit. Dr. A. *Schadenberg* ascended Apo in February, 1882, and *Otto Koch* must have made the ascent at about the same time for Vidal[3] figures some species

[1] This is the first of a series of articles on geographical subjects which it is proposed to publish.—P. C. F.

[2] Voyage aux Philippines et en Malasie (1886), 245–264.

[3] Sinopsis, Atlas (1883).

of plants from the summit of Apo which were collected by the latter. Since 1880 Mount Apo has been climbed many times by various persons, to my knowledge by at least ten Americans within the past five years, and I am informed by those who have made the ascent that there are comparatively few difficulties to be encountered, either in the approach to the mountain or in its ascent. Nevertheless, as late as 1905 I have seen accounts in Manila newspapers "of the first ascent of Mount Apo."

We have no records that Mount Malindang, the second highest mountain in the Philippines, had been ascended previous to 1906, when in May of that year Maj. *E. A. Mearns* and *W. I. Hutchinson* and their party reached the summit. Mounts Banajao, Pinatubo, Tonglon, Datá, Solis, and Mayón, all in Luzon, Canlaon in Negros, Madiaas in Panay, all 7,000 feet in altitude or higher, have been ascended one or many times each, by various persons, and secondary mountains such as Mariveles, Arayat, Maquiling, Isarog and Iriga in Luzon, Silay in Negros, Pulgar and Victoria in Palawan, and many others, are more or less known.

Halcon the third highest peak in the Philippines, is situated in the north-central part of Mindoro. With no known trails leading to it, surrounded by dense forests, cut off from the coast by difficult ridges and large rivers subject to enormous and appalling floods, it stood seemingly inaccessible. Its location is perhaps in the most humid part of the Philippines, where the rains continue for nine months in the year, in a region geographically quite unknown and inhabited by a sparse population of entirely wild and very timid people, and on an island regarding which there is a widespread and generally accepted belief as to its unhealthfulness. Although within 100 miles of Manila and not more than 15 from Calapan, the capital of Mindoro, so far as I have been able to determine it remained unconquered up to the year 1906.

MINDORO.

Mindoro ranks as seventh in size among the islands of the Philippine Archipelago, being located a little north of the center of the entire group and having an area of approximately 3,851 square miles. In general outline it is roughly triangular, its greatest length being from northwest to southeast, 110 miles, its greatest breadth from northeast to southwest, 56 miles. Geographically, it is in closer proximity to Luzon than to any other large island of the group.

Verde Island passage, separating Mindoro from the south coast of Batangas Province, Luzon, is but 7½ miles in width in its narrowest part between Escarceo Point, Mindoro, and Malocot Point, Luzon. The small island of Lubang lies 15 miles north of the northwest point, while the larger island of Marinduque is 23 miles east of the central part of Mindoro. Tablas is situated 31 miles east of southern Mindoro, and Panay 36½ miles east of south. Busuanga, the beginning of the Palawan chain, is 33 miles southwest.

The name Mindoro is of Spanish origin, taken from *Mina de oro*, meaning mine of gold, applied by the earlier Spanish explorers. It came no doubt from tales imparted to them by the natives of the fabulous mineral wealth of the island, yet for over three and three-quarters centuries this reputed golden treasure has remained undiscovered. The ancient native name of the island was Mait.

Topographically, Mindoro is exceedingly rough and the interior is very imperfectly understood; it is known locally as "the Africa of the Philippines." The mountains in the north culminate in the Halcon Range, the highest peak being exceeded among Philippine mountains only by Apo and Malindang, both in Mindanao.

The census of the Philippine Islands taken in 1903 gives the total population of Mindoro as 28,361, of which 21,097 are classified as civilized and 7,264 as wild. As comparatively little is known regarding the Mangyans, the aborigines inhabiting the interior, the latter figure must be considered as approximate rather than exact. The civilized inhabitants are confined entirely to the coast region, the Tagalogs predominating in the north, the Visayans in the south.

Undoubtedly the Negritos are the aboriginal inhabitants of the island and the Mangyans are the descendents of Negrito and Malayan stock. They are confined entirely to the interior of Mindoro, except in the southern part, where one or two towns of semicivilized Mangyans are located on the coast. Capt. R. G. Offley,[4] United States Army, Governor of Mindoro, states that they are non-Christian but not savages by nature or habit, that they will run at sight of a stranger if his coming and intentions have not previously been announced. They are divided into several groups, the chief among which are the Buquit, Bañgon and Batangañes; these roam in bunches or by families, the oldest acting as chief; they are willing workers, but they have no knowledge whatever of agriculture, and the Christian Filipino avails himself of the fact that they do not know the value of money by giving a handful of salt for a banca, while the price of a small working bolo to a Mangyan has been known to be ten years of servitude. The best description of these people which I have seen is that given by Dean C. Worcester,[5] to whose book the reader is referred. In regard to the Mangyans as a whole, Captain Offley's statement is inaccurate in some respects, for the ones we encountered on the north slopes of Halcon have fairly permanent habitations and also possess a decided knowledge of agriculture, although it is of a very primitive kind. We saw but three representatives of these people on the entire trip, an old man, a boy and a girl, but we passed through numerous clearings, some of them several hundreds of acres in extent where there were houses; however, the inhabitants fled at our approach. In one

[4] Census of the Philippine Islands (1903), 2: 547.

[5] The Philippine Islands and their People (1901), 375–377; 406–418.

clearing, at an altitude of about 3,000 feet, we found in cultivation: rice, corn, sugar-cane, bananas, yams, sweet potatoes, tomatoes, beans, squashes and taro, while domestic pigs and chickens were in evidence. Most of the dwellings were very small and primitive, consisting of a platform raised two or three feet above the ground, with a thin palm-leaf roof and usually without walls, but in the clearing mentioned above we found an unusually large and well-constructed house about 20 feet long, 15 feet wide and 12 feet from the floor to the apex of the roof. It was firmly constructed, elevated on posts about 6 feet above the ground, with a pole floor and grass-thatched roof and walls and was evidently the abode of a person of prominence in a local tribe. Such a pretentious house certainly is unusual among the Mangyans.

Mindoro has attained and still retains a widespread but apparently not entirely deserved reputation for unhealthfulness, frequently being spoken of as "the white man's grave." In spite of adverse reports as to the unwholesomeness of Mindoro and the prevalence of fevers and various tropical diseases in the island, on our trip, which extended over forty days in the height of the rainy season when on nearly every day all members of the party were wet at least once and sometimes all day and for many days in succession, working our way slowly through drenched forests, fording streams and much of the time on short rations, none of the Americans in the party were sick and among the twenty-five natives employed, only three contracted fever and then in a very mild form. In common with previous explorers in Mindoro, we found the leeches very abundant and exceedingly troublesome at the lower altitudes but we became entirely free of them after reaching the height of about 5,000 feet. Ordinary brown soap was found to be an excellent leech repellant and this was given each day to our native carriers who smeared it on their naked legs. Previous experience had taught us that canvas or leather leggings are entirely unsatisfactory as a protection against leeches, and all the Americans in the party were equipped with woolen "puttees." These proved to be more satisfactory and gave absolute protection against the attacks of leeches. Quinine was issued regularly to all members of the party.

MOUNT HALCON.

The name Halcon is of Spanish origin signifying falcon, but the application of this name to the mountain is not clear. As usual, the native names vary. According to Lieut. Fitzhugh Lee's report of his trip made across Mindoro in 1904, the natives living at the mouth of the Baco River knew it as the Alag Mountain. We found those living at Subaan, only 7 miles from Baco, speaking of it as the Baco.

The altitude of the highest peak is given on Spanish charts as 3,865

meters, while our uncorrected aneroid readings determine an altitude of 9,000 feet, both of these records apparently being too high. In April, 1906, a triangulation party of the Coast and Geodetic Survey, under the direction of Mr. O. W. Ferguson, estimated the height of the mountain as 8,504 feet, the mean of three determinations from as many different stations. The same party ascertained the geographical coördinates of the highest peak to be latitude N. 13° 15′ 46″, longitude E. 120° 59′ 29″.

Viewed from the coast, Halcon appears to present no particular difficulties so far as the ascent is concerned. It is a long, more or less broken ridge running from east to west, presenting steep slopes, especially on the north, but with three pronounced spurs with more gradual slopes leading from it, one to the east, one to the south and one to the west. The crest line of these spurs present rather gradual slopes, although they are steep in places. Several subsidiary spurs lead off from the main range in various directions, notably to the north. Difficulties encountered in making the ascent of Halcon, as is the case with most Philippine mountains, were found to be not so much in the actual climbing as in the approach to the mountain, the fording of streams, the crossing of ridges, the cutting of trails through the dense vegetation and in the transportation of necessary supplies and equipment.

The highest peak of Halcon shows no signs whatever of ever having been visited by human beings, and as it would be a physical impossibility for any person to reach the summit without extensive trail cutting, it seems evident that in recent years at least, it has never been visited by man. Several attempts to reach the top of the mountain have been made and in the past three centuries it is possible, but not probable, that some of the early Spanish explorers in their search for the fabulous mineral wealth of Mindoro, might have made the ascent. I have been able to find no account whatever of attempts made by the Spaniards, and the utter inaccuracy of Spanish maps as to the location of Halcon Peak and the course of the Alag and Baco rivers would indicate that they had no positive knowledge whatever of this part of Mindoro. In fact, on many maps such a large river as the Alag is not indicated at all, although it joins the Baco at tide water and at less than 3 miles from the coast.

PREVIOUS ASCENTS OF THE MOUNTAIN.

In April, 1891, *Dean C. Worcester* visited some Mangyan clearings on the slopes of Mount Halcon, probably ascending to about 2,500 or 3,000 feet. However, so far as I can learn he made no attempt to reach the summit, but his trip in this vicinity is the first one of which I have any knowledge. The reader is referred to his own account of his Mindoro experiences.[6]

[6] *Loc. cit.*

In October, 1895, *John Whitehead*, an English naturalist tried to reach the summit, but although he did not succeed in attaining the highest peak he was undoubtedly the first person to reach an altitude of 6,000 feet. As Whitehead's primary object was to collect objects of natural history and especially birds, he apparently made no serious attempt to reach the highest point on the mountain. I can do no better here than to quote from W. R. Ogilvie-Grant's [7] account of Whitehead's experience on Mount Halcon.

On the 19th of Octber, 1895, he (Whitehead) left Manila with a staff of seven collectors for the Island of Mindoro, with the object of exploring the well-wooded highlands of this comparatively little known island, and returned to Manila on the 16th of February, 1896, after four months' absence. The results of this expedition are, Mr. Whitehead considers, by no means satisfactory, for at the time of his visit the wet season was at its height and, owing to the almost continuous rains, collecting could be carried on only under the greatest difficulties. He tells us that during his stay on Mindoro seventy days out of a hundred were very wet, twenty dull and drizzling, while but ten were comparatively bright and fine; so it can be understood easily that he was unable to do as much as he had hoped.

Unfortunately, he experienced great trouble with his collectors, all of whom suffered at one time or another from fever, and took every opportunity of misbehaving. One man robbed him of his money, while others, left at the foot of the mountain to make a lowland collection, did practically nothing during many weeks, and sold both gun-caps and powder to the natives. He characterizes his Mindoro collection as representing "four months' very hard work and slow starvation"

On landing in Mindoro a guide was engaged as pilot to the high ground, but this worthy led the expedition by a wrong path, and after a long day's march in the usual deluge of rain, Mr. Whitehead found himself on the bank of a fine river surrounded by the most dense and magnificent forest, where he was forced to remain for ten days waiting for porters. It was here that the expedition was nearly wrecked, the river coming down in a tremendous flood with very little warning. The camp had been pitched about 20 feet above the river, which at this part was about 200 yards wide, but in less than twelve hours, fortunately in daylight, the water was running from 2 to 3 feet deep like a mill race through Mr. Whitehead's tent, while his men had to escape in canoes from another house lower down the river, where most of the less portable boxes had been left.

By great exertions all the baggage was saved. "I have," writes Mr. Whitehead, "seen a good deal of Tropics, but I never encountered such deluges, such incessant rains, or such thousands of leeches. The leeches quite crippled two of my men, and one of the two caught 'beriberi' so I sent him back to Manila. All the others had fever, but I got off with two mild attacks of dysentery. I was so reduced, from having nothing to eat but tinned foods and rice, that I became quite weak, losing most of my energy at times. In four months I had eaten only five pigeons, two parrots, and some few thrushes, and, with the exception of eggs, there was no other fresh food to be had." Such is life in the highlands of the Philippines.

By making friends with the true aborigines of Mindoro (the Mangyans) the twenty-five porters required to carry the baggage to the mountains were at last

[7] Grant, W. R. Ogilvie: On the Birds of the Philippine Islands, Part 7. The Highlands of Mindoro. With field notes by John Whitehead. *Ibis:* (1906) VIII, 6, 457.

obtained, and, after two days' march under continuous heavy rain, Mr. Whitehead and his men camped at an altitude of 4,500 feet on Mount Dulangan, in the main range of Mindoro. This range of mountains is somewhat horseshoe shaped. Mr. Whitehead continuous: "To cut a long story short, it rained all November, all December and all January; one deluge began on the 11th of December, and was perhaps second only to that which floated Noah and his great zoölogical collection, for it continued until the 6th of January, 1896. But for all this I was in good health the climate being cool, seldom over 60° F., and some nights only 52° F.; the mountain of the east side is perhaps over 8,000 feet, but the ranges are mostly from 5,000 to 6,000 feet. I was guided by the natives to a part that attained nearly 6,000 feet, but we could not reach the crest of the mountain from this position. The undergrowth is very dense and, without cutting paths, impossible to get through."

In April, 1904, Lieutenant *Fitzhugh Lee, Jr.*, Twelfth United States Cavalry, accompanied by three other officers, Mr. *H. D. McCaskey*, Chief of the Philippine Mining Bureau, ten Americans soldiers and thirty native carriers, left Camp McGrath, Batangas, Luzon, with the object of crossing northern Mindoro and if possible, of making the ascent of Halcon. They landed at the mouth of the Baco River and on April 3 proceeded up that river to the junction of the Alag, following that stream in boats to the head of navigation, an estimated distance of 5½ miles. The Alag was chosen as the most feasible route because its direction is more westerly and because the natives insisted that its source was somewhere in the vicinity of Alag, the local name of Mount Halcon. On April 4 the boats were abandoned, the river having become very shallow and swift. The expedition then followed a narrow trail along the bank, the carriers being assigned about 80 pounds each. The stream was very tortuous, averaging from 50 to 60 yards in width and the party was compelled to ford five or six times during the morning's march. On April 5 the advance was continued up the bed of the river but the loads for the carriers had to be reduced in weight, progress being exceedingly slow and hard, as the rocks in the river bed bruised the carriers' feet. On this day the distance covered was but 3 miles and on the day following but 3½ miles. On the 7th of April progress was reported to be very difficult and dangerous because of the large bowlders in the stream bed, the swift current and the steep cliffs on both sides, and on this day they went but 2½ miles. Lieutenant Lee continues:

"It seems to be more difficult than we had anticipated to locate Mount Halcon. Our field of vision is very limited, confined as we are in the bottom of a deep cañon with lofty perpendicular walls and a wilderness of vegetation growing out from either side overhead. Just at this time we are particularly anxious to get a bearing on the mountain that we may locate the easiest course for an ascent."

On this days' march several of the party came in contact with some poisonous plant, spoken of a species of "poison ivy,"[8] which on the following days caused them much suffering and inconvenience, eruptions

[8] Probably *Semecarpus perrottetii* March (*Anacardiaceae*).—E. D. M.

breaking out all over their bodies, and the faces of some individuals swelling so that they could see only with difficulty. On April 8 they succeeded only in covering 2½ miles but they were fortunate in securing the services of a Mangyan as a guide. On the following day, finding further progress up the Alag impossible, they retraced their steps a short distance, leaving the cañon of the Alag and following the bed of a small river flowing from the west,[9] making camp in the bed of this stream at an altitude of 1,500 feet. It rained at intervals during the day and all the night and the party gave up hope of ascending Halcon. On April 10 and 11 they crossed the divide at an altitude of 3,230 feet, striking the headwaters of the Bagbaujan River flowing westward, in these two days suffering much from the attacks of leeches and from the constant rain. On the night of April 12 a camp was made in the narrow cañon of the Bagbaujan but, at 8 p. m., because of the heavy rain and the sudden rise in the river, the water coming up about 5 feet in one-half hour, the party were obliged to desert their tents in the darkness and take shelter on a ledge above. The rain continued until 10 p. m. when the river subsided as fast as it had risen. On the following day they went down the river for a distance of 1¾ miles, being obliged to make use of ropes for scaling the cliffs. This method of procedure continued on the morning of the 14th, but later in the day they came out into a more open country and left the river bed. As much of their food had become wet owing to the prolonged rains, the question of rations became a very serious one and caused the members of the party considerable anxiety. However, after the 14th, no grave difficulties were encountered, the party continued on down the Bagbaujan and reached the mouth of the river on April 19, having been seventeen days in crossing Mindoro.

In June, 1906, Lieut. *T. H. Jennings*, Seventh United States Cavalry, accompanied by Mr. *M. L. Merritt* of the Philippine Forestry Bureau, made an attempt to ascend Halcon, but little information regarding their trip and experiences is available other than Mr. Merritt's report, who being ordered to reach Manila on the last of June was obliged to return to Calapan before the highest part of the mountain was reached. The party left Calapan on the morning of June 13, going overland by a trail leading inland, reached the Catuyran River, the south fork of the Baco, on the morning of the succeeding day and proceeded up this for some distance, and then followed a stream known as the Dulangan River which flows from the Halcon Range. Here most of their carriers deserted them, and they were delayed in securing more. Continuing up the Dulangan River on the 16th, they left the bed of the stream on the following day and took one of the ridges, which was followed on the 18th and 19th until they arrived at the place where Whitehead had established his camp in 1895. Up to this point the trail was fair. On June

[9] Apparently the Bolton River. (See map.)

21, believing that they were on a ridge leading directly up the mountain, they continued up to an altitude of 5,250 feet, the side slopes of the ridge which they were on being described as very steep and extending for 2,000 feet below. Continuing along the ridge for the succeeding days, on June 26 they reached a peak having an altitude of 7,250 feet, but, on the following day in going along the ridge towards the main range, they came to an impassable cañon separating the spur on which they were from the main range, and accordingly plans were made to descend into the deep valley to the west and to follow the ridge beyond. However, Mr. Merritt who was obliged to return to the coast, left the party on the 28th of June and returned to Calapan. Regarding Lieutenant Jennings' experiences after this date we have no information except that he reached Calapan on the 7th of July, having attained the main ridge on Halcon but not the highest peak. Mr. Merritt's report shows that from June 14 to June 27, rainy weather prevailed most of the time.

Previously Lieutenant *Jennings* had made a trip into the interior of Mindoro north of Halcon, following Lieutenant Lee's course up the Baco and Alag Rivers for an estimated distance of 10 miles, where he left the Alag and ascended the ridge to the north, reaching the Binabay River. Mounting the ridge to the north of the Binabay, he followed it for three days, mostly in a westerly direction, finally he recrossed the Binabay River and taking the ridge between it and the Alag River, he continued for five days, going west and somewhat north of west, reaching an altitude of 6,000 feet on a ridge some distance north of Mount Halcon. He reported from his experience on this trip that he did not consider the route from the north a feasible one for the ascent of Halcon, recommending that whoever should make the attempt to climb the mountain, should try a route from the vicinity of Lake Naujan or from the west coast of Mindoro.

OUR OWN ASCENT OF HALCON.

A geographical and biological expedition to Mount Halcon was planned in October, 1906, under the direction and with the support of Maj. Gen. Leonard Wood, its object being to determine some feasible route to the mountain, to ascend the highest peak, to secure as much data as possible and to collect objects of natural history. The party was under the immediate direction of Dr. *E. A. Mearns*, major and surgeon, United States Army, accompanied by Mr. *W. I. Hutchinson*, of the Philippine Forestry Bureau, and myself, with one topographer, one hospital corps man, a sergeant and five privates of the Twenty-fifth Company of Philippine Scouts, two natives assistants for Dr. Mearns, and five native carriers from Antipolo, Luzon. Fifteen additional native carriers were secured at Subaan, Mindoro.

We spent the day after our arrival on the morning of October 31 at Calapan, the capital of Mindoro, in repacking the camp outfit, rations and

equipment, and in endeavoring to obtain information regarding Mount Halcon. As we expected, but very little which was definite regarding it could be secured in Calapan. Fortunately, we met an American who had a placer claim on the Binabay River and who had been as far inland as the junction of the Binabay with the Alag. He informed as that a good trail existed from Subaan to the Alag River and although he had no information regarding the country beyond the Alag, he was of the opinion that Halcon could be reached and ascended by this route. Topographically, this seemed to us to be the more direct way, although Lieutenant Jennings had reported his belief that a more feasible route could be found from the south, either by way of the Catuyran River, a tributary of the Baco, from Lake Naujan, or from the west coast. We were already acquainted with Mr. Whitehead's experiences on the Dulangan spur of Halcon and also aware of the fact that Lieutenant Jennings had been unable to reach the highest peak of Halcon by following Whitehead's course, and as a selection of any of the routes suggested by Lieutenant Jennings would have necessitated much more overland travel than by way of the trail leading inland from Subaan to the Alag River, the latter was chosen. Accordingly, two large native boats were secured to take the party and equipment up the coast to Subaan, a small village about 10 miles northwest of Calapan; November 1 was entirely occupied in making this trip, and in securing the native carriers for the journey inland. On the morning of November 2 the party left Subaan for the Binabay River, two scouts remaining behind to guard the food supply and equipment which was not immediately taken forward. As rations for forty days had been brought and as the equipment and supplies for field work were bulky and difficult to transport, it was found quite impossible to secure the necessary carriers to take all at one trip, so that plans were made to establish camps from time to time and have the material brought in by relays. The trail for about 2 miles led through an open, flat, semicultivated region and shortly after leaving the coast we were obliged to ford the Subaan River, a stream of considerable size. At the end of 2 miles the trail left the level land and crossed a broad, interrupted ridge, densely forested with magnificent trees and broken by ravines containing small streams, some tributary to the Subaan River, others to the Binabay. The highest altitude reached on this ridge was about 1,000 feet. We established our first camp where the trail crossed the Binabay River at a distance of about 6 miles from Subaan and at an altitude of 700 feet, making it with some American miners who had located a placer claim in the stream bed as coarse gold to a limited extent is found in the sand.

On November 3 the carriers were sent back to Subaan for more supplies and the other members of the party reconnoitered for trails in the vicinity leading towards Halcon, climbing to the top of the ridge to the

southwest to an altitude of 1,200 feet. At the top of this ridge we entered the first Mangyan clearing and here saw the only representatives of these people who were encountered on the entire trip.

Three small houses, each consisting of a platform raised 2 to 3 feet from the ground, with a thin roof of palm leaves, but without walls, were located in this clearing, and later, along the ridge a short distance to the southwest, a larger house was found. All the houses were deserted on our arrival in the clearing, but on the return trip, in the first house we found an old man and his son, who told us that his family had fled at our approach, but that when he saw there were white men in the party he had returned. These people were all small in size, being about 4 feet 10 inches in height, their hair was short and curly.

From the opening which we had reached we secured a magnificent view of Halcon to the south, while the coast region and Calapan were visible to the east. We found two trails leading down to the Alag River, one from the southeast corner of the clearing and the other from the south side. The latter, being more in the direction of Halcon Peak, was selected for our route. On November 5, our carriers having arrived from Subaan the day before, we left the Binabay River and on arrival in the clearing mentioned above again encountered the old Mangyan who said that he was too old to act as our guide, but that he could secure for us one who knew the trails. As a guide familiar with the routes leading to Halcon would have greatly facilitated our work, he was asked to procure one, but after waiting about an hour we decided that he had no intention of returning and so we went on to the Alag River. The trail was well defined, leading down a 30° to 45°, well forested slope. Just before we reached the Alag the path crossed a tributary stream of considerable size which offered no difficulties in fording and as none of our natives had a name for it, we christened it the Egbert River in memory of the late General Harry V. Egbert, United States Army. The distance from the Binabay River to the Alag was about 2 miles. At the point where the trail reached the Alag, the stream was about 100 yards wide, not very deep but quite swift and from the place where we first forded the stream to an altitude of 1,200 feet, where we made our last crossing in the ascent, we found no still water whatever. The American miners living on the Binabay informed us that during the previous ten days there had been comparatively little rain and accordingly we found the Alag fordable. An attempt was made to cross it at the junction of the Egbert River, but it was found to be too swift and deep at that point and we were obliged to proceed up the stream for several hundred yards and then to follow an indirect course along the bars in the more shallow water. It was necessary to ford the stream several times during the day's march in order to avoid abrupt bluffs and cliffs. The Alag, at a distance of about 1 mile above the junction of the Egbert, divides into

two nearly equal branches; one, flowing from the direction of the Halcon Range was considered to represent the main stream and the other, being unknown to any of our party, was named Whitehead River in honor of the late John Whitehead, an English naturalist who made the first serious attempt to ascend Halcon.

From the entrance of the Egbert River to that of the Whitehead, the Alag flows through a rather wide valley lying between two low, densely forested ridges, the river in this interval being from 50 to 100 yards wide. Our trail followed the margin of the stream, sometimes on one side, sometimes on the other. However, after passing the entrance of the Whitehead River the banks of the stream became very irregular, its bed being much narrower, so that because of the corresponding increasing difficulties in fording it was found advantageous to travel through the underbrush along a bench about 25 feet above the level of the stream. This necessitated slow progress as we were obliged to cut a trail through the dense vegetation. Continuing on up the Alag for a short distance above the junction of the Whitehead River, Camp Number Two was established late in the afternoon. On November 6 and 7 the carriers were sent back to Subaan for further supplies and the remainder of the party reconnoitered up the Alag. The river cañon was found to be very narrow, with perpendicular cliffs sometimes several hundred feet in height and covered with dense vegetation, which often rose abruptly from the bed of the stream. In searching for the most feasible route for our carriers the banks were climbed at intervals, but in no case could a view be secured because of the dense thickets. It was decided that the only practicable course, for the present at least, was along the bed of the stream. The advance was rendered very difficult because of the narrowness of the cañon and the swiftness of the water which made fording impossible in most places; moreover, we were aware of the fact that the river was subject to sudden and enormous floods and that in case of heavy rains we were almost certain to be cut off from our base of supplies. The tremendous force of the water in times of floods was much in evidence as we traveled upstream; great water-worn bowlders, 6 to 15 feet in diameter, were everywhere encountered and in places large caverns had been cut in the solid cliffs by the action of the water. At a distance of about a mile above Camp Number Two and at an altitude of 900 feet, another smaller river joins the Alag from the east, this we named the Bolton, in memory of the late Lieut. Edward C. Bolton, former Governor of the District of Davao, Mindanao. This was undoubtedly the stream which Lieutenant Lee's party followed in crossing the divide between the Alag and Bagbaujan Rivers in April, 1901. A beautiful cascade about 15 feet in height exists just below the junction of this with the Alag, here the whole volume of the river is forced through a narrow passage between two large bowlders, falling into a pool surrounded by high cliffs.

On November 8, with twenty loaded carriers, we broke camp and proceeded up the stream to the junction of the Bolton River. Here, finding it no longer possible to follow the Alag, it was decided to take the ridge between it and the Bolton which, however, was exceedingly steep and covered with dense forests. No trail was to be found and accordingly one had to be cleared as we advanced. Ascending to an altitude or 2,250 feet, we came into a deserted Mangyan clearing and before us, across the valley of the Alag, was a magnificent panorama of the entire Halcon Range. Progress during this day had been exceedingly slow because of the difficulties encountered in proceeding along the Alag and in ascending the ridge, it being necessary to limit our speed to that of our loaded carriers. Late in the afternoon it was found that we had convered a distance of but approximately 1½ miles. It was then decided to establish Camp Number Three in the Mangyan clearing, with a subsidiary base camp at the junction of the Alag and Bolton Rivers and consequently natives were sent out to locate water and a messenger was despatched on the trail to instruct our scouts to establish a base camp at the place indicated and to build grass houses of sufficient size to accommodate all of our carriers who were to be traveling back and forth bringing supplies. Just before dark our natives reported "no water" and we prepared for a dry camp, when a brisk shower came on which enabled us to catch enough water for our immediate needs on the tent fly and ponchos. Early on the following morning our natives located a small stream tributary to the Bolton River at several hundred feet below our camp.

As many essential supplies remained at Subaan and at various points along the trail, most of the carriers were sent back to the coast, and from November 9 to 11 the country was explored for trails or for a feasible route to the main range of Halcon. At first it was thought that the best one would be by way of the ridge which we were then on, and that by following this we could avoid descending into the cañon of the Alag. Two of the party followed the ridge to the southwest of our camp for some distance, attaining an altitude of 3,500 feet. Although they found that it might be possible to gain the main range by this route, such a course would necessitate a long detour in order to pass the Alag and practically every foot of the distance would be gained only by trail cutting of the most difficult kind through the dense ridge thickets. In the meantime others of the party reconnoitered in the direction of Halcon peak, finding a well-defined Mangyan trail leading to the Alag at some distance from our camp. On November 12, some of our carriers having returned the night before, we left the camp in charge of two natives and proceeded with thirteen loaded carriers along the Mangyan trail to the Alag. The slope was very steep, being 60° to 70°, and after descending about 1,000 feet we reached the bottom of the cañon at a point where

two streams of equal magnitude joined. Here we found that the Mangyans, in order to be independent of the river in times of flood, had constructed a suspension bridge across the cañon. This was about 75 feet long, made of seven rattan stems so arranged that the lower three strands formed a foot bridge, the upper two serving as hand rails. On both sides of the cañon these rattans were firmly attached to large trees and on the west bank they passed over a huge bowlder in order to give the span sufficient altitude above the water in times of flood.

The west branch was considered to represent the main stream, and the fork flowing from the direction of Halcon Peak was named the Halcon River. The party crossed the Alag, some by means of the suspension bridge, others by fording; the trail was found to continue on up the opposite bank, undoubtedly leading to a recent clearing of considerable magnitude which was plainly to be seen from our Camp Number Three and from which it did not appear feasible to ascend Halcon. Accordingly, we crossed the Halcon River, taking the ridge between it and the Alag, continuing until we reached an altitude of about 3,200 feet, under the impression that we were on the ridge leading to the main range. Late in the afternoon it was discovered that we had still another cañon to cross, and as our carriers were exhausted, we established Camp Number Four in the forest, without water other than the small supply which we had in our canteens and such meager amounts as could be secured from freshly cut rattan stems.

Striking camp at daybreak on the 13th, we proceeded along the ridge for a short distance when we reached a deserted clearing; passing through this we entered a more recent and occupied one which was several hundred acres in area, where one or two deserted houses were found. About one and one-half hours after this we reached the cañon between us and the main ridge, crossing it near its head. The stream in this cañon was called the Cuming River in honor of Hugh Cuming, an Englishman who made extensive collections of plants and animals in the Philippines between the years 1836 and 1840. Breakfast was prepared at this point and at about 10 o'clock we were again on the march, proceeding up the steep eastern bank of the Cuming River, following a rather indistinct Mangyan trail. Near the top of the ridge we entered a deserted clearing containing the ruins of an old house, where the trail seemed to end. From this point a course was taken up the crest of the ridge, which here was rather broad, although it gradually narrowed as we ascended and we soon found ourselves forced to cut our way through exceedingly dense thickets up an 80° slope. After much difficulty we attained the summit of a small spur covered with dense, characteristic, mossy forest. As it was late in the afternoon when the crest line was reached, Camp Number Five was established on the narrow bench in the dense forest, just below the top of the ridge, a small stream being located

about one-fourth of a mile distant and 300 feet below. The distance covered in this day was only about one and one-half miles. On November 14 the carriers were sent back to the base camp on the Alag River for further supplies and on this and the following day trails were opened up on the ridge to an altitude of 7,000 feet, and a point at an altitude of 6,300 feet was selected for Camp Number Six.

Trail cutting became progressively more laborious as we advanced, because of the increasingly stunted character of the vegetation. No particular difficulties were encountered in the first mile, the trail being opened just below the crest of the ridge, but beyond this point further progress was found to be impossible because of a perpendicular landslide which was in our path, making it necessary for us to force our way through the exceedingly dense thickets up a very steep slope to the top of the ridge, the summit of which was attained at an altitude of about 6,650 feet. This ridge was found to slope gradually upward and it varied from 5 to 30 feet in width, in most parts breaking abruptly on both sides in nearly perpendicular slopes. The crest line forest was composed of stunted trees with short, stout trunks and stiff branches, often semiprostrate, and with large spreading roots raised more or less above the ground. Intermixed with the trees was a heavy stand of shrubs and bushes, while an abundance of the very spiny rattans, and nearly as spiny smilax, clambering everywhere through the thickets, rendering trail cutting always a difficult operation and frequently a painful one as well. Everywhere the ground and the trunks and branches of the trees were covered with thick masses of yellow and green moss, filmy ferns, numerous orchids and other epiphytic plants, the ground mat often being one foot or more in thickness, composed of mosses, lichens, ferns and herbaceous plants. A trail was cleared along this ridge to the foot of the sharp slope at an altitude of about 7,000 feet.

We had been favored with exceptionally good weather up to this time, only an occasional shower interfering with our progress, causing no greater inconvenience than a more or less thorough wetting of our persons, which was of minor importance as we were wet nearly every day in fording streams. However, on reaching an altitude of 4,500 feet we entered the region of practically constant fogs and rains which made traveling exceedingly unpleasant because of the wet thickets and heavy drip from the leaves even when it was not raining, as well as because of the reduced temperature, the thermometer rarely registering above 60° F.

We established Camp Number Six on November 17 at an altitude of 6,300 feet at a point previously selected and at a short distance below where our trail ascended to the crest of the ridge. No running water was to be found within a half mile of the camp, but the practically constant rain which prevailed for the thirteen succeeding days rendered the distance from running water of secondary importance. The slopes on the north were very precipitous and in many places entirely denuded

of soil and vegetation, where extensive portions of the main ridge had slid into the valley. The land slides, some of them of recent origin, present a bare, rocky face, covered only in places with a scant growth of grass, herbaceous plants and small bushes. We secured a magnificent view of Halcon, which was 1½ miles distant across a deep valley, by cutting out a few trees on the steep slopes below our camp, but the peak was very rarely visible because of the prevailing fog and rain. Occasionally at intervals of cessation in the severe storm which now came on, the wind would drive the fog away. Judging from these glimpses it became very evident to us that from our present position the only route leading to the latter was by way of the ridge on which we were. On November 18 our carriers came in from Subaan, having made the trip from the coast in three and one-half days. Some were retained for work about the camp, some were sent back to the base camp at the junction of the Baco and Alag Rivers to remain there until further orders, while others were returned to Subaan to bring in food to supply the party on the trip back to the coast. The ones whom we retained at Camp Number Six suffered much from the cold and dampness, as also did the Americans in the party.

Realizing that our food supply was limited and that, because of the present storm, the Alag would be unfordable and accordingly no further supplies could be brought in, it was deemed unwise to remain in camp hoping for a change in weather, hence, on the morning of November 19, Mr. Hutchinson and I proceeded by way of the ridge to an altitude of 7,000 feet where previously we had cleared a trail. We continued it up the steep slope, attaining the main ridge at an altitude of 7,800 feet; the one leading to Halcon Peak running from the east to the west at about right angles to our ridge trail. The montane brush of the upper ridges became reduced to an open heath commencing at the crest line and extending for some distance down the southern slope, the ground cover consisting of tufted grasses, with only occasionally scattered stunted bushes and shrubs, a most grateful change from the dense, mossy ridge thickets through which previously we had been obliged to cut trails. However, these heath lands were limited in extent and so we passed rapidly through them and found the succeeding ridge thickets to be very much more dense than those farther down. Progress through them was literally foot by foot and then only by constant use of bolo. The heavy rain which had set in a few days before, still continued without cessation, adding to our discomfort, the temperature being constantly below 15° C. Owing to the low temperature, the high wind and the continual rain, our position was exceedingly uncomfortable and at times of especially heavy downpours the warmth of our bodies did not suffice to keep the temperature of our wet clothes up to a degree of comfort, the occassional, heavy bursts of cold rain cooling the body to such an

extent that, even with the very active and arduous work of trail clearing in the dense thickets, our sufferings from cold were greatly accentuated. At times, as we came to the crest line, the cold wind would add to our discomfort, although much of the time we were fortunately sheltered from it by the dense thickets. Pitcher plants (*Nepenthes*) became very abundant, clambering everywhere in the thickets, so that in cutting our way through the underbrush, at frequent intervals our bolo slashes would upset the equilibrium of from one to a half dozen pitchers, each holding one-half quart or more of water, which would be precipitated upon us. These irregular douches were far more disagreeable than the constant shower bath from the falling rain.

The heath lands on the upper ridges were interrupted by deep ravines, filled with very dense vegetation through which progress was exceedingly slow. Unfortunately for us, these heath lands were very limited in area and we soon came to a dense ridge thicket which we afterwards learned continued uninterruptedly to the summit of the highest peak. Along this ridge we cleared a narrow trail to an altitude of about 8,300 feet. As it was then late in the afternoon and with the heavy rain still continuing, we returned to camp, arriving just after dark. On November 20 the storm was much more severe than it had been on the preceding days and we were obliged to remain in camp, having little to do other than to listen to the constant drip of the rain and the roar of the streams in the valley below and wondering about the state of the Alag and the safety of our base camp. On the following day the heavy rain continued through the morning, but it slackened at midday, so that we left Camp Number Six at noon and proceeded up to the main ridge, making Camp Number Seven on the open heath at an altitude of 7,900 feet, carrying with us a tent fly and blankets, as well as food for three days. The carriers employed in transporting the material to the high ridge were immediately sent back to Camp Number Six. Light rains continued during the afternoon's march, but toward evening the clouds lifted somewhat, giving us an indistinct view to the south and west. The country south was much more open than that to the north, many of the slopes being grass covered instead of forested, and a number of Mangyan houses were to be seen below 4,000 feet. The entire country toward the south, so far as could be seen, was very rough and mountainous, but the ocean was visible to the southwest; no view to the east and north could be obtained owing to the fogs and clouds. At the point where we pitched our tent a well-defined Mangyan trail crossed the main ridge from north to south, apparently leading up by way of the cañon of the Halcon River or by one of its tributaries, or from one of the Mangyan clearings which we did not visit. As the trail was a much traveled one it seems probable that there is considerable communication between the people living to the north and to the south of Halcon. Evidently, these

Mangyans do not possess the usual superstitions regarding mountains which are found among most natives of the Philippines, or at least not to such a degree as to prevent them from ascending the high ridges. Just before dark the heavy storm set in again, continuing all night and throughout the following day. In spite of it, we left camp on the morning of November 22 with the object of reaching the highest point on Halcon. In passing from the point where we stopped trail cutting a few days before, to the summit of the mountain, we encountered the densest thickets seen on the entire trip, and immediately below the peak it took two men three and one-half hours of constant and heavy work with bolos to open a very narrow trail, for a distance of less than one-half a mile. At 1 o'clock in the afternoon of November 22, twenty-one days from the coast, the party reached the highest point on Halcon. The summit being shrouded in clouds, no view was obtained and as all the members of the party where suffering severely from the cold and rain, we stopped only long enough to take aneroid readings and to deposit a record of the trip, which was placed in a sealed bottle and secured to the largest tree on the summit, there being no bowlders available of which to build a cairn. The top of Halcon is a somewhat flattened ridge about one-eighth of a mile long, sloping gradually to the southeast: the peak is covered with a dense growth of stunted trees, none of them more than 10 feet in height, the ground and the trunks, branches and even smaller branchlets of the trees being thinkly covered with from 5 to 15 inches of moss.

No marks of a trail were observed and no signs were seen anywhere in the vicinity of the peak which would indicate that the summit had ever been visited by human beings, and it would be physically impossible for any person to reach it through the dense forest growth without leaving signs of trail cutting. Late in the afternoon the party arrived at Camp Number Seven and spent a most disagreeable night in wet clothes and blankets, as it was impossible to start a fire because of the continuous wind and rain and consequently no warm food could be prepared. On the morning of November 23 we returned to Camp Number Six and during the two following days we were obliged to remain there because of the storm. On the morning of November 26, our carriers who had remained at the base camp at the junction of the Alag and Bolton Rivers, came back reporting the Alag River very high and unfordable, and for that reason the carriers who had been sent to Subaan had been unable to return: moreover, the food supply at the base camp was very low. As we had no further object in remaining at the higher altitudes we broke Camp Number Six on the morning of November 26 with the intention of sleeping that night at the large Mangyan house described on page 182. As we had but few carriers, every member of the party was obliged to pack a heavy load. The topographer and hospital corps man left Camp Number Six about half an hour before the remainder of the party, but on

our arrival at the Mangyan house they were not to be found, having apparently lost the trail, nor did they appear that night.

On the following day, with the Mangyan house as headquarters, search was made on the back trail for the missing men and messengers were sent down to the Alag River to see if they had arrived at the base camp. No trace of them was found on this day and on the 28th the search was continued. In the morning word was received that they had not appeared at the base camp and accordingly a party was detailed to make a more thorough search on the back trail. However, in the afternoon the lost men appeared in the Mangyan clearing. It seems that on coming down the ridge from Camp Number Six they had missed the trail crossing the headwaters of the Cuming River, and had proceeded for some distance down the main ridge leading toward the Halcon before discovering their mistake. Thinking it possible that they could easily reach the Alag at the point where the suspension bridge crossed the cañon, they continued on down the ridge, but where unable to reach the stream because of the steep cliffs. Accordingly, they retraced their steps for some distance and found an old Mangyan trail which they followed for some time, crossing the Halcon by a second suspension bridge and again attempting to reach the Alag and follow it to the junction of the Bolton River, but once more, because of the dense thickets and high cliffs, they were obliged to give up the attempt. Finally, they retraced their steps by the main ridge, located the trail crossing the headwaters of the Cuming River, and arrived at the Mangyan house after having been out nearly three days without other food than a few acorns which they found in the forest. While we were searching for this party on the ridges, they were in the cañons attempting to reach the streams and accordingly did not hear our shouts or shots.

Because of the weak condition of the men who had been lost, no further progress was made until December 1, except to concentrate our supplies and equipment at Camp Number Nine, at the point where the Bolton River joints the Alag. The Alag was still high and unfordable, although the water was about six feet below the point at which it had been a few days before. All members of the party had been on short rations for several days and there seemed to be no immediate prospect of further supplies reaching us from the coast. On the afternoon of November 30 a rude bridge was built across the Alag at Camp Number Nine by felling trees and floating the trunks down stream so that they lodged against bowlders in the bed of the river, the ends of the trunks being lashed in place with rattan and a hand-rail was added. A brisk rain in the night caused the river to rise considerably and one-half of the bridge was carried away, so that we had to replace it on the following morning. On December 1, the first clear day after thirteen days and nights of nearly constant rain, we broke Camp Number Nine and moved

all the material across the river, but as we had with us only seven carriers, a temporary camp was established on the opposite bank and the two American soldiers, who were still in a weak condition, were left in charge.

At noon, the remaining members of the party, all heavily loaded, proceeded down the east bank of the Alag. Many difficulties were encountered during the afternoon. In a number of places where bluffs arose abruptly from the stream and which on the up trip we had been able to avoid by fording the river, we were now obliged to climb, fording being entirely out of the question. These frequent detours entailed extensive trail cutting which, with a 50-pound pack, soon became a decidedly painful operation, especially as in order to find a feasible route we had frequently to climb the steep banks or to follow the nearly as steep ravines to a height of two or three hundred feet or more. Camp was made just after dark at the foot of a bluff on the edge of the river. A daybreak on December 2 we proceeded down the stream to a point opposite the entrance of the Egbert River, where Camp Number Ten was established.

All the carriers were immediately sent up the river to bring down more supplies, a scout, who succeeded in crossing the Alag with some difficulty, went into Subaan for additional ones, and one man was sent to the Binabay River for food. Fortunately for us the weather still continued clear and the Alag fell rapidly. On December 3 the carriers were again dispatched up the Alag to bring down the remaining equipment, returning to camp late in the afternoon, the two soldiers accompanying them and at the same time the bearers from Subaan arrived, reporting that they had encountered serious difficulties in crossing the Alag on the trip back to the coast, but that they had finally reached their destination and started back with supplies. On their return, finding that the river was high and that it was impossible to cross, they remained on the north bank of the stream for three days waiting for the waters to subside, and then returned to Subaan. As the carriers came in late in the afternoon it was impossible for us to move camp across the river on that day. A heavy rain came on in the night which caused us considerable anxiety for the reason that if it continued for any length of time, we should be unable to cross the river on the following day and would be obliged to follow the stream down to tide-water along the south bank.

The rain continued throughout the night and at daybreak we found that the water had risen about six inches, so that the stream was still fordable, although with great difficulty and considerable danger. Heavily loaded carriers with the assistance of one or two men without loads could usually keep their footing, but some of them were carried downstream by the current, wetting some of our equipment. The Americans in the party who attempted to cross without loads, depending entirely on heavy

poles for assistance, were invariably carried down by the current and were obliged to swim the last few yards in the very swift water. After many delays and heavy work all the equipment was taken across the river and transported to the top of the ridge between the Alag and Binabay Rivers, where Camp Number Eleven was established. The party made an early start on the morning of December 5 and proceeded by way of the Binabay to Subaan, arriving there about 2 o'clock in the afternoon. We were obliged to remain in Subaan throughout the following day and 4 o'clock on the morning of December 7 embarked for Calapan on a large sailing banca, arriving at noon. On the night of December 9, after forty days, the party returned to Manila, having accomplished the objects of the trip.

GENERAL OBSERVATIONS.

No data are available regarding the rainfall in Mindoro but judging solely from the vegetation in the southern part of the Island, the rainfall there is much less and the dry season much more prolonged than it is in the North, in the vicinity of Halcon. The presence of this high mountain and its subsidiary ranges causes an enormous precipitation, extending continuously over nine months of the year, from May to January, while the so-called dry months, February, March and April, are not always completely so, as is to be seen from the heavy rain encountered by Lieutenant Lee in April, 1904. During most of the year the mountain is shrouded in fogs and is very rarely entirely free from clouds for any extended period. The fact that the rivers flowing from the Halcon Range, although comparatively short, carry an enormous body of water and that they are subject to great and frequent floods, as both our party and Whitehead learned from experience, would indicate an abnormally heavy rainfall. The vegetation of Halcon, not only that of the higher altitudes, but of the lowlands surrounding the mountain and extending even to the coast at Baco, demonstrates a high and practically uninterrupted humidity throughout the year. Abundant epiphytes, ferns, orchids and other plants and especially the filmy ferns, which are dependent upon a high and constant humidity for their existence and are identical with, or similar to the species on other mountains in the Philippines at altitudes above 3,000 feet, are found in the vicinity of Halcon, sometimes at sea level. In the forests along the rivers at as low an elevation as 250 feet such plants are abundant and many species are represented.

Halcon is covered with and surrounded by the most dense forests excepting where the vegetation has been destroyed by the Mangyans. From the limits of cultivated land along the coast, extending inward and up to an altitude of 3,000 feet, the trees are of large size and would prove to be of considerable commercial value for timber if the question of transportation were a more simple one. Beginning at an altitude of about

1,200 feet on the ridge between the Alag and Binabay and at about 5 or 6 miles from the nearest Tagalog settlements, one finds traces of the Mangyans in clearings, occupied or deserted. It is the custom of these people to clear a given area by chopping down the trees and brush and after burning it over they plant upland rice, corn, and other crops. Such clearings will be occupied for one or more years until the soil shows signs of exhaustion, until the slopes are denuded by erosion or until the exuberent tropical vegetation becomes too great an obstacle to the primitive agriculturist. He then clears another piece of ground and the deserted one soon reverts to its former forested condition. After a term of years the same land may be cleared again by the same methods. Everywhere on the more gentle slopes from the Binabay River to an altitude of 3,500 feet on Halcon, we observed clearings in all stages, from those freshly cut and not yet burned to those in cultivation, and from those recently deserted to clearings in all stages of reversion to forest. Some of these were very extensive and must have entailed a great amount of labor, for many of the trees felled were 3 feet in diameter, and the only tools possessed by the Mangyans are working bolos and very small, narrow axes.

From a forestry standpoint, practically all the forests in the immediate vicinity of Halcon have been ruined by the above methods of clearing, for it seems evident that the Mangyan selects virgin woods for his work of destruction, doubtless because he has found from experience that the soil is better than in those localities where he has previously cleared and which have reverted.

The floristic conditions[10] of the lower forests indicate high and continuous humidity, shown by the numerous ferns, mosses and epiphytes. As higher altitudes are reached these epiphytes become progressively more abundant, until on the exposed crest-line ridges, beginning at 4,000 feet, the trees are found to be completely covered with a dense mass of mosses and epiphytes, so thick and close that frequently the bark of the tree is not visible. The character of the vegetation entirely changes, the constituent species of the lower forests disappear and others totally different in aspect take their place. Various species of oak and one species of maple are abundant at intermediate altitudes, but on the ridges the vegetation is largely characterized by certain species found in such habitats throughout Malaya. Epiphytic ferns and orchids and other plants become more plentiful and there is a greater diversity in species; mosses are much thicker and more luxuriant, enwrapping even the branches and branchlets of the trees and forming a deep, soft, soil cover, frequently a foot in thickness. Epiphytic shrubs and vines are abundant and give an added character to the vegetation; rhododendrons, huckleberries, raspberries and

[10] For an account of the Flora of Mount Halcon see Merrill, *this Journal (Botany* (1907), 2, 251.

other plants characteristic of the more temperate regions made their appearance, and the pitcher plant (*Nephenthes*), becomes common, climbing through the thickets. The vegetation again gradually changes above 4,000 feet, the trees and shrubs become more stunted and dwarfed, epiphytes increase in abundance, peat moss appears in the ground cover and many of the constituent species of trees, shrubs, herbaceous plants, epiphytes, etc., are again quite different from the ones at 4,000 feet. On gaining the high, main ridge, at 7,800 feet, there is a most radical change; the montane brush has become reduced to a mere heath over considerable areas, the ground having a thin cover of grasses with scattered, stunted bushes and shrubs, a curious mixture of north-temperate and Australian types. These heath lands disappear along the ridge towards the high peak and the montane brush is again in evidence, but more stunted and much more dense than on the lower ridges; epiphytic orchids and ferns become reduced to few species and there is a corresponding increase in the abundance and density of the mosses and lichens which everywhere cover the ground and trunks of the brush. Small branches, even no larger than the finger, appear to be 6 inches or more in thickness owing to their dense covering of yellow and green moss. These upper thickets represent the densest vegetation I have ever observed in the Philippines. It was almost impossible to penetrate it even with a liberal use of the bolo.

CONCLUSION.

The origin of most of the mountains in the Philippines is due to volcanic activity, but Halcon is radically distinct from the others in structure. It is a mass of granite, white quartz, schist and marble. Iron pyrites was observed in some localities, while gold in small amounts is found in the sands of the streams flowing from it. Slate was observed by Mr. McCaskey a short distance north of the main range. In general structure, so far as can be determined from descriptions to be obtained, Halcon seems geologically to be the same as Mount Kinabalu, British North Borneo, the highest peak in the Malayan region.

Halcon Range is a fold, the main ridge running in a generally east and west direction, irregular in profile, but continuous for a long distance at high altitudes. So far as could be determined, three great ridges radiate from the main range, one to the west, one to the south and one to the east, while to the north especially, the slopes are very precipitous and show several subsidiary spurs.

Mindoro itself is anomalous in some respects as compared with other islands of the Philippine group, but later when more definite knowledge is secured regarding it and its neighbors, it may be shown that it is really the oldest part of the Archipelago proper. The one large mammal found in the Philippines, *Bubalus mindorensis*, said to be most closely related to a Celebes form, is confined to the Island of Mindoro; certain

genera of lowland plants, such as *Antiaris*, *Chrysophyllum*, *Ochthocharis*, etc., characteristic of the Malayan region in the west and south, are known in the Philippines only from Mindoro, while the plants from the higher altitudes on Halcon show remarkable affinities with those known from Mount Kinabalu, North Borneo, in many cases they are of specific identity and encountered only in the two localities. At the same time there is a remarkable number of Australian types present in the Halcon flora. From the geological, botanical and zoölogical evidence at hand, indications are found which would seem to point to an early land connection between Mindoro and some great mass to the west and south, but at the same time there is shown a prolonged separation and apparently a greater age than has been discovered in any other part of the Philippines proper. It is probable that Mindoro, in the various disturbances which have from time to time submerged portions of the Archipelago, has constantly remained above the sea.

Extensive collections of natural history specimens were made on the trip, but most of the material was collected and prepared under the most adverse conditions. A series of papers based on this matter, which will add much to our knowledge of the fauna and flora of the Philippines is planned.

A feasible route to the mountain was discovered and mapped, and it was proved that Halcon could be ascended even at the most unfavorable season of the year. The course of the Alag River was in part determined and charted, this large stream not being shown at all on many maps of the Philippines. Several of its tributaries were located and named.

To anyone contemplating a like trip on Halcon the following recommendations will prove to be of some value, and will apply as well to many other mountains in the Philippines. Brown soap should be issued regularly to the native carriers to be used as a leech repellent. This is smeared on the bare legs once or several times a day if necessary, for the loss of blood from the attacks of leeches is always considerable, and serious complications which might cripple a party in regard to transportation might arise from a resulting infection, for on Halcon the only feasible method of transportation is by carriers. All members of the party wearing shoes should be equipped with woolen puttees instead of leather or canvas leggings, as the former are proof against the attacks of leeches, while the two latter give no protection whatever. Eyeholes on shoes should be smeared with soap each day. Quinine should be issued regularly to the members of the party to guard against outbreaks of malaria. All supplies needed on the entire trip should be carried, as no food can be secured in the interior of Mindoro, at least on the north of the Halcon Range, except a few very poor *camotes*, and some small game such as birds, rats and monkeys, the latter two generally not being considered acceptable food. If one is not limited as to time, doubtless the

best carriers for such a trip as we took would be the Mangyans, but they can be approached only with difficulty and because of their superstitions can not be relied upon to stay with a party. As carriers are very difficult to secure in Mindoro and do not prove satisfactory even when they are found, they should be secured at some point in Luzon and landed with the party making the ascent. Camp outfit and equipment should be made as light as possible and food should be confined to essentials. All food supplies and equipment should be wrapped in waterproof packages; the packs should be adapted to carriers and should not exceed 40 or 50 pounds in weight for the ordinary carrier.

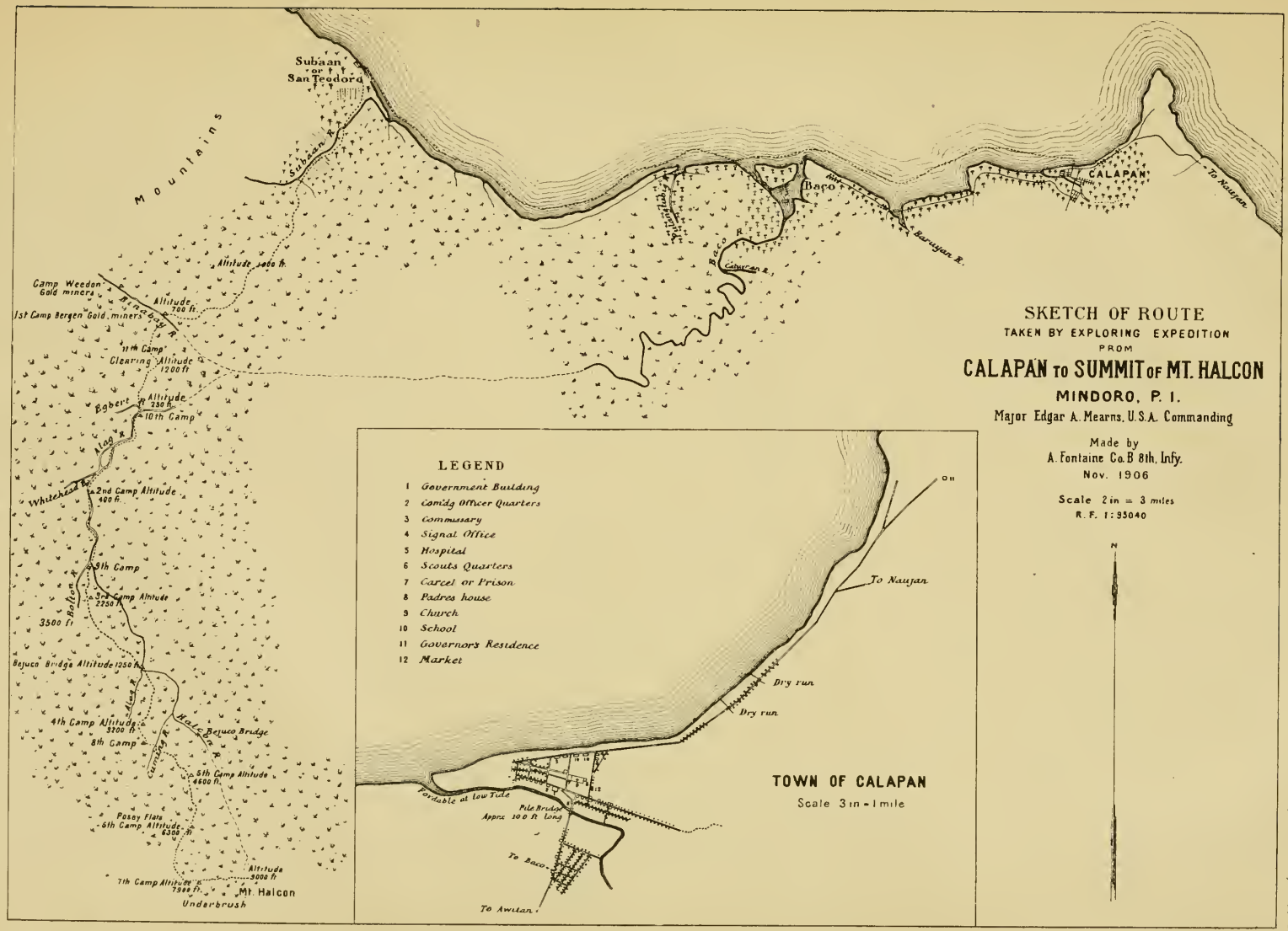
The proper time for ascending Halcon, judging from our imperfect knowledge of the rainfall in the vicinity of the mountain, is in the months of February, March, April, and May, but these months are by no means dry, as is shown by Lieutenant Lee's experience north of Halcon in April. During the remaining months of the year heavy rains prevail, and anyone penetrating beyond the Alag River on our route would do so at the constant risk of being cut off from his base of supplies, as in reality happened to our party. To be cut off for any extended period in the interior of Mindoro would be in most cases a very serious complication and every precaution should be taken to avoid it.

My acknowledgment and thanks are due to Major J. K. Thompson, United States Army, for the accompanying map and for the copies of Lieutenant Lee's report; and to Major George P. Ahern, Director of Forestry of the Philippine Islands, for copies of Lieutenant Jenning's and Foresters Merritt's and Hutchinson's reports.

ILLUSTRATION.

PLATE I. Sketch map of route taken by exploring expedition from Calapan to summit of Mount Halcon, Mindoro, P. I.

PLATE I.


Subaan or San Teodoro
Subaan R.
Mountains
Baco
Baco R.
Calapan R.
Baruyan R.
CALAPAN
To Naujan
Camp Weedon Gold miners
Altitude 700 ft.
1st Camp Bergen Gold miners
Altitude 400 ft.
11th Camp
Clearing Altitude 1200 ft
Egbert
Altitude 250 ft.
10th Camp
Mag R.
Whitehead R.
2nd Camp Altitude 400 ft.
9th Camp
Bolton R.
3rd Camp Altitude 2250 ft
3500 ft
Bejuco Bridge Altitude 1250 ft.
Mag R.
4th Camp Altitude 3200 ft.
8th Camp
Hall's Bejuco Bridge
Cuming R.
5th Camp Altitude 4600 ft.
Posoy Flats
6th Camp Altitude 6300 ft.
Altitude 5000 ft
7th Camp Altitude 7300 ft.
Mt. Halcon
Underbrush
LEGEND
1 Government Building
2 Comdg Officer Quarters
3 Commissary
4 Signal Office
5 Hospital
6 Scouts Quarters
7 Carcel or Prison
8 Padres house
9 Church
10 School
11 Governors Residence
12 Market
To Naujan
Dry run
Dry run
Fordable at low Tide
Pile Bridge Apprx 100 ft long
To Baco
To Awitan
TOWN OF CALAPAN
Scale 3 in = 1 mile
SKETCH OF ROUTE
TAKEN BY EXPLORING EXPEDITION
FROM
CALAPAN TO SUMMIT OF MT. HALCON
MINDORO, P. I.
Major Edgar A. Mearns, U.S.A. Commanding
Made by
A. Fontaine Co. B 8th. Infy.
Nov. 1906
Scale 2 in = 3 miles
R. F. 1: 95040
N

PREVIOUS PUBLICATIONS OF THE BUREAU OF GOVERNMENT LABORATORIES—Concluded.

(Concluded from second page of cover.)

No. 32, 1905.—Biological Laboratory: I. Intestinal Hæmorrhage as a Fatal Complication in Amœbic Dysentery and Its Association with Liver Abscess. By Richard P. Strong, M. D. II. The Action of Various Chemical Substances upon Cultures of Amœbæ. By J. B. Thomas, M. D., Baguio, Benguet. *Biological and Serum Laboratories:* III. The Pathology of Intestinal Amœbiasis. By Paul G. Woolley, M. D., and W. E. Musgrave, M. D.

No. 33, 1905, Biological Laboratory.—Further Observations on Fibrin Thrombosis in the Glomerular and in Other Renal Vessels in Bubonic Plague. By Maximilian Herzog, M. D.

No. 34, 1905.—I. Birds from Mindoro and Small Adjacent Islands. II. Notes on Three Rare Luzon Birds. By Richard C. McGregor.

No. 35, 1905.—I. New or Noteworthy Philippine Plants, IV. II. Notes on Cuming's Philippine Plants in the Herbarium of the Bureau of Government Laboratories. III. Hackel, "Notes on Philippine Grasses." IV. Ridley, "Scitimineæ Philippinenses." V. Clarke, "Philippine Acanthaceæ." By Elmer D. Merrill, Botanist.

No. 36, 1905.—A Hand-List of the Birds of the Philippine Islands. By Richard C. McGregor and Dean C. Worcester.

The previous publications of the Bureau were given out as bulletins in serial number pertaining to the entire Bureau. These publications, if they are desired, can be obtained by applying to the librarian of the Bureau of Science, Manila, P. I., or to the Director of the Bureau of Science, Manila, P. I. Correspondents will confer a favor by returning to the Bureau any previous publications which they may have in duplicate, as a number of bulletins are now out of print.

LIST OF PREVIOUS PUBLICATIONS OF THE MINING BUREAU (NOW DIVISION OF MINES OF THE BUREAU OF SCIENCE).

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1890.—Memoria descriptiva de los manantiales minero-medicinales de la Isla de Luzon, estudiados por la comisión compuesta de los Señores D. José Centano, Ingeniero de Minas y Vocal Presidente, D. Anacleto del Rosario y Sales, Vocal Farmacéutico, y D. José de Vera y Gómez, Vocal Médico.

1893.—Estudio Descriptivo de algunas manantiales minerales de Filipinas ejecutado por la comisión formada por D. Enrique Abella y Casariego, Inspector General de Minas, D. José de Vera y Gómez, Médico, y D. Anacleto del Rosario y Sales, Farmacéutico; precidido de un prólogo escrito por el Excmo. Sr. D. Angel de Avilés, Director General de Administración Civil.

1893.—Terremotos experimentados en la Isla de Luzón durante los meses de Marzo y Abril de 1892, especialmente desastrosos en Pangasinán, Unión y Benguet. Estudio ejecutado por D. Enrique Abella y Casariego, Inspector General de Minas del Archipiélago.

1901.—The Coal Measures of the Philippines. Charles H. Burritt.

1902.—Abstract of the Mining Laws (in force in the Philippines, 1902). Charles H. Burritt.

1902, Bulletin No. 1.—Platinum and Associated Rare Metals in Placer Formations. H. D. McCaskey, B. S.

1903.—Report of the Chief of the Mining Bureau of the Philippine Islands. Charles H. Burritt.

1903, Bulletin No. 2.—Complete List of Spanish Mining Claims Recorded in the Mining Bureau. Charles H. Burritt.

1903, Bulletin No. 3.—Report on a Geological Reconnoissance of the Iron Region of Angat, Bulacan. H. D. McCaskey, B. S.

1904.—Fifth Annual Report of the Mining Bureau. H. D. McCaskey.

1905.—Sixth Annual Report of the Chief of the Mining Bureau. H. D. McCaskey.

1905, Bulletin No. 4.—A Preliminary Reconnoissance of the Mancayan-Suyoc Mineral Region, Lepanto, P. I. A. J. Eveland, Geologist.

1905, Bulletin No. 5.—The Coal Deposits of Batan Island. Warren D. Smith, B. S., M. A., Geologist.

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[1] The first four bulletins in the ornithological series were published by The Ethnological Survey under the title "Bulletins of the Philippine Museum." The other ornithological publications of the Government appeared as publications of the Bureau of Government Laboratories.

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SOME GENERA AND SPECIES NEW TO THE PHILIPPINE FLORA

ADDITIONAL IDENTIFICATIONS OF THE SPECIES DESCRIBED IN BLANCO'S FLORA DE FILIPINAS

By Elmer D. Merrill

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

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(Concluded on third page of cover.)

SOME GENERA AND SPECIES NEW TO THE PHILIPPINE FLORA.

By Elmer D. Merrill.

(*From the botanical section, Biological Laboratory, Bureau of Science, Manila, P. I.*)

In recently published papers on Philippine botany many genera and species have been recorded from the Philippines that were previously not known to occur in the Archipelago, one of the striking proofs of the present comparatively limited knowledge that we have of the flora of the Philippines. As collections of botanical material are made in various islands of the group, genera and species previously known from surrounding regions are constantly being found, and a few of these, mostly observed in recently collected material, are recorded in the following paper.

ALISMACEÆ.

SAGITTARIA Linn.

Sagittaria sagittifolia Linn. Sp. Pl. (1753) 993; Buchenau in Engler's Pflanzenreich **16** (1903) 46. *S. sagittæfolia* var. *diversifolia* Micheli in DC. Monog. Phan. **3** (1881) 66.

Mindanao, Lake Lanao, Camp Keithley (888 Mrs. *Clemens*) November, 1906.

Europe and Asia, extending to Hainan, Formosa, Japan and Java.

This widely distributed species has previously been known as a Philippine plant only by the doubtful record given by *Naves*,[1] who states that he saw living specimens in the Island of Panay, and dried specimens in *Vidal's* herbarium, although *Vidal* does not record the species in any of his published works on the Philippine flora.

GRAMINEÆ.

Phalaris minor Retz. Obs. **3**: 8; Hook. f. Fl. Brit. Ind. **7** (1897) 221.

Luzon, Province of Benguet, near Baguio (Major *E. A. Mearns*) April, 1907, probably introduced.

Southern Europe to British India, South Africa and Australia.

[1] (Blanco's Flora de Filipinas) Nov. App. (1883), 298.

CYPERACEÆ.

MAPANIA Aubl.

Mapania macrocephala (Gaudich.) K. Sch. ex Warb. in Bot. Jahrb. 13 (1891) 265. *Hypolytrum macrocephalum* Gaudich. In Freyc. Voy. Bot. (1826) 414. *Lepironia macrocephala* Miq. Ill. (1871) 64. *pl.* 27.

Balut Island (5409 *Merrill*) October 8, 1906. In wet forests at 700 m. alt.

Moluccas and the Bismarck Archipelago.

Mapania kurzii C. B. Clarke in Hook. f. Fl. Brit. Ind. 6 (1904) 681.

Luzon, Province of Tayabas, Atimonan (4001 *Merrill*) March, 1905. In forested ravines.

Malayan Peninsula.

This species was so identified by the late *C. B. Clarke*, but omitted from his list of Philippine Cyperaceae.[2] Mr. *Clarke* observes that the specimen might be the closely allied *M. multispicata*, but it agrees well with No. 11476 *Ridley* from Singapore, determined by *Clarke* as *M. kurzii*, and also with the description of that species.

SCIRPODENDRON Kurz.

Scirpodendron costatum Kurz in Journ. As. Soc. Beng. 38[2] (1869) 85; Clarke in Hook. f. Fl. Brit. Ind. 6 (1894) 684.

Palawan, San Antonio Bay (5257 *Merrill*) October 17, 1906. Forming dense thickets along a small stream at about 10 m. above sea level. The genus new to the Philippines.

Ceylon, Malayan Peninsula, Java, Australia and Samoa.

ARACEÆ.

CYRTOSPERMA Griff.

Cyrtosperma griffithii (Hassk.) Schott. in Oest. Bot. Wochenbl. (1857) 61; Engler in DC. Monog. Phan. 2 (1879) 271. *Lasia merkusii* Hassk. Cat. Bog. (1844) 59; Pl. Jav. Rar. (1848) 161; Miq. Fl. Ind. Bat. 3 (1855) 177.

Mindoro, Bulalacao (B. S. 1515 *Bermejos*) September, 1906. Samar, Borongan (5218 *Merrill*) October, 1906.

Java, Borneo and the Fiji Islands.

This species is rather abundant in the Visayan Islands and was observed by the author at several localities on the east coasts of Samar and Mindanao in October, 1906. It is extensively cultivated in some places, notably Borongan, and probably does not occur strictly wild in the Philippines. At Borongan and other places where it was observed it was grown in ravines in coconut groves, the petioles often being 8 feet in length and 3 to 4 inches in diameter and the leaf-blades 5 feet in length. The genus is new to the Philippines.

MAGNOLIACEÆ.

KADSURA Kaempfer.

Kadsura scandens Blume Fl. Jav. Schizandreae (1836) 9 *t.* 1; Miq. Fl. Ind. Bat. 1[2] (1859) 19; King in Journ. As. Soc. Beng. 58[2] (1889) 375; Ann. Bot. Gard. Calcutta 3 (1891) 221. *pl.* 71. *Sarcocarpon scandens* Blume Bijdr. (1825) 21.

[2] *This Journal, Bot. Sec. C.* (1907), 2, 109.

MINDANAO, Lake Lanao (683 Mrs. *Clemens*) September–October, 1906. Malayan Peninsula to Java and Sumatra, and probably other islands in the Malayan Archipelago.

The specimens from Mindanao are apparently typical, and with the exclusion of *Kadsura blancoi* = *Phytocrene!* (*Icacinaceæ*) from the *Magnoliaceæ*, the above species is the first one of the genus to be recorded from the Philippines.

ICACINACEÆ.

CARDIOPTERYX Wall. (*Cardiopteris*).

Cardiopteryx moluccana Blume in Rumphia 3 (1837) 277. *t.* 177. *f.* 2. *C. lobata* R. Br. var. *moluccana* Mast. in Hook. f. Fl. Brit. Ind. 1 (1875) 597; F.-Vill. Nov. App. (1883) 46. *C. rumphii* Baill., var. *integrifolia* Baill. in DC. Prodr. 17 (1873) 26.

MINDANAO, Lake Lanao, Camp Keithley (137 Mrs. *Clemens*) 1906, in fruit in February, in flower in July and September.

Baillon gives the distribution of the variety *integrifolia*=*C. moluccana*, as from British India through Malaya to New Guinea, but *Engler* in Nat. Pflanzenfamilien gives its distribution as from the Moluccas, Ceram and New Guinea. *F.-Villar* reported it from Luzon and Panay, but his record of the species as a Philippine plant has previously never been verified.

VITACEÆ.

PTERISANTHES Blume.

Pterisanthes sinuosa Merrill n. sp.

Glabra; foliis ovatis vel oblongo-ovatis, membranaceis, 11 ad 20 cm. longis, 6 ad 11 cm. latis, apice acuminatis, basi leviter cordatis, margine grosse distanter sinuato-dentatis; receptaculo oblongo-lanceolato, longe pedunculato, 11 ad 20 cm. longo, 1 ad 1.8 cm. lato, floribus marginalibus pedicellatis, floribus sessilibus immersis, 4-meris.

Nearly glabrous throughout when mature, the younger parts slightly ferruginous-pilose. Branches slender. Leaves ovate to oblong-ovate, simple, 11 to 20 cm. long, 6 to 11 cm. wide, membranaceous, the apex sharply acuminate, the base somewhat cordate, broad, the margins distantly and coarsely sinuate-dentate, dull or shining; nerves prominent, curved-ascending, about 5 on each side of the midrib; petioles 3 to 5 cm. long. Tendrils bifid. Receptacles red (?) apparently somewhat fleshy when fresh, oblong-lanceolate, 11 to 20 cm. long, 1 to 1.8 cm. wide, long pedunculate, the marginal flowers rather numerous, pedicellate, the pedicels about 1.5 cm. long, those on the surface of the lamina sessile, immersed, very numerous, 4-merous, the petals triangular-ovate, acute, 1 mm. long, the calyx disciform, truncate, about 1.7 mm. in diameter.

MINDANAO, Lake Lanao, Camp Keithley (647 Mrs. *Clemens*), July–October, 1906, four collections.

The first species of this very characteristic Malayan genus to be found in the Philippines and apparently closely related to *Pterisanthes polita* Miq., of the Malayan Peninsula, Sumatra and Borneo, differing from that species in its coarsely sinuate-toothed larger leaves and other characters.

STERCULIACEÆ.

TARRIETIA Blume.

Tarrietia riedeliana Oliver in Journ. Linn. Soc. Bot. 15 (1887) 98.

MINDANAO, Lake Lanao, near Camp Keithley (Mrs. *Clemens*) June, 1906.

The second species of the genus to be found in the Philippines, and an addition to the Celebes element in the Philippine flora now known to be very prominent.

Celebes.

LEGUMINOSÆ.

STRONGYLODON Vog.

Strongylodon lucidus (Forst.) Seem. Fl. Vit. (1865–68) 61. *Glycine lucida* Forst. f. Prodr. (1786) 51. *Rhynchosia lucida* DC. Prodr. 2 (1825) 387. *Strongylodon ruber* Vogel in Linnaea 10 (1836) 585; A. Gray Bot. Wilke's U. S. Explor. Exped. (1854) 446. *t. 48;* Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 191; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 69.

BALUT (south coast of Mindanao) (5411 *Merrill*) October 8, 1906. In thickets along streams at 150 m. Not previously reported from the Philippines.

Ceylon, Andaman Islands, New Guinea to the Fiji Islands and Hawaii.

RUTACEÆ.

FAGARA L.

Fagara torva (F. Muell.) Engl. in Engl. und Prantl. Nat. Pflanzenfam. 3[4] (1895) 119. *Xanthoxylum torvum* F. Muell. Fragm. 7 (1871) 140; Hochr. Pl. Bog. Exsicc. (1904) 18, No. 28. *Zanthoxylum glandulosum* T. et B. Cat. Hort. Bog. (1866) 234, nomen.

MINDANAO, Lake Lanao, Camp Keithley (667 Mrs. *Clemens*) September, 1906.

The identification of the above plant is based largely on a specimen of No. 28 of *Hochreutiner's* Plantae Bogoriensis Exsiccatae in our herbarium. The Mindanao plant seems to be quite the same. *Hochreutiner* is authority for the reduction of the Javan *Zanthoxylum glandulosum* T. et B., to the Australian *Xanthoxylum torvum* F. Muell. = *Fagara torva* (F. Muell.) Engl. An interesting addition to our knowledge of the Philippine flora, the species previously being known from Java and Australia.

MALASTOMATACEÆ.

OCHTHOCHARIS Blume.

Ochthocharis javanica Blume in Flora 2 (1831) 525 et Mus. Bot. 1 (1849) 40; Naud. in Ann. Sc. Nat. III. 15: 307; Triana Melast. 74. *t. 6. f. 67;* C. B. Clarke in Hook. f. Fl. Brit. Ind. 2 (1879) 528; King in Journ. As. Soc. Beng. 69[2] (1900) 14; Miq. Fl. Ind. Bat. 1[1], (1855) 556; Cogn. in DC. Monog. Phan. 7 (1891) 480.

MINDORO, Baco River (F. B. 5518 *Merritt*) November, 1906, in mangrove swamps.

Var. **longipetiolata** Merrill n. var.

Petiolo 1.5 ad 4.5 cm. longo, ceteroquin ut *O. javanica* Bl.

MINDORO, Subaan (6226 *Merrill*) December, 1906; Baco River (F. B. 5488 *Merritt*) November, 1906, in mangrove swamps.

The genus is new to the Philippines, the five known species being Malayan, the genus therefore a characteristic Malayan one. *O. javanica* is found along the seashore from Tenasserim through the Malayan Peninsula to Borneo, Java, Banka and Billeton.

VERBENACEÆ.

PETRAEOVITEX Oliver.

Petraeovitex trifoliata Merrill n. sp.

Frutex scandens; foliis oppositis, trifoliatis, glabris vel parce puberulis; petiolo 3 ad 4 cm. longo; foliolis ovatis vel oblongo-ovatis, acuminatis, usque ad 7 cm. longis; paniculis terminalibus, 20 ad 40 cm. longis, puberulis; flores 8 mm. longi; calycis fructiferis lobis 1.5 ad 2 cm. longis.

A scandent shrub. Branches brown or gray, quadrangular, puberulent, becoming glabrous, 1.5 to 2 mm. in diameter. Leaves opposite, trifoliate, the petiole 3 to 4 cm. long, puberulent, the petiolules 4 to 10 mm. long; leaflets ovate to oblong-ovate, 7 cm. long, 2.5 to 5 cm. wide, subcoriaceous, glabrous or nearly so, somewhat shining, paler beneath, the apex acuminate, the base rounded, often somewhat inequilateral; nerves rather prominent beneath, about 4 on each side of the midrib, the reticulations lax. Panicles terminal, the lower branches subtended by leaves, 20 to 40 cm. long, puberulent, the axis and branches quadrangular. Flowers purple, about 8 mm. long. Calyx puberulent, the tube 4 mm. long, the lobes in anthesis 4 mm. long, oblong-lanceolate. Corolla equalling the calyx, the tube 5 mm. long, narrowly funnel-shaped, puberulent outside, slightly so at the throat inside, the lobes 3 mm. long, oblong-ovate, rounded. Stamens 4; filaments about 4 mm. long, slightly puberulent; anthers 1 mm. long. Calyx in fruit accrescent, the lobes 1.5 to 2 cm. long, oblanceolate, spatulate, obtuse.

PALAWAN, Victoria Peak (B. S. 708 *Foxworthy*) March, 1906, on open steep slopes at 900 m. alt. Nearly or quite the same species is represented by a specimen collected by *Hallier* in February, 1904, at San Ramon, near Zamboanga, MINDANAO.

The genus new to the Philippines, but two species previously known, one from Buru Island and one from New Guinea. The present species is apparently most closely related to the Buru species, *Petraeovitex riedelii* Oliv. in Hook. Icon. Pl. III. 5 (1883) 15. *Pl. 1420*, the type of the genus, distinguished at once from that species by its trifoliate leaves.

LABIATÆ.

POGOSTEMON Desf.

Pogostemon heyneanus Benth. in Wall. Pl. As. Rar. 1 (1830) 31; Lab. (1832–36) 154; Benth. in DC. Prodr. 12 (1848) 153; Wight Icon. *t. 1440.* F.-Vill. Nov. App. (1883) 164; Miq. Fl. Ind. Bat. 2 (1856) 961. *P. Patchouly* Pellet. in Mem. Soc. Sc. Orleans. 5 (1845) 277. *t. 7;* Benth. l. c.; Miq. l. c.; F.-Vill. l. c., Hook f. Fl. Brit. Ind. 4 (1885) 633.

Luzon, Province of Pampanga, Mount Arayat (5025 *Merrill*) February, 1906, det. *Rolfe* as *P. patchouli* Pellet.: Province of Rizal, Montalban (2442 *Ahern's collector*) January, 1905. In forests and thickets, perfectly wild, not cultivated.

The only record of this plant as a Philippine species that I have seen is *F.-Villar's,* who states that he saw living specimens in Luzon, this record, like so many of *F.-Villar's* and *Naves'*, being subject to doubt, and accordingly it has been thought best again to record the species as a Philippine one, with citation of specimens. I have followed *Hooker f.*, in considering *Pogostemon heynianus* Benth., identical with *P. patchouli* Pellet., but the former name being the earlier is retained. In consideration of the fact that *Hooker f.* states "perhaps only a var. of *P. parviflorus*", it seems probable that the plant recorded from Luzon by *F.-Villar*, l. c., as *Pogostemon parviflorus* Benth., was only a form of *P. heynianus.* I have not seen the species cultivated in the Philippines and the specimens collected on Mount Arayat were growing on steep forested slopes at an altitude of about 400 m., remote from any dwelling or settled region, while *Ahern's collector* informs me that the Montalban specimens were from open forests.

British India to the Malayan Peninsula, Sumatra and Borneo.

ACANTHACEÆ.

THUNBERGIA Linn. f.

Thunbergia alata Boj. in Hook. Exotic Fl. (1823–27) *t. 177;* Nees in DC. Prodr. 11 (1857) 58; Clarke in Hook. f. Fl. Brit. Ind. 4 (1884) 391.

Luzon, Manila (14 *Merrill*) April, 1902, in waste places; Province of Bataan, Lamao River (B. S. 1612 *Foxworthy*) October, 1906.

A native of tropical Africa, now widely distributed in the tropics of both hemispheres.

The species has apparently been distributed by cultivation as an ornamental plant, and undoubtedly was so introduced into the Philippines, although I have not seen specimens in cultivation in the Archipelago, where it is perfectly spontaneous, although not common. It has not previously been reported from the Philippines.

RUBIACEÆ.

PETUNGA DC.

Petunga racemosa (Roxb.) K. Sch. in Engl. und Prantl. Nat. Pflanzenfam. 4^4 (1891) 80. *Randia racemosa* Roxb. Hort. Beng. (1814) 15: Fl. Ind. 1, (1820) 144. *Petunga roxburghii* DC. Prodr. 4 (1830) 399; Hook. f. Fl. Brit. Ind. 3 (1880) 120; King & Gamble in Journ. As. Soc. Beng. 72^2 (1903) 223.

Balabac (B. S. 447 *Mangubat*) March, 1906, a shrub in forests, no representative of the genus having previously been reported from the Philippines. An Indo-Malayan type.

Northern India to Burmah, Malayan Peninsula, Java, Sumatra and Borneo.

RANDIA Linn.

Randia auriculata (Wall.) K. Sch. in Engl. und Prantl. Nat. Pflanzenfam. 4[3] (1891) 75; King & Gamble in Journ. As. Soc. Beng. 72[2] (1903) 207. *Webera auriculata* Wall. in Roxb. Fl. Ind. ed Carey & Wall. 2: 537. *Stylocoryna auriculata* Wall. Cat. (1828) No. 8402. *Cupia auriculata* DC. Prodr. 4 (1830) 394. *Pseudixora ? auriculata* Miq. Fl. Ind. Bat. 2 (1856) 210. *Anomanthodia auriculata* Hook. f. in Benth. et Hook. f. Gen. Pl. 2: 87; Fl. Brit. Ind. 3 (1880) 108. *Randia corymbosa* Boerl. in Koord. & Val. Bijd. Boomsoort. Java 8 (1902) 88, non Wight. & Arn.

Negros, Gimagaan River (B. F. 4265 *Everett*); (1624 *Whitford*) May, 1906. A Malayan type, new to the Philippines.

Malayan Peninsula and Archipelago.

BIKKIA Reinw.

Bikkia grandiflora Reinw. in Blume Bijdr. (1826) 1017; Miq. Fl. Ind. Bat. 2 (1856) 156; K. Sch. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 549.

Sibutu (Sulu Archipelago) (5297 *Merrill*) October 13, 1906. In thickets on rocky seashores, the genus new to the Philippines, an eastern Malayan and Polynesian type.

Eastern Malaya to New Guinea and Polynesia.

IXORA Linn.

Ixora congesta Roxb. Fl. Ind. 1 (1820) 76; DC. Prodr. 4 (1830) 486; Hook. f. Fl. Brit. Ind. 3 (1880) 146; King and Gamble in Journ. As. Soc. Beng. 73[2] (1904) 76. *Pavetta congesta* Miq. Fl. Ind. Bat. 2 (1856) 76.

Mindanao, Lake Lanao, Camp Keithley (237 Mrs. *Clemens*) February, April and May, 1906; Mount Malindang (B. F. 4757 *Mearns & Hutchison*) May, 1906. An Indo-Malayan type new to the Philippines.

Burma through the Malayan Peninsula to the Malayan Archipelago.

GOODENIACEÆ.

SCAEVOLA Linn.

Scaevola minahassæ Koord. in Meded. 's Lands Plant. 19 (1898) 513, 628.

Mindanao, Lake Lanao, Camp Keithley (690 Mrs. *Clemens*) September–October, 1906.

North-east Celebes.

I have made the above identification entirely from *Koorders'* rather short description which applies closely to our specimens. According to Mrs. *Clemens's* notes, the plant is a vine 30 to 40 feet in height, while *Koorders* describes the species as a shrub 1.5 to 2 m. high, the inference being, from his statement "frutex 1½–2 m. alta", that the plant is erect, but on page 513 he speaks of it as a scandent shrub.

The first species of the section *Enantiophyllum* to be found in the Philippines, a second apparently undescribed species being found also in Jolo which is described below.

Scaevola dajoensis Merrill n. sp. § *Enantiophyllum*.

Herbacea, scandens, ramulis foliisque oppositis, axillis barbatis; foliis ovato-lanceolatis vel oblongo-lanceolatis, acuminatis, basi acutis, margine irregulariter subrepando glanduloso-dentatis; cymae axillares, pauciflorae; corolla flava, 13 mm. longa.

A scandent herbaceous plant reaching a height of 5 m. Branches terete, glabrous, slender. Leaves opposite, membranous, glabrous or somewhat pubescent along the midrib beneath, ovate-lanceolate to oblong-lanceolate, the base acute, the apex long slender acuminate, the margins irregularly rather coarsely subrepand glandular-dentate, 6 to 9 cm. long, 2 to 3 cm. wide; nerves 6 to 7 on each side of the midrib, not prominent; petioles 2 to 5 mm. long, bearded in the axils. Cymes axillary, few-flowered, the peduncles 1.5 cm. long or less, pubescent. Calyx about 5.5 mm. long, the tube slightly hirsute, narrowly ovoid, 2.5 mm. long, the lobes lanceolate, 3 mm. long, persistent. Corolla yellow, 13 mm. long, slightly hirsute outside, densely so within, the lobes 5 to 6 mm. long, hyaline margined. Stamens glabrous. Style glabrous; stigma ciliate-fringed. Fruit fleshy, ovoid, dark-purple, about 8 mm. long.

Jolo, Mount Dajo (5324 *Merrill*) October 11, 1906, scandent in thickets on exposed ridges at an altitude of 650 m., in the Moro stronghold on Mount Dajo which was reduced by the American troops in March, 1906.

Apparently most closely related to *Scaevola minahassæ* Koord., from Celebes and Mindanao, differing from that species in being more glabrous and with larger leaves which are acute at the base and not pubescent beneath.

COMPOSITÆ.

BLUMEA DC.

Blumea sericans Hook. f. Fl. Brit. Ind. **3** (1881) 262; Forbes & Hemsl. Journ. Linn. Soc. Bot. **23** (1888) 422.

Mindanao, Lake Lanao, Camp Keithley (894 Mrs. *Clemens*) January, 1907, common in open grass lands; not previously recorded from the Philippines.

Chittagong, Burma and Martaban to southern China and Formosa.

ADDITIONAL IDENTIFICATIONS OF THE SPECIES DESCRIBED IN BLANCO'S "FLORA DE FILIPINAS."

By Elmer D. Merrill.

(*From the botanical section, Biological Laboratory, Bureau of Science, Manila, P. I.*)

In April, 1905, I published a work entitled "A Review of the Identifications of the Species Described in Blanco's Flora de Filipinas"[1] in which an attempt was made to correlate the species considered by *Blanco* in the different editions of his "Flora de Filipinas," and to summarize what was known regarding them, indicating those that were referable to known and previously described species, those that were apparently valid and those that were unknown or doubtful. Since the publication of that paper, one of the objects of which was to serve as a guide in the collection of material and data that might serve to clear up doubtful points in *Blanco's* work, extensive collections have been made and our knowledge of the Philippine flora has been greatly extended, while from time to time certain points regarding *Blanco's* work have been cleared up. Accordingly it is proposed occasionally to publish notes regarding *Blanco's* species, as the data available seems to warrant such action.

In the preparation of the previous work too much dependence was placed on the work of *Fernandez-Villar,* and his identifications of some of *Blanco's* species were then accepted which have since been found to have been erroneous. Doubtless in the future as various groups are carefully monographed, numerous changes will have to be made in his identifications that were previously accepted by me.

Through the kindness of Dr. *C. B. Robinson,* of the New York Botanical Garden, I have received copies of two papers in which references are made to previous attempts at clearing up *Blanco's* species, which seem to have been overlooked by most, if not all, recent investigators of Philippine botany. The first paper is that of *Walpers,* a summary of the first edition of Blanco's "Flora de Filipinas" published in *Linnæa* (1842), vol. **16**, Litteratur-Bericht, pages 1 to 68, in which the first

[1] *Publications of the Bureau of Government Laboratories,* Manila (1905) No. **27.**

447 species described by *Blanco* are enumerated, with Latin translations of the species that *Blanco* described as new, and accepting those that *Blanco* ascribed to other authors without question. The paper is of little value and adds but very little to our actual knowledge of *Blanco's* species. The next paper is by Hasskarl, published in Flora, vol. **47** (1864), pages 17–23, 49–59; this was intended to be a critical review of the first edition of *Blanco's* work, but was apparently discontinued after the first thirty-three species described by *Blanco* were considered. Latin translations of *Blanco's* descriptions are given and some critical notes, while some new names appear, most of which must fall as synonyms. Still another reference supplied me by Dr. *Robinson,* is a review of *Blanco's* "Flora de Filipinas" by *George Tradescant Lay* in the Chinese Repository **7**: 422–437, 1838. Of this I have seen no copy, but Dr. *Robinson* informs me that it is of no scientific importance, data regarding about 15 species only being abstracted, with additions from the author's observations.

In the following paper notes on a number of *Blanco's* species are included, the arrangement following my previous publication,[2] the page references following the family names referring to that paper.

MAGNOLIACEÆ (p. 15).

Kadsura blancoi Azaola is excluded from the *Magnoliaceæ* and referred to *Phytocrene* (p. 423).

ANONACEÆ (p. 16).

Uvaria lanotan Blanco, ed. 1, 464. **Unona latifolia** Blanco, ed. 2, 324= *Mitrephora lanotan* (Blanco) Merr. in Govt. Lab. Publ. **35** (1905) 71, with description, synonomy and citation of specimens.

NYMPHEACEÆ (p. 17).

Nymphæa lotus Blanco, ed. 1, 456; ed. 2, 317; ed. 3, **2** (1878) 222; F.-Vill. Nov. App. (1880) 9, non Linn.

Following Conard[3] true *Nymphæa lotus* is found in Africa and Madagascar only, while the Asiatic-Malayan-Australian form treated by various authors as *N. lotus* is *N. pubescens* Willd., which name should be accepted for the Philippine plant.

PITTOSPORACEÆ (p. 18).

Bursaria inermis Blanco, ed. 2, 124; ed. 3, **1**: 122, previously considered, after *F.-Villar,* to be probably identical with *Pittosporum ferrugineum* Ait., is more probably identical with *Pittosporum pentadynum* (Blanco) Merr. The species was really described by *Azaola* and not by *Blanco,* according to the latter's statement. See *Merrill* in Govt. Lab. Publ. **35** (1905) 18.

[2] *Ibid.*

[3] *Carnegie Inst. Pub.* (1905) No. 4, 198.

ELATINACEÆ (p. 19).

Bergia serrata Blanco Fl. Filip., ed. 1 (1837) 387. *Spergula serrata* Blanco l. c., ed. 2 (1845) 271; ed. 3, 2: 140. *Bergia glandulosa* Turcz. in Bull. Soc. Nat. Mosc. 27 [2] (1854) 371; Rolfe in Journ. Bot. 23 (1885) 210; Vid. Phan. Cuming. Philip. (1885) 95; Rev. Pl. Vasc. Filip. (1886) 51. Mats. and Hayata. Enum. Pl. Formosa. (1906) 40. *Bergia verticillata* F.-Vill. Nov. App. (1880) 15, non Willd.

Luzon, without locality (1058 *Cuming*), duplicate type of *Bergia glandulosa* Turcz; (138 *R. Marave*) 1894–95. Manila (Normal School Students) 1904; Province of Ilocos Norte (B. S. 2304 *Mearns*) January, 1907; Province of Zambales, Subic (*Hallier*) December, 1903; Province of Rizal, Bosoboso (B. S. 2058 *Ramos*) February, 1907.

In my treatment of *Blanco's* species I followed *F.-Villar* in considering this species the same as *Bergia verticillata* Willd. From the description, however, it can not be *Willdenow's* species, but I can not distinguish it from *Bergia glandulosa* Turcz., and *Blanco's* name being the earlier is here retained. The species, so far as is known, is confined to Luzon and Formosa.

GERANIACEÆ (p. 26).

Oxalis acetosella Blanco ed. 1, 388; ed. 2, 272, non Linn.

Following *B. L. Robinson* [4] *Oxalis corniculata* Linn., to which *Blanco's* species has been reduced, is confined to Europe and the eastern United States, while the widely distributed form found in southern Europe, the southern United States and in subtropical and tropical regions of both hemispheres is a distinct species, *Oxalis repens* Thunb. Oxal. (1781) 16. In case Robinson's distinctions hold good, this name should be applied to the common Philippine form of Oxalis.

RUTACEÆ (p. 27).

Fagara octandra Blanco ed. 1, 67; ed. 2, 48, non Linn. = *Melicope luzonensis* Engl. in Perk. Frag. Fl. Philip. (1905) 161. See *Merrill* in Govt. Lab. Publ. 35 (1905) 24.

Limonia linearis Blanco, ed. 1, 357; **Limonia monophylla** Blanco, ed. 2, 252, non Linn.=*Atalantia linearis* (Blanco) Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 200 ! A characteristic endemic species.

Cookia anisum-olens Blanco, ed. 1, 359; **Cookia anisodora** Blanco ed. 2, 253. This is a *Clausena* as indicated by the author in Govt. Lab. Publ. 17 (1904) 21, and later described by *Perkins* as *Clausena warburgii*, Frag. Fl. Philip. (1905) 162. There is no doubt whatever as to the identity of the material cited with *Blanco's* species. In case of objection to *Blanco's* poorly constructed specific name, his second specific name, *anisodora*, still has priority over *Perkin's* name.

SIMARUBACEÆ (p. 29).

Ailanthus pongelion Blanco ed. 1, 380; ed. 2, 268, non Gmel., is not *A. malabarica*, DC., as determined by *F.-Villar*, but is a distinct species, *A. philippinensis* Merr. in Govt. Lab. Publ. 35 (1905) 25, with synonomy, description and citation of specimens.

[4] *Journ. Bot.* 44, (1906) 391.

BURSERACEÆ (p. 30).

Guiacum abilo Blanco ed. 1, 30; *Icica abilo* Blanco ed. 2, 256=*Garuga abilo* (Blanco) Merr. in Govt. Lab. Publ. **35** (1905) 73 ! *G. mollis* Turcz., is a synonym, and *G. floribunda* Decne., ex descr., a quite different species.

CHAILLETIACEÆ (p. 32).

Riana tricapsularis Blanco ed. 1, 850; ed. 2, 126=*Diehapetalum tricapsulare* (Blanco) Merr. in Govt. Lab. Publ. **35** (1895) 35. Apparently a very distinct endemic species.

OLACINEÆ (*Icacinaceæ*).

PHYTOCRENE Wall.

Phytocrene blancoi (Azaola) *Kadsura blancoi* Azaola in Blanco Fl. Filip. ed. 2 (1845) 594; ed. 3, **3** (1879) 118; Merr. in Govt. Lab. Publ. **27** (1905) 15. *Schizandra elongata* F.-Vill. Nov. App. (1880) 4, non Hook. f. et Th. *Phytocrene luzoniensis* H. Baill, in Adansonia **10** (1872) 28, et in DC. Prodr. **17** (1873) 10. *Gynocephalum luzoniense* Llanos ex Baill. ll. cc. as syn.

LUZON, Province of Rizal (1661 *Merrill*) March, 1903; 2439 *Ahern's collector*) January, 1905: Province of Laguna (*Alberto*) May, 1905.

MINDANAO, Lake Lanao, Camp, Keithley (447 Mrs. *Clemens*) March, 1906.

In my treatment of Blanco's species[5] I considered *Kadsura blancoi* as a doubtful species, following *F.-Villar* in treating it as a *Magnoliaceous* plant. However, a careful examination of *Blanco's* description shows that the plant can not be a *Kadsura* or a *Schizandra*. The description is very imperfect, but from the gross characters and the fruit description the species can belong to no other genus than *Phytocrene* "fruto en una cabezuela ó capítulo que contiene más de setenta frutos, de tres lados, á manera de los del plátano, musa, apiñados ó reunidos sobre un receptáculo que pesaba 25 á 30 libras." In the one specimen that I have seen in fruit, the heads weighed about 15 pounds. The locality from which the material came, on which the description of *Kadsura blancoi* was based, is not given, but the specimens undoubtedly came from one of the provinces near Manila, Rizal, Laguna or Bulacan. After a careful consideration of the matter I do not hesitate to refer the species to *Phytocrene*, adopting *Azaola's* name as the earliest one for it and reducing to it *Phytocrene luzoniensis* H. Baill.

A second species of the genus, perhaps *Phytocrene macrophylla* Blume, is represented by material collected near Davao, Mindanao (Nos. 2765, 2995 *Williams*).

AMPELIDACEÆ (p. 33).

Cissus pedata Blanco, ed. 1, 71; ed. 2, 52, non Lam=*Tetrastigma lanceolarium* (Roxb.) Planch. ! *Blanco's* description is entirely too short and imperfect to warrant the above identification from the description alone, but the Tagalog name *Ayo*, cited by him, is almost universally and quite consistently applied to *Planchon's* species which is common in the Philippines.

[5] *Publications of the Bureau of Government Laboratories*, Manila, (1905), No. 27, 15.

LEGUMINOSÆ (p. 37).

Cylista piscatoria Blanco, ed. 1, 589; **Galactia ? terminiflora** Blanco ed. 2, 411, previously considered by the author to be a distinct species of *Millettia*. *M. piscatoria* (Blanco) Merr. is certainly identical with *Derris elliptica* (Wall.) Benth., a species widely distributed from Martaban to the Malayan Peninsula and Archipelago. (See *Merrill* in Philip. Journ. Sci. 1 (1906) Suppl. 66.)

Cytisus quinquepetalus Blanco ed. 1, 598; ed. 2, 581. Following *F.-Villar* this was considered to be the same as *Desmodium cephalotes* Wall., but on securing specimens it was found to be quite distinct from *Wallich's* species and to represent a distinct species of *Desmodium*, *D. quinquepetalum* (Blanco) Merr. in Govt. Lab. Publ. 35 (1905) 20.

Negretia mitis Blanco ed. 1, 588; ed. 2, 410, non Beauv., has been considered by the author as *Mucuna lyonii* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 197. However the validity of the latter species seems doubtful, and it may prove only a form of *Mucuna nivea* DC., to which *Blanco's* species was reduced by *F.-Villar*.

Mimosa membranulacea Blanco ed. 1, 739; **Reichardia pentapetala** Blanco, ed. 2, 233. This was considered to be the same as *Pterolobium indicum* A. Rich., after *F.-Villar*, but was later considered by the author to represent a distinct species. *Pterolobium membranulaceum* (Blanco) Merr., in Govt. Lab. Publ. 35 (1905) 22, where the species is redescribed.

Bauhinia grandiflora Blanco, ed. 1, 332; ed. 2, 231, non Juss. This is apparently identical with *Bauhinia acuminata* Linn., and not at all *B. variegata* Linn., to which *F.-Villar* reduced it. *B. acuminata* Linn., seems to be widely distributed in Luzon but is nowhere abundant.

MYRTACEÆ (p. 45).

Metrosideros pictapetala Blanco, ed. 2, 295. This species was described by Blanco in the first edition under the name *Legnotis lanceolata*, p. 445, as pointed out to me by Dr. *C. B. Robinson* in lit. *F.-Villar* failed to connect *Legnotis* of the first edition with *Metrosideros* of the second edition, and made no attempt to reduce the former. I have as yet not succeeded in connecting *Blanco's* species with any known one.

Eugenia lobas Blanco ed. 1, 857; **Eugenia cauliflora** Blanco ed. 2, 291. Considered by the author to represent a distinct species and redescribed under the former name in Govt. Lab. Publ. 35 (1905) 48.

ONAGRACEÆ (p. 48).

Balingayum is excluded from this family and referred to *Calogyne* (*Goodeniaceæ*) which see (p. 434).

ARALIACEÆ (p. 51).

Nauclea digitata Blanco, ed. 2, 102=*Schefflera blancoi* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 109.

RUBIACEÆ (p. 52).

Remijia odorata Blanco ed. 2, 115. I am now of the opinion that *F.-Villar* was correct in referring this species to the widely distributed *Randia densiflora* (Wall.) Benth.

Serissa pinnata Blanco, ed. 1, 163: **Remijia oscura** Blanco, ed. 2, 116 Previously referred by me to *Gardenia* as a distinct species, *G. pinnata* (Blanco) Merr. The species is, however, identical with *Hypobatherum glomeratum* (Bartl.) K. Schum. as pointed out by *K. Schumann* in Engl. und Prantl Nat. Pflanzenfam. IV. 4 (1891) 156, the synonomy being as follows: **Hypobatherum glomeratum** (Bartl.) K. Sch. in Engl. und Prantl Nat. Pflanzenfam. IV. 4 (1891) 156; Elmer Leaflets Philip. Bot. 1 (1906) 8. *Platymerium glomeratum* Bartl. in DC. Prodr. 4 (1830) 619; Miq. Fl. Ind. Bat. 2 (1856) 200; F.-Vill. Nov. App. (1883) 113. *Serissa pinnata* Blanco Fl. Filip., ed. 1 (1837) 163. *Remijia oscura* Blanco l. c. ed. 2 (1845) 116; ed. 3, 1 (1877) 207. *Randia obscura* F.-Vill. Nov. App. (1883) 108; Vid. Sinopsis Atlas (1883) 29. *t. 57 f. B. Gardenia pinnata* Merr. in Govt. Lab. Publ. 27 (1905) 53. *Gardenia obscura* Vid. Phan. Cuming. Philip. (1885) 119; Rev. Pl. Vasc. Filip. (1886) 153; Ceron. Cat. Pl. Herb. (1892) 95; Merr. in Forestry Bureau Bull. 1 (1903) 54.

Pavetta membrenacea Blanco ed. 1, 59; **Pavetta sambucina** Blanco, ed. 2, 41, non DC. Erroneously reduced by *F.-Villar* to *Pavetta angustifolia* R. et S. A distinct species represented by No. 1584 *Merrill;* Nos. B. S. 996, 1834 *Ramos;* Nos. 1862, 3309 *Ahern's collector. Pavetta manillensis* Walp. (1843) is a synonym. *Blanco's* name *P. membrenacea* (1837) being the first published for the species.

Coffea volubilis Blanco, ed. 1, 157; ed. 2, 111 = *Morinda volubilis* (Blanco) Merr. Philip. Journ. Sci. 1 (1906) Suppl. 137, with description.

GOODENIACEÆ (p. 56).

Balingayum decumbens Blanco ed. 1, 187; ed. 2, 132 = *Calogyne pilosa* R. Br., or a closely related species, see *Merrill* Govt. Lab. Publ. 35 (1906) pp. 66–68, for a discussion of this previously doubtful genus, which was considered by *Bentham* and *Hooker* as belonging in the *Olacaceæ* and by *F.-Villar* as belonging in the *Onagraceæ*.

SAPOTACEÆ (p. 57).

Sideroxylon duclitan Blanco ed. 1, 129; ed. 2, 92. *Sideroxylon ramiflorum* Merr. in Govt. Lab. Publ. 17 (1904) 43, should be reduced to *Blanco's* species.

OLEACEÆ (p. 57).

Mogorium aculeatum Blanco ed. 1, 9; ed. 2, 7 = **Jasminum aculeatum** (Blanco) Walp. in Linnaea 16 Litt.-Bericht 3, 12, Hassk. in Flora 47 (1864) 50; Merr. in Govt. Lab. Publ. 35 (1905) 76. The transfer of the specific name to *Jasminum* was first made by *Walpers* fide *Hasskarl*. The combination is not given in Index Kewensis. A full description of the species with synonomy is given by *Merrill* l. c.

APOCYNACEÆ (p. 58).

Echites repens Blanco ed. 1, 109 non Jacq.; **Echites procumbens** Blanco ed. 2, 78 = *Aganosma marginata* G. Don. (*Holarrhena procumbens* (Blanco) Merr., *H. macrocarpa* F.-Vill.)

Echites spiralis Blanco ed. 1, 110; ed. 2, 79, non Wall. = *Parsonsia confusa* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 118. *P. rheedii* F.-Vill, non *Heligme rheedii* Wight.

CONVOLVULACEÆ (p. 62).

Convolvulus dentatus Blanco ed. 1, 89; ed. 2, 66, non Vahl.=*Ipomoea triloba* Linn. (*I. blancoi* Choisy). Dr. *C. B. Robinson*, in lit., states that he is of the opinion that *Blanco's* species is identical with *Ipomoea triloba* Linn., and I can not but agree with him after a careful examination of the various descriptions and the tropical American material of the Linnean species in our herbarium.

ACANTHACEÆ (p. 66).

Antirrhinum molle Blanco ed. 1, 503; ed. 2, 353 non Linn. = *Hygrophila phlomoides* var. *roxburgii* Hook. f.!

VERBENACEÆ (p. 67).

Premna serratifolia Blanco, ed. 2, 342, non Linn. = *Premna odorata* Blanco, see Merrill in Philip. Journ. Sci. 1 (1906) Suppl. 232.

Premna cordata Blanco ed. 1, 489; non R. Br. *Premna tomentosa* Blanco ed. 2, 342, non Wall.=*Premna cumingiana* Schauer, see Merrill l. c. 230.

EUPHORBIACEÆ (p. 75).

Phyllanthus niruri Blanco ed. 1, 690, non Linn.; **Phyllanthus tetrander** Blanco ed. 2, 480, non Roxb.=*Phyllanthus blancoanus* Muell. Arg., *Mueller's* species being based entirely on *Blanco's description*. To this species I have referred various specimens in Philip. Journ. Sci. 1 (1906) Suppl. 74.

MORACEÆ (p. 78).

Ficus payapa Blanco ed. 1, 683; ed. 2, 475. *Blanco's* description is quite too short and indefinite from which to determine this species. Material received under the Tagalog name *Payapa* seems to be referable to *Ficus forstenii* Miq. See Merrill in Philip. Journ. Sci. 1 (1906) Suppl. 47.

Ficus laccifera Blanco, ed. 1, 673; ed. 2, 468, non Roxb. Material received from the Visayan Islands under the Visayan name *lagnob* cited by *Blanco* for this species is identical with *Ficus hauili* Blanco, known to the Tagalogs as *hauili*, which in turn is perhaps not distinct from *F. leucantotoma* Poir.

SCITAMINEÆ (p. 83).

Costus nigricans Blanco ed. 1, 3; ed. 2, 3,=*Curcuma zeodaria* (Berg.) Rosc.! (See Merril in Philip. Journ. Sci. 1 (1906) Suppl. 36.

DIOSCOREACEÆ (p. 86).

Dioscorea divaricata Blanco ed. 1, 797; ed. 2, 550. Apparently a distinct species; see Merrill in Philip. Journ. Sci. 1 (1906) Suppl. 35.

LILIACEÆ (p. 87).

Smilax latifolia Blanco ed. 2, 548, non R. Br. = *Smilax vicaria* Kth.! Apparently a distinct species; see Merrill in Philip. Journ. Sci. 1 (1906) Suppl. 35.

PANDANACEÆ (p. 89).

Pandanus gracilis Blanco ed. 1, 778; ed. 2, 536. The species recently described by the author, *Pandanus whitfordii* Merr. in Govt. Lab. Publ. 17 (1904) 8, may prove to be identical with *Blanco's* species although it does not agree in habit with the form described by *Blanco*.

Pandanus exaltatus Blanco ed. 1, 778; ed. 2, 536. Manifestly two species are included in the description. The mountain form is doubtless the one I have described as *Pandanus arayatensis*, and I have identified as *Blanco's* species a coast form from Semerara Island.

Pandanus radicans Blanco ed. 1, 780; ed. 2, 537. This is not the same as *P. dubius* Spreng., but apparently a valid species as redescribed by Elmer, Leaflets Philip. Bot. (1906) 74.

GRAMINEÆ (p. 91).

Paspalum villosum Blanco ed. 1, 40; ed. 2, 28, non Thunb. I am now of the opinion that this is a form of *Paspalum scrobiculatum* Linn.

Andropogon ramosus Blanco, ed. 1, 37; ed. 2, 25, non Forsk. = *Ischaemum rugosum* var. *distachyum* (Cav.) Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 330.

Cenchrus hexaflorus Blanco ed. 1, 36; ed. 2, 24. This was previously reduced by me to *Pennisetum macrostachyum* Brongn., but I am now of the opinion that it is the same as *Pennisetum compressum* R. Br.

Andropogon schoenanthus Linn,, Blanco ed. 1, 39; ed 2, 27. I have considered (Philip. Journ. Sci. 1 (1906) Suppl. 339) that *Blanco* described the *Linnean* species, but it is impossible to be quite sure of this until flowering specimens are received.

PREVIOUS PUBLICATIONS OF THE BUREAU OF GOVERNMENT LABORATORIES—Concluded.

(Concluded from second page of cover.)

No. 32, 1905.—*Biological Laboratory:* I. Intestinal Hæmorrhage as a Fatal Complication in Amœbic Dysentery and Its Association with Liver Abscess. By Richard P. Strong, M. D. II. The Action of Various Chemical Substances upon Cultures of Amœbæ. By J. B. Thomas, M. D., Baguio, Benguet. *Biological and Serum Laboratories:* III. The Pathology of Intestinal Amœbiasis. By Paul G. Woolley, M. D., and W. E. Musgrave, M. D.

No. 33, 1905, Biological Laboratory.—Further Observations on Fibrin Thrombosis in the Glomerular and in Other Renal Vessels in Bubonic Plague. By Maximilian Herzog, M. D.

No. 34, 1905.—I. Birds from Mindoro and Small Adjacent Islands. II. Notes on Three Rare Luzon Birds. By Richard C. McGregor.

No. 35, 1905.—I. New or Noteworthy Philippine Plants, IV. II. Notes on Cuming's Philippine Plants in the Herbarium of the Bureau of Government Laboratories. III. Hackel, "Notes on Philippine Grasses." IV. Ridley, "Scitimineæ Philippinenses." V. Clarke, "Philippine Acanthaceæ." By Elmer D. Merrill, Botanist.

No. 36, 1905.—A Hand-List of the Birds of the Philippine Islands. By Richard C. McGregor and Dean C. Worcester.

The previous publications of the Bureau were given out as bulletins in serial number pertaining to the entire Bureau. These publications, if they are desired, can be obtained by applying to the librarian of the Bureau of Science, Manila, P. I., or to the Director of the Bureau of Science, Manila, P. I. Correspondents will confer a favor by returning to the Bureau any previous publications which they may have in duplicate, as a number of bulletins are now out of print.

LIST OF PREVIOUS PUBLICATIONS OF THE MINING BUREAU (NOW DIVISION OF MINES OF THE BUREAU OF SCIENCE).

1890.—Descripción física, geológica y minera en bosquejo de la Isla de Panay por D. Enrique Abella y Casariego, Inspector General de Minas del Archipiélago.

1890.—Memoria descriptiva de los manantiales minero-medicinales de la Isla de Luzon, estudiados por la comisión compuesta de los Señores D. José Centano, Ingeniero de Minas y Vocal Presidente, D. Anacleto del Rosario y Sales, Vocal Farmacéutico, y D. José de Vera y Gómez, Vocal Médico.

1893.—Estudio Descriptivo de algunas manantiales minerales de Filipinas ejecutado por la comisión formada por D. Enrique Abella y Casariego, Inspector General de Minas, D. José de Vera y Gómez, Médico, y D. Anacleto del Rosario y Sales, Farmacéutico; precidido de un prólogo escrito por el Excmo. Sr. D. Angel de Avilés, Director General de Administración Civil.

1893.—Terremotos experimentados en la Isla de Luzón durante los meses de Marzo y Abril de 1892, especialmente desastrosos en Pangasinán, Unión y Benguet. Estudio ejecutado por D. Enrique Abella y Casariego, Inspector General de Minas del Archipiélago.

1901.—The Coal Measures of the Philippines. Charles H. Burritt.

1902.—Abstract of the Mining Laws (in force in the Philippines, 1902). Charles H. Burritt.

1902, Bulletin No. 1.—Platinum and Associated Rare Metals in Placer Formations. H. D. McCaskey, B. S.

1903.—Report of the Chief of the Mining Bureau of the Philippine Islands. Charles H. Burritt.

1903, Bulletin No. 2.—Complete List of Spanish Mining Claims Recorded in the Mining Bureau. Charles H. Burritt.

1903, Bulletin No. 3.—Report on a Geological Reconnoissance of the Iron Region of Angat, Bulacan. H. D. McCaskey, B. S.

1904.—Fifth Annual Report of the Mining Bureau. H. D. McCaskey.

1905.—Sixth Annual Report of the Chief of the Mining Bureau. H. D. McCaskey.

1905, Bulletin No. 4.—A Preliminary Reconnoissance of the Mancayan-Suyoc Mineral Region, Lepanto, P. I. A. J. Eveland, Geologist.

1905, Bulletin No. 5.—The Coal Deposits of Batan Island. Warren D. Smith, B. S., M. A., Geologist.

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Vol. IV, Part 1.—Studies in Moro History, Law, and Religion, by Najeeb M. Saleeby. Paper, ₱0.75; half Morocco, ₱3.25.

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[1] The first four bulletins in the ornithological series were published by The Ethnological Survey under the title "Bulletins of the Philippine Museum." The other ornithological publications of the Government appeared as publications of the Bureau of Government Laboratories.

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THE PHILIPPINE PLANTS COLLECTED BY THE WILKES UNITED STATES EXPLORING EXPEDITION

By Elmer D. Merrill

(From the botanical section of the Biological Laboratory, Bureau of Science)

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No. 2, 1902, Chemical Laboratory.—The Preparation of Benzoyl-Acetyl Peroxide and Its Use as an Intestinal Antiseptic in Cholera and Dysentery. Preliminary Notes. By Paul C. Freer, M. D., Ph. D.

No. 3, 1903, Biological Laboratory.—A Preliminary Report on Trypanosomiasis of Horses in the Philippine Islands. By W. E. Musgrave, M. D., and Norman E. Williamson.

No. 4, 1903, Serum Laboratory.—Preliminary Report on the Study of Cattle and Carabaos in the Philippine Islands. By James W. Jobling, M. D.

No. 5, 1903, Biological Laboratory.—Trypanosoma and Trypanosomiasis, with Special Reference to Surra in the Philippine Islands. By W. E. Musgrave, M. D., and Moses T. Clegg.

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No. 10, 1903, Biological Laboratory.—Two Cases of a Peculiar Form of Hand Infection (Due to an Organism Resembling the Koch-Weeks Bacillus). By John R. McDill, M. D., and Wm. B. Wherry, M. D.

No. 11, 1903, Biological Laboratory.—Entomological Division, Bulletin No. 1: Preliminary Bulletin on Insects of the Cacao. (Prepared Especially for the Benefit of Farmers.) By Charles S. Banks, Entomologist.

No. 12, 1903, Biological Laboratory.—Report on Some Pulmonary Lesions Produced by the Bacillus of Hæmorrhagic Septicæmia of Carabaos. By Paul G. Woolley, M. D.

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No. 20, 1904.—Biological Laboratory: I. Does Latent or Dormant Plague Exist Where the Disease is Endemic? By Maximilian Herzog, M. D., and Charles B. Hare. *Serum Laboratory:* II. Broncho-Pneumonia of Cattle: Its Association with B. Bovisepticus. By Paul G. Woolley, M. D., and Walter Sorrell, D. V. S. III. Pinto (Paño Blanco). By Paul G. Woolley, M. D. *Chemical Laboratory:* IV. Notes on Analysis of the Water from the Manila Water Supply. By Charles L. Bliss, M. S. *Serum Laboratory:* V. Frambœsia: Its Occurrence in Natives in the Philippine Islands. By Paul G. Woolley, M. D.

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No. 31, 1905, Biological Laboratory.—I. Notes on a Case of Hæmatochyluria (Together with Some Observations on the Morphology of the Embryo Nematode, Filaria Nocturna). By William B. Wherry, M. D., and John R. McDill, M. D., Manila, P. I. II. A Search Into the Nitrate and Nitrite Content of Witte's "Peptone," with Special Reference to Its Influence on the Demonstration of the Indol and Cholera-Red Reactions. By William B. Wherry, M. D.

(Concluded on third page of cover.)

THE PHILIPPINE PLANTS COLLECTED BY THE WILKES UNITED STATES EXPLORING EXPEDITION.

By Elmer D. Merrill.

(From the Botanical Section, Biological Laboratory, Bureau of Science, Manila, P. I.)

Volumes 15, 16, and 17 of the reports of the Wilkes United States Exploring Expedition deal with botany, the two first published in 1854 and the last from 1859 to 1874. The first of these by Asa Gray, entitled "Botany, Phanerogamia, Vol. 1" (volume 15 of the whole), consisting of 717 pages of text, quarto, and a folio atlas of 100 plates, and considering the flowering plants from *Ranunculaceæ* to *Loranthaceæ*, is the one treated of in detail in the following paper, although in this introduction it has been considered advisable to include some notice of the other two volumes dealing with the vascular and cellular cryptogams, so far as they apply to the Philippines.

Volume 16, entitled "Botany, Cryptogamia, Filices including Lycopodiaceae and Hydropterides," by William D. Brackenridge, was published in 1854, consisting of VIII + 357 pages, quarto, and a folio atlas of 46 plates. In this work seventy-seven species of Philippine ferns are enumerated, of which fifteen were described as new. Most of the specimens on which this list was based are to be found in the United States National Herbarium. From the "Letters of Asa Gray" published in 1893, some information is obtainable regarding this very rare work. On pages 404 and 405 we learn that Dr. Gray edited Brackenridge's manuscript, and read the proofs of the work, and on page 432 we further learn that "a fire in Philadelphia consumed all the edition except ten copies which has been sold mostly in Europe" and that "the Government lost a part of their small impression." As a consequence of this disaster the work is very rare, but Mr. W. R. Maxon of the United States National Herbarium informs me that partial or complete copies of the work are to be found in many of the State libraries in the United States, these presumably originating from the distribution of that part of the Government's quota which escaped the fire.

Volume 17 consists of several papers published at various times, the first few consider the vascular cryptogams, while the last by John Torrey, entitled "Phanerogamia of the Pacific Coast of North America,"

having no bearing on Philippine botany, is not discussed here. The first paper in the volume is by W. S. Sullivant, on the mosses, this being published privately in 1859, an imperial folio of 32 pages and 26 plates. Three species of Philippine mosses are included, two of them with descriptions, although diagnoses had previously appeared in the Proceedings of the American Academy 3 (1857) 181–185. In 1862, the remainder of the work treating of the vascular cryptogams was published, the second paper being an enumeration of the lichens by Edwin Tuckerman, no Philippine forms being considered. In a following paper, pages 155 to 192, J. W. Bailey and W. H. Harvey deal with the algae and diatoms, six species of the former being enumerated from the Philippines, of which one was new, and twenty-six species of the latter, of which five were new, these new species also having been previously described.[1] The last paper on cellular cryptogams is one on fungi by M. A. Curtiss and M. J. Berkeley, pages 195 to 202, in which a single Philippine species is enumerated.

One other work, although not published as a Wilkes Expedition report, which treats of the botany of the expedition, is the second part of Pickering's "Geographical Distribution of Animals and Plants," which was published in 1876. This work was prepared for the Wilkes Expedition reports, and part 1 was issued as such, part 2 being published by the author privately, after Government appropriations for printing had been withdrawn. It consists of 524 pages, ending abruptly, the remainder never having been printed. The Philippines are considered from page 491 to the end, the work ending in the middle of the enumeration of Mangsi (Philippines) plants. Here are listed approximately 500 species of Philippine plants, for the most part without specific identifications and in many cases not even determined to the family. However, from this list, it is evident that many species of plants were collected in the Philippines that were not included in other published reports, some of which appear not to be represented by extant specimens.

The Wilkes Expedition reached Manila on January 13, 1842,[2] and botanical collections were made from this date to the 20th of the month in the vicinity of the city and on a trip inland up the Pasig River and across Laguna de Bay. Messrs. Pickering and Eld proceeded to Santa Cruz and Majaijai, from the latter place ascending Mount Majaijai (Mount Banajao) on January 17, while Messrs. Rich, Dana and Brackenridge went to the town of Bay with the object of proceeding to Taal Volcano, but finding the latter trip impracticable they went to Los Baños and made a partial ascent of Mount Maquiling, being later joined

[1] *Proc. Acad. Philad.* 6 (1854) 430, 431, reprinted in *Quart. Journ. Micros. Sci.* 3 (1855) 93, 94.

[2] Pickering, Geog. Distr. Animals and Plants 2 (1876); Wilkes, Narrative 5 (1845) 272–367.

by Messrs. Pickering and Eld and then returning to Manila. Botanical collections were made by both parties. Leaving Manila, January 20, the expedition sailed southward, the next place where collecting was done being Caldera near Zamboanga, Mindanao, a portion of January 31 being spent there. From Caldera the ship proceeded to Soung (now Jolo) on the Island of Sulu or Jolo, and February 4 and 5 were spent there and on Marongas Islet, but because of the unfriendly attitude of the natives little collecting could be done except along the beach. Leaving Jolo they then proceeded across the Sulu Sea, making no stop until the Mangsee (Mangsi) Islands, two small islands between the larger ones of Balabac and Banguey, were reached, where they remained from February 8 to 12, the expedition then proceeding through Balabac Strait to Singapore.

In 1836, Asa Gray was tendered and accepted the appointment of botanist to the expedition, but in 1838, because of delays in the start, and other work claiming his attention, he resigned. In 1848, some time after its return, he was appointed to work up the reports of the flowering plants and estimated that this report would fill three volumes of text. However, only one volume of Gray's part appeared, although we learn from his letters that as late as 1858 he was still working on the manuscript of additional portions which never were published. Moreover, there are many specimens in the United States National Herbarium bearing his manuscript names of species that have not as yet been published, most, if not all of which, so far as Philippine plants are concerned, are now antedated in publication by the names of other authors. In volume 15 (Phanerogamia, vol. 1) one hundred and four species of Philippine plants are enumerated of which fifteen were described as new; these are considered in the present paper.

While I was in Washington in July and August, 1907, I had an opportunity of examining the Wilkes Expedition specimens in the United States National Herbarium, and later, search was made in the Gray Herbarium at Cambridge and in the Herbarium of Columbia University, now at the New York Botanical Garden, for specimens which could not be found at Washington. Still later, in November and December of the same year, an opportunity occurred of comparing my critical notes, sketches, photographs, etc., with various types in the herbaria of the Royal Gardens at Kew and of the British Museum. As a result of the examination of the above material it has been considered worth while to complete my notes and prepare the accompanying list for publication.

The most complete set of Wilkes Expedition plants is preserved in the United States National Herbarium at Washington, but even it lacks many specimens. Partial sets are to be found in the Gray Herbarium at Cambridge, and in the Herbarium of Columbia University, and there are a few sheets at the Royal Gardens, Kew, England. Representatives of

fourteen of the Philippine species considered by Gray, were not to be found in the United States National Herbarium, and but four of this number were found elsewhere, one, *Hemigyrosa perrottetii* Bl., being represented in the Gray Herbarium, and three, *Derris uliginosa* Benth., *Sophora tomentosa* Linn., and *Rubus rugosus* Sm., in the Columbia University Herbarium. Many of the species mentioned by Pickering, such as *Gahnia*, *Cnicus*, etc., were not found, but more careful search may reveal them in some one of the above institutions, although it seems evident that a considerable number of the Wilkes Expedition plants are no longer extant. Only ninety-six species of Wilkes Expedition Philippine flowering plants were found in the United States National Museum that were not considered by Gray, and most of these represent common and widely distributed species.

All Philippine plants collected by the Wilkes Expedition that are mentioned by Gray in his one published volume on the botany of the Wilkes Expedition are enumerated in the list given below. Where no doubt exists as to the correctness of his identification no comment is made. No attempt has been made to discuss the ferns in the present paper, and it has not been thought worth while to enumerate the species represented in the United States National Herbarium that were not considered by Gray. The present paper will serve to clear up a number of points in regard to the synonomy of Philippine species, and an examination of the authentic specimens in the light of our present knowledge of Philippine botany has enabled me to correct several errors in identification on the part of Dr. Gray.

The photographs of the four types here reproduced were supplied me by Dr. J. N. Rose, associate curator of the United States National Herbarium, and are here published with the consent of the Secretary of the Smithsonian Institution.

ANONACEÆ.

Guatteria pallida Blume ? (p. 27). "Hab. Baños, near Manilla, Luzon, a poor specimen, with young fruit, destitute of flowers, which I can only doubtfully refer to Blume's *G. pallida*, with the figure of which it pretty well accords." The specimen is *Goniothalamus elmeri* Merr., a common endemic species.

Anaxagorea luzonensis sp. nov. (p. 27). "Hab. mountains near Baños in the Island of Luzon. (Also in Cuming's Philippine collection, No. 831)." A very common and widely distributed species.

MYRISTICACEÆ.

Myristica cinerea Poir. ? (p. 35). "Hab. Caldera, Mindanao, Philippine Islands." Leaf specimens only, identical with *Myristica mindanaensis* Warb., an endemic species, known only from Mindanao.

MENISPERMACEÆ.

Cissampelos discolor DC. ? var. **cardiophylla** A. Gray (p. 38). "Hab. small island in the Sooloo Sea." Apparently only a form of *Cissampelos pareira* Linn., common throughout the Archipelago, and the Tropics generally.

CAPPARIDACEÆ.

Polanisia icosandra Wight & Arn. (p. 68). "Hab. Luzon, near Manilla."=*P. viscosa* DC. A common weed throughout the Archipelago.

Capparis aurantioides Presl (p. 70). "Hab. Philippine Islands, at Caldera, Mindanao, and the Sooloo Islands." Fragmentary specimens of a species somewhat resembling *Capparis micracantha* DC., possibly correctly identified with Presl's species.

Capparis sepiaria Linn. (p. 70). "Hab. small island of the Sooloo Sea." The common form of the species, widely distributed in the Indo-Malayan region.

Capparis cerasifolia sp. nov. (p. 71). "Small island of the Sooloo Sea, same as Cuming's No. 1068 from the Philippine Islands." This has been reduced by some authors to *Capparis horrida* Linn., but is apparently a distinct and valid species. The type is well matched by No. 658 Copeland, and Nos. 2152 and 2200 R. S. Williams, from Mindanao. It is quite distinct from No. 1068 Cuming which Gray also refers here.

Capparis odorata Blanco ? (p. 71). "Hab. vicinity of Manilla, Luzon (without flowers or fruit)." The specimen is *C. micracantha* DC., a very common species in the Philippines.

CARYOPHYLLACEÆ.

Drymaria cordata Willd. (p. 123). "Hab. . . . . Luzon, Philippine Islands: in mountains near Manilla: doubtless introduced." Rather common in the Philippines.

MALVACEÆ.

Malvastrum tricuspidatum Gray (p. 148). "Hab. . . . . Manilla, Luzon." The oldest name for the species is *M. coromandelinum* (Willd.) Garcke. A common weed.

Sida rhombifolia Linn. (p. 158). "Hab. . . . . Luzon, ... the var. with *pointless or barely mucronate carpels*." No specimens found. A widely distributed species.

Sida acuta Burm. (p. 159). "Hab. . . . shores of Laguna, Baños, Luzon." No specimens found; common and widely distributed.

Sida javensis Cav. (p. 160). "Hab. near Manilla, Luzon." Rather common locally in Luzon.=*S. humilis* Willd.

Abutilon indicum Don (p. 167). "Hab. near Manilla and Baños: common in waste places." A very common weedy plant.

Urena lobata Linn. var. **scabriuscula** (DC.) A. Gray, (p. 169). "Hab. . . . . mountains near Baños, Luzon (Philippine Islands, Cuming No. 469)." Very abundant and widely distributed.

Abelmoschus moschatus Moench (p. 172). "Hab. . . . Mindanao, Philippine Islands. . . . " A common weed; widely distributed.

Paritium tiliaceum A. Juss. (p. 178). "Hab. . . . Luzon, near Manilla." No specimens found; a species very common along the seashore throughout the Archipelago.

Thespesia populnea Correa (p. 179). "Hab. . . Mangsi Islands." No specimens found; common and widely distributed.

STERCULIACEÆ.

Heritiera littoralis Dryand. (p. 184). "Hab. Sooloo Islands. . . ." Specimen not found; common along the seashore throughout the Philippines.

Sterculia ceramica R. Br. (p. 184). "Hab. small island in the Sooloo Sea." The specimen is *Sterculia luzonica* Warb. A littoral tree, known from the Philippines, Celebes, and Halmeheira.

Melochia corchorifolia Linn. (p. 191). "Hab. . . . . Baños, Luzon." Very common and widely distributed in the Philippines.

Pterospermum diversifolium Blume ? (p. 194). "Hab. shores of Laguna, Baños, Luzon." The specimens represent Blume's species, which is common and widely distributed in the Philippines.

TILIACEÆ.

Corchorus olitorius Linn. (p. 195). "Hab. shores of Laguna, Baños, Luzon, Philippine Islands." A common and widely distributed weed.

Corchorus capsularis Linn. (p. 196). "Hab. shores of Laguna, Baños, Luzon." Common and widely distributed in the Philippines.

Triumfetta annua Linn. (p. 197). "Hab. vicinity of Manilla, Luzon. (The same as Cuming's no. 1462, from the Philippine Islands)." The specimen is *Triumfetta rhomboidea* Jacq., as is No. 1462 Cuming.

TERNSTROEMIACEÆ.

Calpandra lanceolata Blume (p. 213). "Hab. mountains near Baños, Luzon, Philippine Islands." The specimen is *Thea montana* (Blanco) Merrill.

GUTTIFERÆ.

Garcinia mangostana Linn. (p. 217). "Hab. Mangsi Islands." The mangosteen is commonly cultivated in the Sulu Archipelago.

Calophyllum inophyllum Linn (p. 218). "Hab. . . . Mangsi Islands." Common along the seashore throughout the Philippines.

Calophyllum spectabile Willd. (p. 218). "Hab. . . . . Mangsi Islands." Leaf specimens only, representing a species unknown to me but certainly not *C. spectabile*.

RUTACEÆ.

Atalantia monophylla DC. (p. 234). "Hab. on a small island in the Sooloo Sea. (Flowers occasionally trimerous)." Specimen very fragmentary, possibly the same as *Atalantia retusa* Merr., not *A. monophylla*.

Triphasia monophylla DC. (p. 234). "Hab. in mountains in the neighborhood of Baños, Luzon (without flowers or fruit)." Apparently the young spiny state of *Atalantia disticha* (Blanco) Merr.

Triphasia trifoliata DC. (p. 234). "Hab. in the vicinity of Manilla, Luzon." Common in the Philippines.

Sclerostylis atalantioides Wight & Arn ? (p. 234). "Hab. Mangsi Islands in the Sooloo Sea . . . . the same as No. 991 of Cuming's Philippine Collection." = *Atalantia disticha* (Blanco) Merr., a species common and widely distributed in the Philippines, and of which *A. nitida* Oliv., is another synonym.

Murraya exotica Linn. (p. 235). "Hab. Philippine Islands, near Manilla, Luzon." The Malayan form usually so identified, common in the Philippines.

Micromelum pubescens Blume (p. 235). "Hab. Mangsi Islands in the Sooloo Sea." The specimen is *M. tephrocarpum* Turcz., a species doubtfully distinct from *M. pubescens*, both being common in the Philippines.

MELIACEÆ.

Didymochiton gaudichaudianum A. Juss. ? (p. 241). "Hab. Mangsi Islands in the Sooloo Sea (without flowers or ripe fruit)." = *Dysoxylum* sp., near *D. cauliflorum* Hiern.

SAPINDACEÆ.

Schmidelia racemosa Linn. (p. 249). "Hab. island in the Sooloo Sea (in flower only)." The specimen is *Allophylus ternatus* Radlk.

Schmidelia obovata sp. nov. (p. 249). "Hab. . . . Mangsi Islands, in the Sooloo Sea." The specimen is *Allophylus timorensis* Blume, a common seacoast species.

Moulinsia rubiginosa Don (p. 250). "Hab. Caldera, Mindanao, one of the Philippine Islands." = *Erioglossum rubiginosum* Blume, common and widely distributed in the Philippines.

Hemigyrosa perrottetii Blume (p. 251). "Hab. Philippine Islands near Baños, Luzon." = *Guioa perrottetii* (Blume) Radlk. A very common endemic species. Specimen in Gray Herbarium, but not in the United States National Herbarium.

Cupania ? richii sp. nov. (p. 257). "Hab. near Caldera, Mindanao, Philippine Islands (in fruit only)." This has been reduced by Radlkofer to *Lepidopetalum perrottetii* Blume, but the specimen differs from the ordinary form of the latter species in its larger fruits and leaves, being well matched by No. 2160 Williams, collected near Zamboanga, Mindanao, although probably not specifically distinct from Blume's species.

Otophora Blancoi Blume (p. 259). "Hab. Baños, near Manilla, Luzon." = *Otophora fruticosa* Blume, a species very common throughout the Philippines.

Dodonaea viscosa Linn. (p. 260). "Hab. Sooloo Islands, Caldera, Mindanao." Along the seashore, common and widely distributed.

VITACEÆ.

Cissus geniculata Blume ? (p. 272). "Hab. Luzon, at Baños, near Manilla." Undoubtedly Blume's species.

Leea sambucina Willd. (p. 274). "Hab. Philippine Islands, Luzon and Mindanao." No specimens found.

RHAMNACEÆ.

Colubrina asiatica Richard (p. 277). "Hab. . . . . Sooloo Islands." Common and widely distributed along seashore throughout the Philippines. No specimen found.

HIPPOCRATEACEÆ.

Salacia macrophylla Blume (p. 286). "Hab. near Caldera, Mindanao, Philippine Islands." The specimen, which is with immature fruit only, is apparently a species of *Gelonium* related to *G. glomerulatum* Hassk. (*Euphorbiaceæ*).

OLACACEÆ.

Olax imbricata Roxb. (p. 305). "Hab. Philippine Islands; on the shores of Laguna, Baños, near Manilla, Luzon." The species is common and widely distributed in the Philippines.

OXALIDACEÆ.

Oxalis corniculata Linn. (p. 320). "Hab. . . . . Baños, Luzon." The specimen represents the form described by Thunberg as *Oxalis repens*, and considered by B. L. Robinson to be a species distinct from *O. corniculata* Linn.

ANACARDIACEÆ.

Mangifera indica Linn. (p. 364). "Hab. near Manilla." Cultivated throughout the Philippines.

BURSERACEÆ.

Canarium luzonicum (Blume) A. Gray (p. 374). "Hab. vicinity of Baños, Luzon." The specimen is *Canarium villosum* (Blume) Miq. (*C. cumingii* Engl.) Very common in the Archipelago.

LEGUMINOSÆ.

Crotalaria verrucosa Linn. (p. 390). "Hab. . . . . Baños, near Manilla, Luzon." The species is common and widely distributed in the Philippines. No specimen found.

Crotalaria calycina Schrank (p. 290). "Hab. Caldera, Mindanao, one of the Philippine Islands." A species locally common in the Philippines.

Crotalaria sessiliflora Linn. (p. 390). "Hab. Luzon, on Mount Majaijai." This species is apparently uncommon in the Philippines, but has been found by later collectors in Luzon. Specimen not found.

Indigofera tinctoria Linn. (p. 403). "Hab. . . . . Caldera, Mindanao, Philippine Islands." Common and widely distributed.

Tephrosia piscatoria Pers. (p. 407). "Hab. . . . Luzon, near Manilla." Specimen not found, but the form credited to Luzon was probably *T. luzonicnsis* Vog. (= ? *T. purpurea* Pers.)

Phylacium bracteosum Benn. (p. 407). "Hab. . . . . Luzon, near Manilla." Common and widely distributed in Luzon.

Uraria picta Desv. (p. 430). "Hab. near Caldera, Mindanao, one of the Philippine Islands." A species locally common.

Uraria lagopoides DC. (p. 430). "Hab. . . . near Caldera, Philippine Islands . . . the same as No. 1873 of Cuming's Philippine collection." Common and widely distributed in the Philippines.

Dendrolobium umbellatum Wight & Arn. (p. 431). "Hab. small island in the Sooloo Sea." = *Desmodium umbellatum* DC., a common shrub along the seashore throughout the Philippines. Specimen not found.

Phyllodium pulchellum Desv. (p. 431). "Hab. Philippine Islands; near Baños, Luzon." = *Desmodium pulchellum* DC. Common and widely distributed in the Philippines.

Desmodium triflorum DC. (p. 432). "Hab. Luzon, Philippine Islands." Common and widely distributed in the Philippines.

Desmodium capitatum DC. (p. 433). "Hab. Baños, Luzon, Philippine Islands." Locally abundant.

Desmodium gangeticum DC. (p. 433). "Hab. Luzon; with the preceding species." Very common and widely distributed.

Desmodium leptopus A. Gray sp. nov. (p. 436). "Hab. Luzon, Philippine Islands; on mountains near Baños." The type is well matched by No. 6527 Elmer, and No. 1409 Williams, Benguet, Luzon, and No. 3043 Williams, Davao, Mindanao. A species related to, if not identical with *D. gardneri* Benth. *D. leptopus* A. Gray was first published in Plantae Junghuhnianae. (Pl. 1.)

Canavalia turgida Grah. (p. 440). "Hab. Mangsi Islands . . . . " The common seacoast *Canavalia*, with broad turgid pods, confused by most authors with *C. obtusifolia* DC.

Erythrina ovalifolia Roxb. (p. 445). "Hab. near Manilla, Luzon." Locally common.

Strongylodon macrobotrys A. Gray sp. nov. (p. 448, *t. 49*). "Hab. in the mountains near Baños, Luzon, Philippine Islands." A very striking endemic species, not uncommon.

Vigna lutea A. Gray (p. 452). "Hab. Mangsi Islands." Common along the seashore throughout the Philippines.

Dolichos falcatus Linn. (p. 453). "Hab. shores of Laguna, at Baños, Luzon." Apparently not common in the Philippines, but rediscovered in Luzon by Loher.

Cajanus indicus Spreng. (p. 453). "Hab. Luzon . . . . " Commonly cultivated throughout the Philippines. Specimen not found.

Flemingia strobilifera R. Br. (p. 454). "Hab. Philippine Islands; Luzon, near Manilla and Baños." Very common throughout the Philippines.

Pongamia glabra Vent. (p. 455, *t.* 53). "Hab. . . . Mindanao, Philippine Islands, near Caldera." A tree common along the seashore throughout the Philippines.

Millettia ? luzonensis A. Gray sp. nov. (p. 456). "Hab. shores of Laguna, Baños, Luzon." The specimen is very fragmentary, as noted by Gray, and is *Gliricidia sepium* (Jacq.) Stend., (*G. maculata* H. B. K.), a native of tropical America, introduced into the Philippines and now widely distributed and abundant throughout the Archipelago.

Derris uliginosa Benth. (p. 457). "Hab. Philippine Islands, near Caldera, Mindanao . . . . " In tidal swamps throughout the Philippines. In the herbarium of Columbia University, but not in the United States National Herbarium.

Dalbergia cassioides Wall. (p. 457). "Hab. Philippine Islands at Caldera, Mindanao." The specimen is probably *Dalbergia ferruginea* Roxb. It consists of young leaves only.

Sophora tomentosa Linn. (p. 406). "Hab. . . . . Mangsi Islands." A tree abundant along the seashore throughout the Philippines. Specimen not found in the United States National Herbarium, but two sheets are in that of Columbia University.

Caesalpinia sappan L. (p. 461). "Hab. small island in the Sooloo Sea." Common throughout the Philippines.

Cassia alata Linn. (p. 462). "Hab. shores of Laguna, Baños, Luzon, Philippine Islands." Common throughout the Philippines.

Pilostigma acidum Benth. (p. 470). "Hab. Philippine Islands; in mountains near Baños, Luzon." = *Bauhinia malabarica* Roxb. A common tree in Luzon.

Cynometra inaequifolia A. Gray sp. nov. (p. 473). "Hab. Philippine Islands, near Baños, Luzon (Also collected by Mr. Cuming; No. 1297)." A tree not uncommon in Luzon.

Pithecolobium dulce Benth. (p. 485). "Hab. Luzon, Philippine Islands; introduced from tropical America." Very common throughout the Philippines.

ROSACEÆ.

Rubus rosaefolius Smith (p. 501). "Hab. Luzon, near Baños . . . . . " The common Philippine form usually so identified.

Rubus rugosus Smith (p. 503). "Hab. . . . . Luzon, ..." Undoubtedly *R. Rolfei* Vidal! No specimen in the United States National Museum or in the Gray Herbarium, but one is in that of Columbia University.

MYRTACEÆ.

Barringtonia speciosa Linn. f. (p. 508). "Hab. . : . Mangsi Islands." A tree common along the seashore throughout the Philippines. No specimen found.

Eugenia benthamii A. Gray (p. 520). "Hab. Mangsi Islands in the Sooloo Archipelago." Very fragmentary, but unquestionably identical with the specimen from Tobie Island, *Syzygium nitidum* Benth., which I have examined at Kew, and which is really the type of the species. It is matched by Nos. 2185 and 2237 Merrill, Mindoro, and is apparently a valid species.

Sonneratia acida Linn. f. (p. 550). "Hab. Luzon, in the vicinity of Manilla (in fruit)." = *S. caseolaris* Engl., a species not uncommon in the Philippines.

Eucalyptus multiflora Rich sp. nov. (p. 554). "Hab. near Caldera, Mindanao, one of the Philippine Islands." One of the few species of *Eucalyptus* found outside of Australia, and not as yet rediscovered. It has been reduced by Maiden to *Eucalyptus naudiniana* F. Müll. (Pl. 2.)

MELASTOMATACEÆ.

Memecylon calderense A. Gray sp. nov. (p. 574, Tab. 71). "Hab. near Caldera, Mindanao, one of the Philippine Islands." Reduced by Cogniaux to *M. paniculatum*, but it may prove to be a distinct species, the branches and branchlets terete.

Dissochaeta cumingii Naudin ? (p. 600). "Hab. Luzon; in the mountains near Baños." Leaf specimens only, but certainly *Astronia meyeri* Merr.

Melastoma fasciculare Naudin ? (p. 602). "Hab. Luzon, Philippine Islands, near Manilla." The specimen agrees with a cotype of Naudin's species in herb. Kew, and is to me the same as *Melastoma polyanthum* Blume, although Cogniaux reduces it with doubt to *Melastoma imbricatum* Wall. I have seen no specimens of the latter species from the Philippines.

LYTHRACEÆ.

Pemphis acidula Forst. (p. 605). "Hab. Sooloo Islands . . . . " Common along the seashore throughout the Philippines.

COMBRETACEÆ.

Terminalia catappa Linn. (p. 615). "Hab. Mangsi Islands, in the Sooloo Sea . . . . " The specimen in the United States National Herbarium marked "Mangsi" is exactly identical with a sheet in the Herbarium of Columbia University marked "Tongatabu," both specimens undoubtedly having come from the same tree, the specimen at Washington probably being wrongly labeled. Neither sheet represents *Terminalia catappa* L., but the Polynesian *Terminalia littoralis* Seem., a species not found in the Indo-Malayan region.

ONAGRACEÆ.

Ludwigia jussiaeoides Lam. (p. 619). "Hab. Caldera, Mindanao, one of the Philippine Islands." The specimen is apparently *Ludwigia prostrata* Roxb.

CUCURBITACEÆ.

Trichosanthes quinquangulata A. Gray sp. nov. (p. 645). "Hab. Mangsi Islands, in the Sooloo Sea." Apparently a valid species, not uncommon in the Philippines.

Momordica charantia Linn. (p. 646). "Hab. Luzon; at Baños, Laguna, etc." Common in cultivation and as an escape.

BEGONIACEÆ.

Begonia repens Blume (p. 658). "Hab. Luzon, on mountains in the vicinity of Baños. Specimen not found.

Begonia cumingii A. Gray, sp. nov. (p. 658). "Hab. Majaijai Mountains, Luzon, same species as No. 1897 of Cuming's Philippine collection." = *Begonia philippinensis* A. DC! (Pl. 3.)

Begonia aequata A. Gray sp. nov. (p. 658). "Hab. Luzon; on mountains near Baños." The type is exactly matched by No. 8324 Elmer, a topotype. (Pl. 4.)

CRASSULACEÆ.

Bryophyllum calycinum Salisb. (p. 690). "Hab. Philippine Islands, in the vicinity of Baños, Luzon." Common and widely distributed in the Philippines.

UMBELLIFERÆ.

Hydrocotyle asiatica Linn. (p. 693). "Hab. Luzon, near Manilla." Common throughout the Philippines. = *Centella asiatica* (L.) Urban.

ARALIACEÆ.

Panax fructicosum Linn. (p. 716). "Hab. Philippine Islands; near Baños, Luzon." Very commonly cultivated throughout the Philippines, for ornamental purposes.

LORANTHACEÆ.

Loranthus philippensis Cham. & Schlecht. (p. 741). "Hab. Luzon; in the mountains near Baños." Common and widely distributed in the Philippines; endemic.

ILLUSTRATIONS.

PLATE 1. *Desmodium leptopus* A. Gray.
2. *Eucalyptus multiflora* Rich.
3. *Begonia cumingii* A. Gray.
4. *Begonia acquata* A. Gray.

PLATE I.

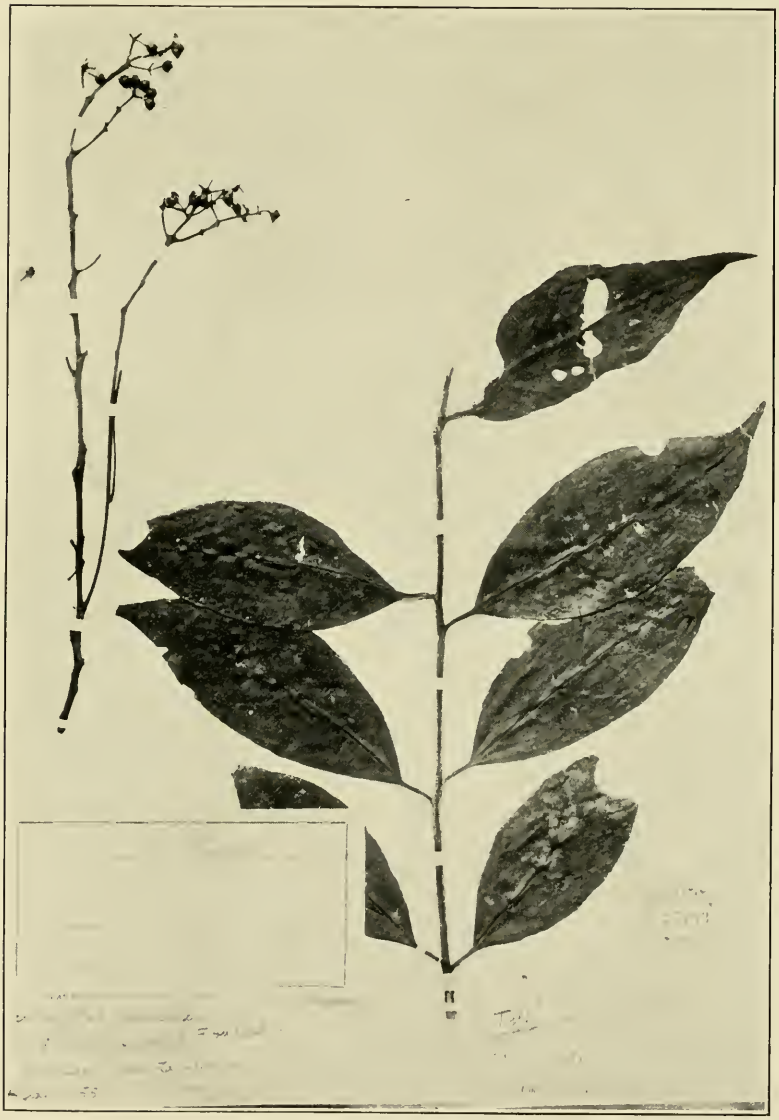

PLATE II.

PLATE III.

PLATE IV.

PREVIOUS PUBLICATIONS OF THE BUREAU OF GOVERNMENT LABORATORIES—Concluded.

(Concluded from second page of cover.)

No. 32, 1905.—Biological Laboratory: I. Intestinal Hæmorrhage as a Fatal Complication in Amœbic Dysentery and Its Association with Liver Abscess. By Richard P. Strong, M. D. II. The Action of Various Chemical Substances upon Cultures of Amœbæ. By J. B. Thomas, M. D., Baguio, Benguet. *Biological and Serum Laboratories:* III. The Pathology of Intestinal Amœbiasis. By Paul G. Woolley, M. D., and W. E. Musgrave, M. D.

No. 33, 1905, Biological Laboratory.—Further Observations on Fibrin Thrombosis in the Glomerular and in Other Renal Vessels in Bubonic Plague. By Maximilian Herzog, M. D.

No. 34, 1905.—I. Birds from Mindoro and Small Adjacent Islands. II. Notes on Three Rare Luzon Birds. By Richard C. McGregor.

No. 35, 1905.—I. New or Noteworthy Philippine Plants, IV. II. Notes on Cuming's Philippine Plants in the Herbarium of the Bureau of Government Laboratories. III. Hackel, "Notes on Philippine Grasses." IV. Ridley, "Scitimineæ Philippinenses." V. Clarke, "Philippine Acanthaceæ." By Elmer D. Merrill, Botanist.

No. 36, 1905.—A Hand-List of the Birds of the Philippine Islands. By Richard C. McGregor and Dean C. Worcester.

The previous publications of the Bureau were given out as bulletins in serial number pertaining to the entire Bureau. These publications, if they are desired, can be obtained by applying to the librarian of the Bureau of Science, Manila, P. I., or to the Director of the Bureau of Science, Manila, P. I. Correspondents will confer a favor by returning to the Bureau any previous publications which they may have in duplicate, as a number of bulletins are now out of print.

LIST OF PREVIOUS PUBLICATIONS OF THE MINING BUREAU (NOW DIVISION OF MINES OF THE BUREAU OF SCIENCE).

1890.—Descripción física, geológica y minera en bosquejo de la Isla de Panay por D. Enrique Abella y Casariego, Inspector General de Minas del Archipiélago.

1890.—Memoria descriptiva de los manantiales minero-medicinales de la Isla de Luzon, estudiados por la comisión compuesta de los Señores D. José Centano, Ingeniero de Minas y Vocal Presidente, D. Anacleto del Rosario y Sales, Vocal Farmacéutico, y D. José de Vera y Gómez, Vocal Médico.

1893.—Estudio Descriptivo de algunas manantiales minerales de Filipinas ejecutado por la comisión formada por D. Enrique Abella y Casariego, Inspector General de Minas, D. José de Vera y Gómez, Médico, y D. Anacleto del Rosario y Sales, Farmacéutico; precidido de un prólogo escrito por el Excmo. Sr. D. Angel de Avilés, Director General de Administración Civil.

1893.—Terremotos experimentados en la Isla de Luzón durante los meses de Marzo y Abril de 1892, especialmente desastrosos en Pangasinán, Unión y Benguet. Estudio ejecutado por D. Enrique Abella y Casariego, Inspector General de Minas del Archipiélago.

1901.—The Coal Measures of the Philippines. Charles H. Burritt.

1902.—Abstract of the Mining Laws (in force in the Philippines, 1902). Charles H. Burritt.

1902, Bulletin No. 1.—Platinum and Associated Rare Metals in Placer Formations. H. D. McCaskey, B. S.

1903.—Report of the Chief of the Mining Bureau of the Philippine Islands. Charles H. Burritt.

1903, Bulletin No. 2.—Complete List of Spanish Mining Claims Recorded in the Mining Bureau. Charles H. Burritt.

1903, Bulletin No. 3.—Report on a Geological Reconnoissance of the Iron Region of Angat, Bulacan. H. D. McCaskey, B. S.

1904.—Fifth Annual Report of the Mining Bureau. H. D. McCaskey.

1905.—Sixth Annual Report of the Chief of the Mining Bureau. H. D. McCaskey.

1905, Bulletin No. 4.—A Preliminary Reconnoissance of the Mancayan-Suyoc Mineral Region, Lepanto, P. I. A. J. Eveland, Geologist.

1905, Bulletin No. 5.—The Coal Deposits of Batan Island. Warren D. Smith, B. S., M. A., Geologist.

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Vol. II, Part 1.—Negritos of Zambales, by William Allen Reed. Paper, ₱1.25; half Morocco, ₱3.75.

Vol. II, Part 2 and Part 3.—The Nabaloi Dialect, by Otto Scheerer. The Bataks of Palawan, by Edward Y. Miller. (Bound also in one volume with Part 1, Negritos of Zambales.) Paper, ₱1.25; half Morocco, ₱3.75. Combined half Morocco, ₱5.

Vol. III.—Relaciones Agustinianas de las razas del Norte de Luzon, by Perez. Not listed by Bureau of Printing.

Vol. IV, Part 1.—Studies in Moro History, Law, and Religion, by Najeeb M. Saleeby. Paper, ₱0.75; half Morocco, ₱3.25.

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[1] The first four bulletins in the ornithological series were published by The Ethnological Survey under the title "Bulletins of the Philippine Museum." The other ornithological publications of the Government appeared as publications of the Bureau of Government Laboratories.

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NOTES ON PHILIPPINE BOTANY

By Elmer D. Merrill and R. A. Rolfe

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I., and from the Kew Herbarium, London, England.)

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PREVIOUS PUBLICATIONS OF THE BUREAU OF GOVERNMENT LABORATORIES.

[1] *No. 1, 1902, Biological Laboratory.*—Preliminary Report of the Appearance in the Philippine Islands of a Disease Clinically Resembling Glanders. By R. P. Strong, M. D.

No. 2, 1902, Chemical Laboratory.—The Preparation of Benzoyl-Acetyl Peroxide and Its Use as an Intestinal Antiseptic in Cholera and Dysentery. Preliminary Notes. By Paul C. Freer, M. D., Ph. D.

[1] *No. 3, 1903, Biological Laboratory.*—A Preliminary Report on Trypanosomiasis of Horses in the Philippine Islands. By W. E. Musgrave, M. D., and Norman E. Williamson.

[1] *No. 4, 1903, Serum Laboratory.*—Preliminary Report on the Study of Rinderpest of Cattle and Carabaos in the Philippine Islands. By James W. Jobling, M. D.

[1] *No. 5, 1903, Biological Laboratory.*—Trypanosoma and Trypanosomiasis, with Special Reference to Surra in the Philippine Islands. By W. E. Musgave, M. D., and Moses T. Clegg.

[1] *No. 6, 1903.*—New and Noteworthy Plants, I. The American Element in the Philippine Flora. By Elmer D. Merrill, Botanist. (Issued January 20, 1904.)

[1] *No. 7, 1903, Chemical Laboratory.*—The Gutta Percha and Rubber of the Philippine Islands. By Penoyer L. Sherman, jr., Ph. D.

[1] *No. 8, 1903.*—A Dictionary of the Plant Names of the Philippine Islands. By Elmer D. Merrill, Botanist.

[1] *No. 9, 1903, Biological and Serum Laboratories.*—A Report on Hæmorrhagic Septicæmia in Animals in the Philippine Islands. By Paul G. Woolley, M. D., and J. W. Jobling, M. D.

[1] *No. 10, 1903, Biological Laboratory.*—Two Cases of a Peculiar Form of Hand Infection (Due to an Organism Resembling the Koch-Weeks Bacillus). By John R. McDill, M. D., and Wm. B. Wherry, M. D.

[1] *No. 11, 1903, Biological Laboratory.*—Entomological Division, Bulletin No. 1: Preliminary Bulletin on Insects of the Cacao. (Prepared Especially for the Benefit of Farmers.) By Charles S. Banks, Entomologist.

[1] *No. 12, 1903, Biological Laboratory.*—Report on Some Pulmonary Lesions Produced by the Bacillus of Hæmorrhagic Septicæmia of Carabaos. By Paul G. Woolley, M. D.

No. 13, 1904, Biological Laboratory.—A Fatal Infection by a Hitherto Undescribed Chromogenic Bacterium: Bacillus Aureus Fœtidus. By Maximilian Herzog, M. D.

[1] *No. 14, 1904.—Serum Laboratory:* Texas Fever in the Philippine Islands and the Far East. By J. W. Jobling, M. D., and Paul G. Woolley, M. D. *Biological Laboratory:* Entomological Division, Bulletin No. 2: The Australian Tick (Boophilus Australis Fuller) in the Philippine Islands. By Charles S. Banks, Entomologist.

No. 15, 1904, Biological and Serum Laboratories.—Report on Bacillus Violaceus Manilæ: A Pathogenic Micro-Organism. By Paul G. Woolley, M. D.

[1] *No. 16, 1904, Biological Laboratory.*—Protective Inoculation Against Asiatic Cholera: An Experimental Study. By Richard P. Strong, M. D.

No. 17, 1904.—New or Noteworthy Philippine Plants, II. By Elmer D. Merrill, Botanist.

[1] *No. 18, 1904, Biological Laboratory.*—I. Amebas: Their Cultivation and Etiologic Significance. By W. E. Musgrave, M. D., and Moses T. Clegg. II. The Treatment of Intestinal Amœbiasis (Amœbic Dysentery) in the Tropics. By W. E. Musgrave, M. D.

No. 19, 1904, Biological Laboratory.—Some Observations on the Biology of the Cholera Spirillum. By W. B. Wherry, M. D.

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No. 21, 1904, Biological Laboratory.—Some Questions Relating to the Virulence of Micro-Organisms with Particular Reference to Their Immunizing Powers. By Richard P. Strong, M. D.

No. 22, 1904, Bureau of Government Laboratories.—I. A Description of the New Buildings of the Bureau of Government Laboratories. By Paul C. Freer, M. D., Ph. D. II. A Catalogue of the Library of the Bureau of Government Laboratories. By Mary Polk, Librarian.

[1] *No. 23, 1904, Biological Laboratory.*—Plague: Bacteriology, Morbid Anatomy, and Histopathology (Including a Consideration of Insects as Plague Carriers). By Maximilian Herzog, M. D.

No. 24, 1904, Biological Laboratory.—Glanders: Its Diagnosis and Prevention (Together with a Report on Two Cases of Human Glanders Occurring in Manila and Some Notes on the Bacteriology and Polymorphism of Bacterium Mallei). By William B. Wherry, M. D.

No. 25, 1904.[2]—Birds from the Islands of Romblon, Sibuyan, and Cresta de Gallo. By Richard C. McGregor.

No. 26, 1904, Biological Laboratory.—The Clinical and Pathological Significance of Balantidium Coli. By Richard P. Strong, M. D.

No. 27, 1904.—A Review of the Identification of the Species Described in Blanco's Flora de Filipinas. By Elmer D. Merrill, Botanist.

No. 28, 1904.—I. The Polypodiaceæ of the Philippine Islands. II. Edible Philippine Fungi. By Edwin B. Copeland, Ph. D.

No. 29, 1904.—I. New or Noteworthy Philippine Plants, III. II. The Source of Manila Elemi. By Elmer D. Merrill, Botanist.

No. 30, 1905, Chemical Laboratory.—I. Autocalytic Decomposition of Silver Oxide. II. Hydration in Solution. By Gilbert N. Lewis, Ph. D.

No. 31, 1905, Biological Laboratory.—I. Notes on a Case of Hæmatochyluria (Together with Some Observations on the Morphology of the Embryo Nematode, Filaria Nocturna). By William B. Wherry, M. D., and John R. McDill, M. D., Manila, P. I. II. A Search Into the Nitrate and Nitrite Content of Witte's "Peptone," with Special Reference to Its Influence on the Demonstration of the Indol and Cholera-Red Reactions. By William B. Wherry, M. D.

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[1] Out of print.

[2] The first four bulletins in the ornithological series were published by the Ethnological Survey under the title "Bulletins of the Philippine Museum." Later ornithological publications of the Government appeared as publications of the Bureau of Government Laboratories.

(Concluded on third page of cover.)

THE PHILIPPINE

JOURNAL OF SCIENCE

C. BOTANY

VOL. III JULY, 1908 No. 3

NOTES ON PHILIPPINE BOTANY.

By ELMER D. MERRILL and R. A. ROLFE.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I., and from the Kew Herbarium, London, England.)

The following paper was in greater part written at Kew, in November and December, 1907, while Mr. Merrill was at the Kew Herbarium studying the types of Philippine plants preserved there, and comparing the recently collected material with the rich Philippine collections, and the very extensive series of Indo-Malayan and Chinese plants preserved at Kew. Through the kindness of Lieutenant-Colonel D. Prain, Director of the Royal Gardens, Kew, Mr. R. A. Rolfe, assistant in charge of the Philippine collections in the Herbarium, was allowed to assist at this work during a part of each day. The Kew Herbarium contains more than 25,000 specimens of Philippine plants alone, including the duplicate material forwarded by the Bureau of Science, which is by far the largest collection of Philippine plants extant, with the exception of that of the Bureau of Science.

A number of species were encountered during the progress of the work, which had apparently not been hitherto described, the descriptions of many of these being included in the following paper. Various species previously described from other regions were found in the material examined, and whenever these species had not been reported from the Philippines, they have been included. A certain number of errors were met with in the work of the several botanists who have published papers on the Philippine flora, and whenever possible, these have been corrected;

other evident errors will need to be considered at a later date when more complete material is available for study. Mr. J. R. Drummond kindly examined critically the material in *Cruciferae* and a part of that in *Compositae*, and his notes are included in the present paper, each note being followed by his initials.

Sixteen species are described as new, and no less than fourteen genera, previously unknown from the Philippines, are recorded for the first time, while approximately fifty species, previously described by various authors from extra-Philippine regions are here first credited to the Archipelago.

HYDROCHARITACEAE.

HYDRILLA Richard.

Hydrilla verticillata (L.f.) Royle Ill. Bot. Himal. (1839) *t. 376;* Presl Bemerk. (1844) 112; Casp. in Pringsh. Jahrb. 1 (1858) 494; Hook. f. Fl. Brit. Ind. 5 (1888) 659; C. H. Wright ex Forbes & Hemsl. in Journ. Linn. Soc. Bot. 36 (1903) 1; Naves Nov. App. (1883) 214.

Serpicula verticillata Linn. f. Suppl. (1781) 416; Roxb. Pl. Coromandel 2 (1798) *t. 164.*

LUZON, Province of Tayabas, *Whitford 839;* Province of Rizal, *Loher 1592.* MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens.*

Previously enumerated from the Philippines by Naves but as so many of his records are erroneous, it has been thought best again to enumerate the species from the Archipelago.

Central Europe through tropical Asia to Australia and the Mascarene Islands.

LILIACEAE.

SMILAX Tourn.

Smilax leucophylla Blume Enum. Pl. Jav. 1 (1830) 18; A. DC. Monog. Phan. 1 (1878) 200; Naves Nov. App. (1883) 263.

Smilax vicaria Kunth Enum. 5 (1850) 262; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 35.

Smilax latifolia Blanco Fl. Filip. ed. 2 (1845) 548; ed. 3, 3:204, non R. Br.

Smilax macrophylla Naves Nov. App. (1883) 262, non Roxb.

LUZON, Province of Bataan, Mount Mariveles, *Merrill 3771;* Province of Rizal, *Merrill 1743; For. Bur. 1877 Ahern's collector; Loher 1923, 1934.*

Smilax vicaria Kunth was based on Blanco's description of *S. latifolia*, non R. Br., the specimens cited above agreeing with Blanco's description. At the same time they seem to agree in all essential characters with authentically named *S. leucophylla* Blume in Herb. Kew, and accordingly Kunth's species is here reduced, it previously having been considered a doubtful one.

Java, Borneo and (?) the Malay Peninsula.

ASPARAGUS Linn.

Asparagus lucidus Lindl. Bot. Reg. 30 (1844) Miscel. 29, no. 36; Baker in Journ. Linn. Soc. Bot. 14 (1875) 605.

Var. **dolichocladus** Merrill & Rolfe var. nov.

Differing from the typical form in its short pedicels, which do not exceed 1.5 mm in length, and in its phylloclades, some of which are 4.5

cm long, most of them, however, varying from 1 to 2.5 cm in length, the axillary spines nearly straight, 5 to 7 mm long.

Luzon, Province of Benguet, Tilad, *Loher 1928*, distributed as *A. racemosus*.

The genus is new to the Philippines, the species extending from Japan and Korea to Formosa and southern China.

CARYOPHYLLACEÆ.

ARENARIA Linn.

Arenaria serpyllifolia Linn. Sp. Pl. (1753) 423; DC. Prodr. 1 (1824) 411; Edgw. in Hook. f. Fl. Brit. Ind. 1 (1874) 239; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1886) 70.

Luzon, Province of Benguet, Loo, *Loher 1621*.

A widely distributed species in temperate and subtemperate regions, the first representative of the genus to be found in the Philippines, apparently indigenous.

SAGINA Linn.

Sagina procumbens Linn. Sp. Pl. (1753) 128; Edgw. in Hook. f. Fl. Brit. Ind. 1 (1874) 242.

Luzon, Province of Benguet, *Loher 1622*.

Widely distributed in the north and south temperate zones, in Asia southward to western Tibet and Sikkim; the first representative of the genus to be found in the Philippines.

POLYGONACEÆ.

POLYGONUM Linn.

Polygonum alatum Hamilt. in D. Don Prodr. Fl. Nepal. (1823) 72; Hook. f. Fl. Brit. Ind. 5 (1886) 39; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1891) 340.

Polygonum nepalense Meisn. in DC. Prodr. 14 (1856) 128.

Luzon, Province of Benguet, *Loher 5207*.

Afghanistan to Ceylon, China, Japan and the Malay Archipelago; new to the Philippines.

Polygonum glabrum Willd. Sp. Pl. 2 (1799) 447; Meisn. in DC. Prodr. 14 (1856) 114; Hook. f. Fl. Brit. Ind. 5 (1886) 34; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1891) 340.

Luzon, Province of Benguet, *Elmer 5970; Loher 4594*.

Tropical and subtropical regions of Asia, Africa and America; new to the Philippines.

Polygonum Hydropiper Linn. Sp. Pl. (1753) 361; Meisn. in DC. Prodr. 14 (1856) 109; Hook. f. Fl. Brit. Ind. 5 (1886) 39; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1891) 340; Walp. in Nov. Act. Nat. Cur. 19 (1843) Suppl. 1: 407.

Luzon, *Meyen* in Herb. Berol.; Province of Benguet, Kabayan, *Merrill 4428*, October, 1905.

Western Europe and northern Africa to China, Japan, and Java, also in North America.

Walpers' identification of Meyen's specimen appears to be correct, it having been examined in the Berlin Herbarium in January, 1908, but the specimen collected by Meyen in Luzon, and reported by Walpers l. c. as *Polygonum Persicaria* Linn., is not that species, but *P. barbatum* Linn.

Polygonum praetermissum Hook. f. Fl. Brit. Ind. 5 (1886) 47; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1891) 347.

Luzon, Province of Benguet, *Loher 4598;* District of Lepanto, Mount Data, *Merrill 4521.*

Eastern India and Ceylon to central China, also in Tasmania; new to the Philippines.

Polygonum Posumbu Hamilt. in D. Don Prodr. Fl. Nepal. (1823) 71; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1891) 346.

Luzon, Province of Benguet, *Merrill 4805; Elmer 5776; Williams 1450.*

Eastern Himalayan region to China, Japan, Formosa and Java; new to the Philippines.

RANUNCULACEÆ.

CLEMATIS Linn.

Clematis Meyeniana Walp. in Nov. Act. Nat. Cur. 19 (1843) Suppl. 1: 297; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1886) 5; Hook. f. in Curtiss' Bot. Mag. III. 59 (1903) *pl. 7897.*

Luzon, Province of Benguet, *Loher:* Suyoc to Pauai, *Merrill 4777,* November, 1906, alt. 2,000 m.

A species extending from southern China to the Riu Kiu Islands and Formosa, not previously reported from the Philippines.

NARAVELIA DC.

Naravelia Loheri Merrill & Rolfe sp. nov.

Scandens; foliis oppositis, petiolatis, integris, membranaceis, acuminatis, basi 5-nerviis; floribus solitariis, terminalibus, longe pedunculatis; sepalis 4, ovatis; petalis circiter 12, lineari-spatulatis, circiter 2 cm longis, 2 mm latis; ovario villosissimo; achenis lanceolatis, plus minus hirsutis, 2 cm longis, ecaudatis.

Scandent, the stems slender, reddish or straw colored, striate, sparingly pilose, becoming nearly glabrous, the young shoots rather densely ferruginous-pubescent. Leaves opposite, the petiole about 2 cm long, slightly pilose or pubescent; leaflets 2, ovate or oblong-ovate, membranous, glabrous or nearly so, entire or rarely with one or two large or small teeth, base rounded or acute, apex acuminate and tipped with a small mucro, 5 to 8 cm long, 2.5 to 4.5 cm wide; nerves 5, basal, prominent, ascending, the reticulations lax, rather prominent; petiolules 1 cm long or less, usually densely pubescent, the tendril elongated, slender, glabrous, 3-partite at the apex. Flowers few, solitary, at the apices of the lateral branches, the peduncles 4 cm long or more, somewhat pubescent, elongated in fruit. Sepals 4, 8 to 9 mm long, ovate, somewhat pubescent, deciduous. Petals about 12, linear-spatulate, glabrous, 2 cm long, or less, 2 mm wide above. Stamens about 3 mm long. Carpels densely hirsute. Achenes 10 to 15, about 2 cm long, narrowly lanceolate, appressed-hirsute but not densely so, gradually narrowed above to a slender beak, not tailed.

Luzon, Province of Rizal, Novaliches, *Loher 6*, May 25, 1890.

A most characteristic species, at once recognizable by its solitary long-pedicelled flowers and tailless achenes.

ANEMONE Linn.

Anemone vitifolia Buch.-Ham. in DC. Prodr. 1 (1818) 210; Hook. f. et Thoms. in Hook. f. Fl. Brit. Ind. 1 (1872) 8; Diels in Engl. Jahrb. 19 (1900) 330; M. Smith in Journ. Linn. Soc. Bot. 36 (1905) 456.

Anemone luzonicnsis Rolfe ex Hayata in Bot. Mag. Tokyo 20 (1906) 73, *nomen*.

Luzon, Province of Benguet, *Vidal 1356; Williams 1272; Elmer 6250; Merrill 4787:* District of Lepanto, Mount Data, *Loher 1*.

Himalayan region to central and southern China and Formosa; an interesting example of the eastern extension of the Himalayan flora to the high table-land of northern Luzon.

RANUNCULUS Linn.

Ranunculus philippinensis Merrill & Rolfe sp. nov.

Caespitosus, plus minus hirsutus, usque ad 15 cm altus; foliis tripartitis, 1.5 ad 2 cm longis, segmentis trifidis, acutis; floribus terminalibus, solitariis, luteis, 1.5 cm diam., petalis oblongo-obovatis, obtusis; acheniis 6 ad 15, compressiusculis, in capitula globosa aggregatis, glabris, punctatis; stylo uncinato persistente.

A tufted, acaulescent species with erect 1-flowered scapes, but under some conditions stoloniferous. Petioles 3 to 15 cm long, erect, with scattered appressed hairs which are more numerous below. Leaves trifoliolate, 1.5 to 2 cm long with scattered appressed or spreading long white hairs on both surfaces, the leaf-segments 1.5 cm long or less, the middle one longer petioluled than the lateral ones, each segment cut into three, rarely more, ovate, acute lobes, the sinus very narrow, acute. Pedicels erect, somewhat appressed-hirsute, 4 to 15 cm long, 1-flowered. Flowers yellow, 1.5 cm in diameter. Sepals membranous, oblong-ovate, with few long hairs outside, about 5 mm long. Petals 5, oblong-obovate, apex rounded, narrowed at the base, about 8 mm long, 4 mm wide. Filaments nearly 3 mm long; anthers 1.5 mm long. Achenes 6 to 15 in globose heads, compressed, glabrous, punctate, 3.5 mm long, 2 mm wide, terminated by a somewhat curved beak about 1 mm long.

Luzon, District of Lepanto, Mount Data, *Merrill 4508, 4570*, November, 1905; *Loher 10*, February, 1894: Province of Benguet, Panai, *Merrill 4750*, November, 1905; *Loher 11*, February, 1894.

In mossy forests and in swamps above 2,250 m alt., the genus new to the Philippines.

A most interesting species, which strangely enough does not have its closest allies to the north and west, but in the southeast in Queensland and New Zealand. It is in fact so closely allied to the Australian *Ranunculus lappaceus* Sm., that it is difficult to distinguish the Philippine plant from some forms of the Australian species. However, *Ranunculus philippinensis* is smaller than typical *R. lappaceus*, is much more hirsute than the latter, and has much fewer achenes, minor

characters it is true, but which with geographical distribution may sufficiently distinguish the Philippine form, although it might be better to consider the Luzon plant simply as a variety of the Australian species.

MAGNOLIACEÆ.

MICHELIA Linn.

Michelia Cumingii Merrill & Rolfe nom. nov.

Michelia parviflora Merr. in Govt. Lab. Publ. (Philip.) 35 (1906) 70; Philip. Journ. Sci. 1 (1906) Suppl. 53; non Rumph. in DC. Reg. Veg. Syst. Nat. 1 (1818) 449; Delessert Icon. Select. Plant. 1 (1820) 22. *tab. 85.* (In Index Kewensis, by error, Rumphius' species is listed as *M. parvifolia.*)

LUZON, Province of Tayabas, *Cuming 783;* Province of Rizal (Morong), *Vidal 2040, 2043;* Bosoboso, *Merrill 2681; For. Bur. 2155, 3202 Ahern's collector;* Province of Bataan, *Borden;* Province of Benguet, *Loher 5200, 5201.*

An endemic species, not uncommon in Luzon.

CRUCIFERÆ.

CARDAMINE Linn.

Cardamine Regeliana Miq. Ann. Mus. Bot. Lugd.-Bat. 2 (1865) 73.

Cardamine parviflora Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 194, non Linn.

LUZON, Province of Benguet, *Loher 2026;* Baguio, *Elmer 5846;* District of Lepanto, Balili, *Merrill 4609,* November, 1905.

These specimens are undoubtedly *Cardamine Regeliana* Miq., which is widely distributed in eastern Asia, from the neighborhood of Behring's Straits through Japan, Korea, China, the Philippines, and the Malay Archipelago.

Chinese examples have been referred as subspecies *flexuosa* to *Cardamine hirsuta* Linn., but the true *C. hirsuta* of Linnæus does not appear to reach eastern Asia. The plant intended as subspecies *flexuosa* is presumably *C. sylvatica* Link, to which the type of Miquel's species is no doubt very close, but it seems advisable to follow Miquel in keeping *C. Regeliana*, for the present at least, separate. Regel, who had not seen specimens of the North American *C. angulata* Hook., referred Kamtschatkan specimens of *C. Regeliana* to the North American species, but erroneously. By Maximowicz it appears to have been distributed as *C. sylvatica* var. *kamschatica* and there seems little doubt that the forms placed at St. Petersburg under this name, from Japan, etc., are referred correctly to the same species as the small form from Kamtschatka, although the latter is of dwarf habit and depauperated. If the six-anthered form with large pinnæ to the leaves, from southern Europe, be regarded as embracing *C. Regeliana*, then the specific name would be *C. sylvatica*, for although Hudson's *C. flexuosa* has priority, it seems very questionable if the plant he had in view was true *C. sylvatica.* (J. R. D.)

Cardamine sp.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4624 Mearns & Hutchinson.*

This may be a new species, but it is very near *Arabis heterophylla* var. α Forster in Herb. Kew, which is not the same as *Cardamine heterophylla* Hook. in Ic. Plant. 58 and Journ. Bot. 2:104. The plant of the Icones is a form common on and near the southern coasts of Australia and in Tasmania, which

appears to be the same as *Cardamine debilis* Banks & Solander, and this may not improbably have been Forster's typical *Nisymbrium heterophyllum*, but the Mindanao form differs from the Tasmanian (*Gunn 466*) in the size of the flowers and otherwise. It does not appear where Forster's var. α was met with, but the probability is that it was in New Zealand. The material is hardly sufficient to warrant the establishment of a new species, even if the plant discovered on Mount Malindang by Mearns & Hutchinson be identical with Forster's single gathering. (J. R. D.)

CAPPARIDACEÆ.

CAPPARIS Linn.

Capparis Cumingii Merrill & Rolfe sp. nov.

Scandens, glabra; spinis nullis vel minutis; foliis oblongis, subcoriaceis, usque ad 11 cm longis, basi rotundatis, apice breviter et late acuminatis, nervis utrinque 7 vel 8; paniculis terminalibus, floribus ad apices ramulorum subumbellatis dispositis; baccis globosis.

Scandent, glabrous throughout. Branches terete, at least the upper portions spineless, the panicle-branches sometimes subtended by two small spines. Leaves oblong, coriaceous, 9 to 11 cm long, 3 to 5 cm wide, the base rounded, the apex short, broadly acuminate; nerves 7 or 8 on each side of the midrib; petioles 2 to 2.5 cm long. Inflorescence a terminal panicle about 20 cm long, the primary branches stout, spreading, the lower ones 5 to 7 cm long, the flowers subumbellately disposed at the ends of the branches, 3 to 10 flowers on each branchlet, their pedicels 1 to 2.5 cm long. Buds globose. Flowers rather large. Sepals 4, concave, imbricate, ovate, rounded, 1 cm long or less. Petals obovate or oblong, 2 cm long or less. Stamens indefinite, their filaments 2.5 cm long; the stipe to the ovary 3 to 3.5 cm long. Fruit globose, glabrous, 2 cm in diameter, the pedicel thickened above.

Luzon, Province of Albay, *Cuming 1234*.

A characteristic species, distinguishable by its oblong subcoriaceous leaves and terminal panicles of rather large flowers, the flowers being long-pedicelled and fascicled at the ends of the branches.

CUNONIACEÆ.

SPIRAEOPSIS Miq.

Spiraeopsis celebica Miq. Fl. Ind. Bat. 1[1] (1857) 719; Ceron Cat. Pl. Herb. (1892) 57.

Luzon, Province of Camarines Sur, Mount Isarog, *Vidal 2719*, in Herb. Kew.

This monotypic genus is, so far as is known, confined to Celebes and Luzon, and has previously been credited to the Philippines in the rather obscure "Catálogo de las Plantas del Herbario," published in Manila in 1892. In view of its special interest in adding a species belonging to a monotypic genus to the already long list known only from Celebes and the Philippines, it is again enumerated here.

ROSACEÆ.

ERIOBOTRYA Lindley.

Eriobotrya oblongifolia Merrill & Rolfe sp. nov.

Glabra, inflorescentiis exceptis; foliis oblongis vel oblongo-lanceolatis, crasse coriaceis, usque ad 10 cm longis, apice et basi acutis vel acuminatis, margine minute crenulatis; paniculis thyrsoideis, dense ferrugineo-tomentosis, 5 cm longis; ovarium 5-loculare; styli 4 vel 5.

A tree, glabrous throughout except the inflorescence. Branches reddish-brown, glabrous, rugose when dry. Leaves 7 to 10 cm long, 1.5 to 2.5 cm wide, coriaceous, shining, the apex short and sharply acuminate or subacute, narrowed below to the acute or slightly decurrent-acuminate base, the margins minutely crenate; nerves numerous and with the reticulations rather distinct on the lower surface; petioles 1 to 1.5 cm long. Panicles terminal, thyrsiform, 5 cm long or less, densely ferruginous-tomentose. Flowers about 1 cm in diameter, white. Calyx ferruginous-tomentose, funnel-shaped, about 4 mm long, the lobes broad, acute, about 1.5 mm long. Petals imbricate, broadly ovate, rounded, 5 mm long. Filaments 3 mm long or less, glabrous; anthers broad, 1 mm long. Ovary 5-celled, each cell 2-ovuled; styles 4 or 5, 3.5 to 4 mm long, united for the lower 1.5 mm. Fruit ovoid, red, black when dry, 5 mm long, glabrous. Seeds 5, 4 mm long, strongly 3-angled.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4680 Mearns & Hutchinson*, May, 1906, in forests at 1,800 m altitude.

LEGUMINOSÆ.

DESMODIUM Desv.

Desmodium Bolsteri Merrill & Rolfe sp. nov. § *Dollinera.*

Frutex 1 m altus; foliis trifoliolatis, foliolis oblongo-obovatis, usque ad 4 cm longis, apice rotundatis, retusis, subtus leviter appresse pilosis; racemis paniculatis, terminalibus; leguminibus 4-articulatis, 2.5 cm longis, glabris vel leviter pilosis.

A shrub about 1 m high with trifoliolate leaves, the leaflets oblong-obovate, 4 cm long or less, the pods 4-jointed, about 2.5 cm long, 5 mm wide. Branches reddish-brown, terete, glabrous, lenticellate. Leaves somewhat crowded on the younger branches, the branchlets somewhat appressed-pilose and with numerous linear acuminate stipules about 8 mm long, usually appressed. Petioles 1 cm long or less, slightly pilose, the leaflets slightly appressed-pilose beneath, the base acute, the apex rounded, retuse, submembranous, the nerves 5 or 6 on each side of the midrib, obscure, the terminal leaflet about 4 cm long, 12 mm wide, its petiolule 5 mm long, the lateral leaflets similar but smaller, their petiolules about 1 mm long. Inflorescence terminal, lax, 3–4 cm long, few-flowered, the pedicels (in fruit) spreading, 7 to 8 mm long, slender. Flowers unknown. Pods 4-jointed, about 2.5 cm long, 5 mm wide, thin,

slightly pilose, the basal joint abruptly contracted into a slender pedicel, the terminal joint apiculate.

Luzon, Province of Cagayan, Peña Blanca, *F. H. Bolster 181*, October 7, 1905, on boulders along the river at an altitude of about 150 m.

Desmodium virgatum Zoll. Nat. Geneesk. Arch. 3 (1846) 58; Prain in Journ. As. Soc. Beng. 66[2] (1897) 143.

Luzon, *Vidal 248; Loher 2348, 2349; Bur. Sci. 4 Foxworthy; For. Bur. 2231 Meyer.* Palawan, *Bur. Sci. 194 Bermejos.*

Burma to Perak and Java; new to the Philippines.

Desmodium gyroides DC. Mém. Leg. (1825) 322; Prodr. 2 (1825) 326; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 175.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 269*, July, 1906.

British India to Indo-China, the Malay Peninsula and Archipelago; new to the Philippines.

FLEMINGIA Roxb.

Flemingia philippinensis Merrill & Rolfe sp. nov.

Suffruticosa, prostrata; foliis trifoliolatis, foliolis subsessilibus, coriaceis, dense et valde reticulatis, leviter pilosis, 4 ad 6 cm longis, apice rotundatis; racemis axillaribus, solitariis, congestis, 2 ad 2.5 cm longis; floribus 8 mm longis, calycis lobis valde inaequalibus; leguminibus 7 mm longis, pubescentibus, turgidis; seminibus globosis.

A suffrutescent perennial from a stout woody root, the branches prostrate, trailing, the leaves trifoliolate, the leaflets densely and strongly reticulate, somewhat pilose on both surfaces, coriaceous, rounded at the apex, the inflorescence a dense axillary solitary raceme 2 to 2.5 cm long, the bracts lanceolate, the lower lobe of the calyx much exceeding the others. Branches prostrate, terete or somewhat angular, appressed-pilose, in age nearly glabrous. Petioles stout, 1 to 2 cm long, flattened above, somewhat pilose; leaflets subsessile, nearly equal, coriaceous, densely and strongly reticulate, oblong, entire, inequilateral at the base, rounded at the apex, 4 to 6 cm long, 1.5 to 3 cm wide. Flowers about 8 mm long, the calyx densely appressed-pilose, the lobes lanceolate, acuminate, the lowest one much exceeding the others. Corolla pink or pale-purple, the standard about 6 mm long. Pod 7 mm long, 3 mm wide, turgid, somewhat pubescent, 1- or 2-seeded, the pedicels about 3 mm long, the calyx persistent. Seeds black, smooth, globose.

Luzon, District of Lepanto, Cervantes to Maneayan, *Merrill 4460*, November, 1905, in open grass-covered slopes. Allied to *Flemingia congesta* but abundantly distinct.

MILLETTIA Wight & Arn.

Millettia Ahernii Merrill & Rolfe sp. nov.

Arbor parva, glabra; foliis imparipinnatis, 3- vel 4-jugatis, circiter 25 cm longis; foliolis glabris, supra nitidis, elliptico-ovatis vel elliptico-oblongis, basi acutis, apice acuminatis, subcoriaceis, 8 ad 9 cm longis, 3 ad 4.5 cm latis, nervis utrinque 8; leguminibus lanceolatis, crassis, planis, 18 ad 20 cm longis, 2 ad 2.5 cm latis.

A tree, glabrous throughout, (inflorescence unknown). Branches terete, glabrous, light-grayish-brown, lenticellate. Leaves about 25 cm long, odd pinnate, 3- or 4-jugate, the rachis about 15 cm long; leaflets elliptical-ovate to elliptical-oblong, 8 to 9 cm long, 3 to 4.5 cm wide, subcoriaceous, somewhat shining, paler beneath, entire, base acute, apex short-acuminate, the acumen blunt; nerves about 8 on each side of the midrib, not prominent, the reticulations rather obscure; petiolules 5 mm long. Inflorescence terminal. Pods lanceolate, 18 to 20 cm long, 2 to 2.5 cm wide, thick, woody, glabrous, flattened, somewhat narrowed at the base, the apex acute, sometimes slightly curved.

Luzon, Province of Rizal, Bosoboso, *For. Bur. 3373 Ahern's collector*, September, 1905.

A species allied to *Millettia Merrillii* Perk., differing from that species in its larger leaves and very much larger and more woody pods.

PITHECOLOBIUM Mart.

Pithecolobium ellipticum (Blume) Hassk. in Retzia 1 (1855) 225; Prain in Journ. As. Soc. Beng. 66[2] (1897) 270.

Inga elliptica Blume Cat. Gew. Buitenz. (1823) 88; Walp. Repert. 1 (1842) 930.

Pithecolobium fasciculatum Benth. in Hook. Lond. Journ. Bot. 3 (1844) 208 ?; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 304.

Palawan, *For. Bur. 4144 Curran.*

Malay Peninsula and Archipelago; new to the Philippines and here recorded from the Archipelago for the first time, and under its oldest specific name as shown by Prain l. c.

LESPEDEZA Michx.

Lespedeza juncea Pers. var. **sericea** (Thunb.) Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1887) 181.

Hedysarum sericeum Thunb. Fl. Jap. (1784) 287.

Lespedeza sericea Miq. Ann. Mus. Bot. Lugd.-Bat. 3 (1867) 49.

Luzon, Province of Benguet, *Loher 2336*, February, 1894.

Northern India to China, Japan, Formosa, and also in Australia; the genus new to the Philippines.

SIMARUBACEÆ.

BRUCEA J. S. Mill.

Brucea mollis Wall. Cat. (1828) no. 8483; Benn. in Hook. f. Fl. Brit. Ind. 1 (1875) 521.

Brucea luzoniensis Vidal Sinopsis Atlas (1883) 19, *t. 26, f. B.*; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 70.

After an examination of a full series of the Luzon form, and comparison with the Indian material at Kew, we are of the opinion that *Brucea luzoniensis* Vidal, although sufficiently distinct from *B. sumatrana* Roxb., can not be maintained as a species distinct from *B. mollis*. The type of Vidal's species is no longer extant, and the species is not represented in his Philippine collection at Kew, although it was secured by Loher.

Himalaya and Silhet.

MELIACEÆ.

TOONA Roem.

Toona Calantas Merrill & Rolfe nom. nov.

Cedrela odorata Blanco Fl. Filip. (1837) 184; ed. 2 (1845) 130; ed. 3, 2:130, non Linn.

Cedrella Toona F.-Vill. Nov. App. (1883) 45, non Roxb.

Luzon, Province of Cagayan, *For. Bur. 6652 Klemme*, April, 1907: Province of Tayabas, Mauban, *Vidal 2347:* Province of Isabela, *Vidal 2358:* Province of Rizal (Morong), *Vidal 2345:* Province of Camarines Sur, *Vidal 2346:* Province of Zambales, *Vidal 2348*. Mindoro, Bongabong River, *Whitford 1435*, February, 1906.

A species allied to *Cedrela febrifuga* Blume (=*Toona febrifuga* Roem.), but differing in its constantly larger fruits, which are 3 to 3.5, sometimes 4 cm in length. It apparently is widely distributed in the Philippines. We have here adopted the specific name *Calantas* from the native and trade name of the species, it being universally known in the Philippines by that name, the timber being fragrant and of considerable commercial importance. We have no doubt but that the two Philippine specimens doubtfully referred by C. DeCandolle [1] to *Cedrela febrifuga*, are really *Toona Calantas*. An allied species, possibly true *Toona febrifuga* Roem., is represented by *For. Bur. 5881 Curran*, from Zambales Province, Luzon, its fruits but 2 cm in length.

AGLAIA Lour.

Aglaia luzoniensis (Vidal) Merrill & Rolfe comb. nov.

Beddomea luzoniensis Vidal Rev. Pl. Vasc. Filip. (1886) 84.

Beddomea simplicifolia F.-Vill. Nov. App. (1883) 43, non Bedd.

Aglaia monophylla Perk. Frag. Fl. Philip. (1904) 33.

In describing *Aglaia monophylla*, Dr. Perkins indicated that it is possibly identical with Vidal's *Beddomea luzoniensis*, and on examining the type of the latter we are able to affirm the identity of the two species, here adopted the earlier specific name. The species is widely distributed in the Philippines and is represented by the following specimens:

Luzon, Province of Tayabas, *Vidal 169*, (type of *Beddomea luzoniensis* Vid.): Province of Albay, *Vidal 2341:* Province of Rizal, Bosoboso, *For. Bur. 3257 Ahern's collector:* Province of Camarines Sur, *Ahern 123*. Mindoro, Bongabong River, *For. Bur. 3623, 3661, 3677, 3745, 3756 Merritt; Whitford 1411*. Negros, *For. Bur. 7236 Everett*. Dinagat, *Ahern 487*. Tinago, *Ahern 415*. Mindanao, Province of Surigao, *Ahern 667*. Palawan, *For. Bur. 3541 Curran; Bur. Sci. 224 Bermejos; 733 Foxworthy*. Panay, *Vidal 2364*.

Var. **trifoliata** Merrill & Rolfe var. nov.

Most of the leaves trifoliolate, a few unifoliolate, in other characters as in the species.

Mindanao, Province of Misamis, Mount Malindang, *For. Bur. 4724 Mearns & Hutchinson*, May, 1906.

[1] *Records Bot. Surv. India* 3 (1908) 373.

MALPIGHIACEÆ.

ASPIDOPTERIS A. Juss.

Aspidopteris ovata (Turcz.) Merrill & Rolfe comb. nov.

Ryssopteris ovata Turcz. in Bull. Soc. Nat. Mosc. 36² (1863) 583.

Aspidopteris sp. Vidal Phan. Cuming. Philip. (1885) 99.

Combretum sexalatum Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 212, in part, excl. *For. Bur. 3130 Ahern's collector.*

Luzon, Province of Albay, *Cuming 941, 945:* Province of Rizal, Novaliches, *Loher 5138;* Montalban, *Loher 175, 176;* Bosoboso, *Merrill 2811; For. Bur. 1163, 1868, 3126, 3321 Ahern's collector:* Province of Tayabas, Lucena, *Merrill 2891.* Panay, Miagao, *Vidal 2738.* Ticao, *Vidal 2242.* Masbate, *Merrill 3380.*

A rather widely diffused and somewhat variable endemic species, apparently related to *Aspidopteris elliptica* A. Juss. It was first described by Turczaninow under *Ryssopteris*, his type being one of Cuming's numbers cited above. However, Vidal, in working up Cuming's plants, overlooked Turczaninow's description and entered it in his Phanerogamae Cumingianae Philippinarum as *Aspidopteris* sp. *Combretum sexalatum* Merrill, is a mixture, being based on the flowering specimens of a true *Combretum* (p. 116), while the fruiting specimen described is *Aspidopteris ovata.*

POLYGALACEÆ.

POLYGALA Linn.

Polygala persicariaefolia DC. Prodr. 1 (1824) 326; Chodat Monog. Polygal. (1891) 331; β **Wallichiana** Chodat l. c.

Polygala septemnervia Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 202.

Philippines, without locality, *Micholitz.* Luzon, Province of Benguet, *Merrill 4263, 4401.* Panay, *Vidal 2090.*

We are of the opinion that *Polygala septemnervia* Merr., can not be distinguished specifically from *P. persicariaefolia* DC., it being accordingly here reduced.

British India to southern China and Timor, with some forms in tropical Africa.

Polygala japonica Houtt. Handleid. 10 (1779) 89, *t. 62, f. 1;* Chodat Monog. Polygal. (1891) 353.

Polygala luzoniensis Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 202.

Luzon, Province of Benguet, *Loher 1631; Merrill 4368.*

Polygala luzoniensis Merrill is apparently only a form of *P. japonica* and is here reduced to that species.

Japan to Formosa and Celebes.

Polygala triphylla Ham. in D. Don Prodr. Fl. Nepal. (1825) 200; Chodat l. c. 41.

Luzon, Province of Benguet, Kabayan, *Merrill 4442,* October, 1905.

India to southern China and Japan; new to the Philippines.

DICHAPETALACEÆ.

DICHAPETALUM Dup.-Thouars.

Dichapetalum luzoniense Merrill & Rolfe sp. nov. § *Eudichapetalum.*

Frutex scandens; ramis junioribus dense fulvo-pubescentibus; foliis elliptico-ovatis, acutis vel obscure acuminatis, supra nervis exceptis glabris, subtus praesertim ad nervos dense olivaceo-pubescentibus; cymis

axillaribus, solitariis, pedunculatis, dichotomis, dense fulvo-pubescentibus; calycis laciniis ad 3 mm longis, anguste ovatis; petalis 5, glabris, oblongis vel oblongo-spatulatis, apice fissis; ovario 3-loculare, dense villoso.

A scandent shrub, the branches densely pubescent, in age becoming nearly glabrous. Leaves alternate, coriaceous, 9 to 13 cm long, 4 to 7 cm wide, gradually narrowed from the middle to the obscurely acuminate apex and to the acute base, the upper surface shining, glabrous except the nerves which are pubescent, beneath densely pubescent; nerves about 8 on each side of the midrib, prominent, the reticulations distinct; petioles densely fulvous-pubescent, 5 mm long or less. Cymes rather densely flowered, axillary, solitary, dichotomous, densely pubescent, including the peduncle 4 to 5 cm long, 3 to 4 mm wide. Calyx densely pubescent outside, glabrous within, the lobes about 3 mm long, narrowly ovate, acute. Petals 5, free, glabrous, oblong to oblong-spatulate, 3 mm long, 1 mm wide, cleft at the apex. Stamens glabrous; filaments 2.5 mm long; anthers 0.5 mm long. Ovary ovoid, triangular in cross section, 3-celled, densely pubescent. Fruit (immature) densely ferruginous-hirsute, obovoid, 1-celled, about 1.5 cm long.

Luzon, Province of Rizal, Bosoboso, *Bur. Sci. 1128 Ramos*, July, 1906; Antipolo, *For. Bur. 3157 Ahern's collector*, June, 1905; *Vidal 469*, in Herb. Kew; Province of Laguna, Los Baños, *Elmer*, April, 1906.

Allied to *Chailletia deflexifolia* Turcz., of the Malay Peninsula, but apparently distinct.

EUPHORBIACEÆ.

MALLOTUS Lour.

Mallotus anisophyllus Hook. f. Fl. Brit. Ind. 5 (1887) 436.

Palawan, *Bur. Sci. 787, 883 Foxworthy*, May, 1906.

Malay Peninsula and Borneo; new to the Philippines.

ANACARDIACEÆ.

PISTACIA Linn.

Pistacia philippinensis Merrill & Rolfe sp. nov.

Arbor usque ad 8 m alta; foliis 10 ad 18 cm longis; imparipinnatis, 9-jugatis, foliolis glabriusculis, integris, basi acutis, apice acuminatis, valde inaequilateralibus; inflorescentiis femineis paniculatis, diffusis, usque ad 15 cm longis; drupis 5 mm longis, ovoideis, leviter compressis, rugosis.

A tree about 8 m high with odd pinnate about 9-jugate leaves, the leaflets lanceolate, acuminate, strongly inequilateral, 2.5 to 5 cm long, 5 to 8 mm wide, the panicles terminal and lateral, 15 cm long or less, the mature fruits ovoid, about 5 mm long. Branches reddish-brown, slender, terete or somewhat angled, lenticellate, glabrous, the young growing tips frequently somewhat pubescent. Leaves alternate, 10 to 18 cm long, the rachis slender, glabrous; leaflets about 9 pairs, strongly inequilateral, membranous when young, becoming firm and subcoriaceous

in age, glabrous, somewhat shining above, entire, the base acute, the apex gradually and sharply acuminate, 2.5 to 5 cm long, 5 to 8 mm wide, subsessile, the nerves rather obscure. Panicles 15 cm long or less, slightly pubescent, densely ferruginous-tomentose at the base only, diffuse. Female flowers sessile or short-pedicellate, 1.5 mm long or less, the bracts deciduous, the sepals about 1.5 mm long. Ovary subglobose; style 2-cleft. Male flowers pedicelled, the bracts if any early deciduous. Stamens 3; anthers 2 mm long, the filaments very short. Drupe about 5 mm long, slightly longer than broad and somewhat compressed, rugose when dry.

Luzon, Province of Benguet, Tilad and Ambuklao, *Loher 737; Vidal 1825;* Baguio, *For. Bur. 5093 Curran*, August, 1906.

An interesting species, the first representative of the genus to be reported from the Philippines, well characterized by its comparatively narrow leaflets and 2-cleft styles.

MANGIFERA Linn.

Mangifera lagenifera Griff.; Perkins Frag. Fl. Philip. (1904) 25.

This species must be excluded from the known Philippine flora, as of the specimens cited by Perkins l. c., *Cuming 2330* is from Malacca, correctly localized in Engler's monograph of the family,[2] while *Merrill 610* from Culion is *Buchanania florida* Schauer! = *B. arborescens* Bl.

DRACONTOMELUM Blume.

Dracontomelum Dao (Blanco) Merrill & Rolfe comb. nov.

Paliurus Dao Blanco Fl. Filip. (1837) 174; ed. 2 (1845) 122; ed. 3, 1:219.

Dracontomelum mangiferum F.-Vill. Nov. App. (1883) 56; Merr. in Govt. Lab. Publ. 27 (1905) 36; Philip. Journ. Sci. 1 (1906) Suppl. 84, non Blume.

Dracontomelum celebicum Koorders in Meded. 's Lands Plantent. 19 (1898) 110, *nomen.*

Luzon, Province of Tayabas, Baler, *Merrill 1082*, August–October, 1903; Cumaca, *Whitford 869*, September, 1904; Province of Nueva Ecija, *Vidal 175;* Province of Albay, *Vidal 2549, 2550;* Province of Bataan, Lamao River, *For. Bur. 1528, 1648, 1670 Borden.* Mindoro, Puerto Galera, *Merrill 3322;* Baco River, *McGregor 302.*

Blanco's *Paliurus Dao* was referred by F.-Villar to *Dracontomelum mangiferum* Blume, in which he was followed by later authors, but the Philippine material on comparison with authentic specimens of Blume's species was found to differ constantly from *D. mangiferum* in its much smaller leaflets. Blanco's specific name is here retained for the Philippine form, for although his description is short and rather imperfect it manifestly applies to the specimens here cited. Engler[3] has referred *Poupartia pinnata* Blanco to *Dracontomelum mangiferum* Blume, but it seems probable that *Poupartia pinnata* Blanco is really referable to *Spondias mangifera* Willd. *Dracontomelum celebicum* Koorders, from Celebes, is apparently identical with the form here considered, so far as can be determined from the fragmentary cotype in Herb. Kew. *Dracontomelum Dao* seems to be more closely allied to *D. sinense* Stapf than to *D. mangiferum* Blume. The species is remarkable for its strongly developed buttresses. It is commonly known to the natives of the Philippines as *dao.* The wood is rather soft and of little value.

[2] DC. Monog. Phan. 4 (1883) 211.

[3] DC. Monog. Phan. 4 (1883) 252.

SWINTONIA Griff.

Swintonia luzoniensis Merrill & Rolfe sp. nov.

Foliis subcoriaceis, utrinque concoloribus, glaberrimis, oblongis vel oblongo-obovatis, obtusis, 5 ad 9 cm longis, 1.8 ad 3.5 cm latis, basi decurrentibus, nervis lateralibus utrinque 9 vel 10; drupis oblongo-ovoideis; petalis auctis, oblongis vel lanceolatis, obtusis, quam drupis 3-plo longioribus.

A tree with oblong to oblong-obovate glabrous shining subcoriaceous leaves 9 cm long or less, the base acuminate-decurrent, forming narrow wings along the petiole for about one-half its length. Branches reddish-brown or grayish, terete, glabrous, the leaves crowded along the upper portion of the young branches. Leaves 5 to 9 cm long, 1.8 to 3.5 cm wide, the apex broad, rounded or obscurely broadly acuminate, the base long-decurrent, shining, coriaceous; nerves 9 or 10 on each side of the midrib, spreading, reticulate, the secondary nerves and reticulations prominent; petioles 2 to 3.5 cm long. Flowers unknown. Fruit oblong-ovoid, slightly inequilateral, 1.5 to 2 cm long, 10 to 12 mm in diameter, the persistent and accrescent petals reflexed, variable, 4.5 to 6 cm long, 5 to 10 mm wide, oblong to lanceolate, obtuse, gradually narrowed toward the base.

Luzon, Province of Tayabas, Baler, *Merrill 1057*, August, 1903; Province of Albay, *Vidal 3463a;* the latter, consisting of immature fruits only, received at Kew mixed with a species of *Vitex*, probably having been picked up in the forest.

Apparently most closely allied to *Swintonia Schwenkii* Kurz of the Malay Peninsula and Borneo, differing from that species in having its petioles flattened above and narrowly winged, its leaves not glaucous beneath, etc. The first representative of the genus to be found in the Philippines.

CELASTRACEÆ.

GYMNOSPORIA Benth. & Hook. f.

Gymnosporia spinosa (Blanco) Merrill & Rolfe comb. nov.

Cupania spinosa Blanco Fl. Filip. (1837) 184; ed. 2 (1845) 204; ed. 3, 2:17.

Gymnosporia philippinensis Vidal Phan. Cuming. Philip. (1885) 103, *nomen.*

Putterlickia ? philippinensis Planch. ex Vidal l. c. as syn.

Gymnosporia montana F.-Vill. Nov. App. (1883) 47; Vidal Cat. Pl. Prov. Manila (1880) 23; Rev. Pl. Vasc. Filip. (1886) 88; Ceron Cat. Pl. Herb. (1892) 46, non Laws.

Luzon, Province of Batangas, *Cuming 1575;* Province of Cagayan, *Bolster 192;* Province of Bataan, Dinalupijan, *Merrill 1507;* Albucay, *Vidal 190;* Mariveles, *Loher 5136;* Province of Rizal, *Loher 304, 305, 306;* Bosoboso, *Bur. Sci. 1474 Ramos;* San Juan del Monte, *Vidal 189;* Province of Nueva Ecija, *For. Bur. 6034 Zschokke;* Province of Pampanga, Mount Arayat, *For. Bur. 3648 Curran;* Province of Albay, Bacon, *Vidal 2404.* Lubang, *Merrill 978.* Ticao, *For. Bur. 1045 Clark.*

Apparently an endemic species, not the same as *Celastrus montanus* Roxb., although apparently included by Lawson in the aggregate *Gymnosporia montana* in Hooker's Flora of British India. Blanco's description of *Gymnosporia spinosa*

applies closely to the specimens here considered, and accordingly his specific name, being the oldest one available, is here adopted. *Gymnosporia philippinensis* Vidal was based on Planchon's herbarium name *Putterlickia ? philippinensis*, both being *nomina nuda*. The specimen, Cuming no. 1575, is certainly only *Gymnosporia spinosa* with immature leaves. We have not been able satisfactorily to identify Vidal's *Gymnosporia ambigua*, briefly characterized in his Sinopsis, Atlas (1883) 20, *t. 31, f. B.*, no specimens being extant, and the description being very imperfect.

Var. **parva** Merrill & Rolfe var. nov.

Frutex glaber usque ad ? m alta, differt a typo foliis multo minoribus, 2.5 ad 3.5 cm longis, 1 ad ? cm latis.

Luzon, Province of Rizal, Montalban, *Merrill 5070*, March, 1905, in thickets along the Mariquina River.

RHAMNACEÆ.

VENTILAGO Gaertn.

Ventilago gracilis (Vidal) Merrill & Rolfe comb. nov.

Kurrimia gracilis Vidal Rev. Pl. Vasc. Filip. (1886) 89.

Erroneously ascribed by Vidal, probably owing to lack of fruiting specimens at the time, to *Kurrimia* (*Celastraceae*), but a valid species of *Ventilago*, and accordingly here transferred to that genus.

Luzon, Province of Rizal, *Vidal 1122* (type); *Loher 335; For. Bur. 3073 Ahern's collector.*

VITACEÆ.

AMPELOCISSUS Planch.

Ampelocissus imperialis (Miq.) Planch. in DC. Monog. Phan. 5 (1887) 408.

Vitis ? imperialis Miq. Fl. Ind. Bat. (1860) Suppl. 518; Ann. Mus. Lugd. Bat. 1:89.

Cissus ochracea Teysm. & Binn. in Tijdsch. Nederl. Ind. 27 (1864) 35.

Vitis ochracea Teysm. in Planch. l. c. as syn.; Ceron Cat. Pl. Herb. (1892) 51.

Luzon, Province of Albay, Gubat, *Vidal 2429*. Culion, *Merrill 668*, February, 1903. Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 331*, March, 1906.

Sumatra, Java, and Borneo.

Ampelocissus barbata (Wall.) Planch. in DC. Monog. Phan. 5 (1887) 408.

Vitis barbata Wall. in Roxb. Fl. Ind. ed. Carey, 2 (1832) 478; Laws. in Hook. f. Fl. Brit. Ind. 1 (1875) 651, in part; King in Journ. As. Soc. Beng. 65[2] (1896) 387; Ceron Cat. Pl. Herb. (1892) 51.

Panay, *Vidal 2442*. Semerara, *Merrill 4150*.

Assam, Burma, etc., to the Andaman Islands and Perak.

Both the above species are enumerated from the Philippines in Ceron's Catálogo, published in Manila in 1892, but as this work is rather obscure, it has been considered advisable to list the species again, giving their synonomy and distribution.

TILIACEÆ.

TRIUMFETTA Plumier.

Triumfetta repens (Blume) Merrill & Rolfe comb. nov.

Porpa repens Blume Bijdr. (1825) 198; Miq. Fl. Ind. Bat. 1[2] (1859) 198.

Triumfetta subpalmata Soland. ex Hemsl. in Journ. Bot. **28** (1890) 2, *pl. 293, f. 1.*

Triumfetta procumbens Merr. in Govt. Lab. Publ. (Philip.) **6** (1903) 17, non Forst.

Luzon, Province of Camarines Sur, *Merrill 3373*, November, 1903: Province of Pangasinan, *For. Bur. 8401 Merritt & Curran*, December, 1907. Mindoro, Pola, *Merrill 2387*, May, 1903.

Hemsley l. c. has shown that this form is distinct from *Triumfetta procumbens* Forst., but Blume's specific name is much the earlier and is here retained for the species. It is the type of the genus *Porpa* Blume. A cotype of Blume's species is in the herbarium of Columbia University, and Dr. C. B. Robinson who has examined it informs us that it is identical with the material cited above.

Seashores, Java, Borneo, islands off the coast of Cochin China, Keeling Islands and some groups of islands off the coast of Queensland.

MALVACEÆ.

HIBISCUS Linn.

Hibiscus syriacus Linn. Sp. Pl. (1753) 695; Masters in Hook. f. Fl. Brit. Ind. **1** (1874) 344; F.-Vill. Nov. App. (1880) 25; Naves l. c. *t. 346.*

Mindoro, Calapan, *Bur. Sci. 930 Mangubat*, June, 1906.

The only previous record for this species as a Philippine plant is that of F.-Villar, and his work being in general so untrustworthy, it is again recorded here. The species occurs in the Philippines only as a cultivated plant, as is the case with *Hibiscus rosa-sinensis* L., *H. mutabilis* L., and *H. schizopetalus* Hook.

SIDA Linn.

Sida corylifolia Wall. Cat. (1828) no. 1805; Masters in Hook. f. Fl. Brit. Ind. **1** (1874) 342; E. G. Baker in Journ. Bot. **30** (1892) 240.

Luzon, Province of Rizal, *Vidal 2169, 2180; For. Bur. 2447 Ahern's collector.*

The species is not common in the Philippines, and is apparently local, the only previous record of the species from the Archipelago being that of Baker, l. c.

Burma to southern China, Java and the Philippines.

Sida balabacensis Merrill & Rolfe sp. nov.

Suffruticosa, erecta; ramis ramulis pedicellis calycibusque plus minus dense cinereo-stellato-puberulis; foliis oblongo-ovatis, basi rotundatis, apice acuminatis, margine dentatis, subtus leviter puberulis; floribus axillaribus solitariis, pedicellis circiter medium articulatis, geniculatis, usque ad 3 cm longis; carpellis 8, 5 mm longis, verrucosis, apice birostratis, rostris 4 mm longis, retrorso-pilosis.

Erect, more or less branched, suffrutescent. Branches somewhat compressed, densely gray-stellate-puberulent or pubescent. Leaves oblong-ovate, 5 to 8 cm long, 2 to 3.5 cm wide, the base broad, rounded or

slightly cordate, the apex acuminate, the margins irregularly dentate, submembranous, somewhat pubescent beneath, glabrous above except on the nerves, the base with a pair of strong nerves and one or two pairs of shorter ones, the primary nerves above the basal ones about 4 on each side of the midrib, distant, prominent, ascending, the reticulations lax; petioles puberulent, 10 to 14 cm long. Flowers large for the genus, 3 cm in diameter, yellow, the lower ones axillary, solitary, the upper ones forming a terminal raceme, the pedicels jointed in the middle, geniculate, densely puberulent, 3 cm long or less, the bracts deciduous, linear, densely pubescent, about 8 mm long. Calyx densely stellate-pubescent, 1.5 to 2 cm in diameter, cleft to about the middle; the teeth ovate, acute or somewhat acuminate, about 7 mm long, each 3-nerved. Petals about 17 mm long, 14 mm wide, irregularly triangular-obovate, retuse, with numerous nerves radiating from the base, slightly pilose, the base acute. Staminal column about 4 mm long, stamens very numerous. Ovary pubescent. Carpels about 8, rugose, somewhat stellate-pubescent on the upper or exposed surface, about 5 mm long, each tipped with two 4 mm long awns which are furnished with reflexed hairs. Seeds black, triangular-compressed like the carpels, glabrous except the pubescent top and the awns.

Balabac, *Bur. Sci. 456 Mangubat*, March–April, 1906.

A species somewhat resembling *Sida corylifolia* Wall., but distinguished from that species by its large flowers and puberulent branches, pedicels, calyx, etc.

BOMBYCIDENDRON Zoll.

Bombycidendron Vidalianum (Naves) Merrill & Rolfe comb. nov.

Hibiscus Vidalianus Naves in Blanco Fl. Filip. ed. 3, *pl. 333, nomen*; Vidal Sinopsis Atlas 16, *pl. 16, f. C.*, with description; Cat. Pl. Prov. Manila (1880) 19.

Hibiscus grewiaefolius F.-Vill. Nov. App. (1880) 24, excl. syn. Miquel.

Thespesia campylosiphon Vidal Rev. Pl. Vasc. Filip. (1886) 64, non Turcz.

Bombycidendron glabrescens Warb. in Perk. Frag. Fl. Philip. (1904) 110.

Luzon, Province of Rizal, *Loher 138, 139*; *Vidal 1174*; Montalban, *Merrill 5078*; Bosoboso, *For. Bur. 1870, 3331 Ahern's collector*; *Bur. Sci. 4627, 4679 Ramos*; *For. Bur. 10015 Curran*; Antipolo, Decad. Philip. Forest Fl. 27; Province of Bulacan, Norzagaray, *Yoder 84*; Province of Benguet, Baguio, *For. Bur. 5139 Curran*.

The specific name here adopted for this species was published as a *nomen nudum* in 1880, and with a description in 1883, being redescribed by Warburg in 1904 as *B. glabrescens*. *Bombycidendron campylosiphon* (Turcz.) Warb. is quite distinct from *B. vidalianum*, being characterized by its dense, soft pubescence. Vidal erroneously reducing the species, that was dedicated to him, to Turczaninow's species. *B. parrifolium* Warb. is very similar to *B. campylosiphon* in its pubescence, but has smaller leaves. The type, preserved in the Berlin Herbarium, is very fragmentary, and consists of poorly prepared leaf-specimens only, so that it will prove difficult to establish the validity of the species.

STERCULIACEÆ.

PTEROSPERMUM Schreb.

Pterospermum Cumingii Merrill & Rolfe sp. nov.

Arbor vel arbuscula; foliis oblongis, leviter acuminatis, basi subaequalibus vel leviter inaequalibus, rotundatis, supra glabris, subtus dense ferrugineo-puberulis, 4 ad 8 cm longis, 2 ad 3.5 cm latis; fructibus oblongis, cylindricis, circiter 3 cm longis, breviter apiculatis.

A tree or shrub, the branches terete, the older ones grayish, glabrous, the younger ones densely ferruginous-puberulent as are the petioles, under surfaces of the leaves, and the fruits. Leaves oblong, 4 to 8 cm long, 3 to 3.5 cm wide, subcoriaceous, glabrous and shining above, beneath densely ferruginous-puberulent, the apex short and bluntly acuminate, the base rounded, subequal or slightly oblique; nerves prominent beneath, the basal ones 3, with sometimes an additional faint submarginal pair, the primary lateral ones, above the base, 4 on each side of the midrid, the reticulations nearly obsolete; petioles puberulent, 1 to 1.8 cm long. Fruit 2.5 to 3 cm long, cylindrical, about 1.8 cm in diameter, the base abruptly contracted into a short stout cylindrical pseudostalk, the apex short-apiculate, the outside very densely ferruginous-puberulent. Seeds, including the wings, about 1.7 cm long.

PHILIPPINES, without locality, *Cuming 1860*, in Herb. Kew.

A species allied to *P. niveum* Vidal and to *P. obliquum* Blanco, differing from both in its nearly inequilateral leaves and other characters.

THEACEÆ.

SCHIMA Reinw.

Schima Noronhae Reinw. ex Blume Cat. Gew. Buitenzorg (1823) 80; Bijdr. (1825) 130; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1886) 80.

PALAWAN, Mount Pulgar, *For. Bur. 3881 Curran*, February, 1906.

Eastern India to southern China and the Malayan region; new to the Philippines.

TERNSTROEMIA Linn.

Ternstroemia Toquian (Blanco) F.-Vill. Nov. App. (1880) 18.

Llanosia Toquian Blanco Fl. Filip. ed 2 (1845) 319.

Ternstroemia Lobbiana Pierre Fl. Forest. Cochinch. (1887) *pl. 123*, in note.

Ternstroemia penangiana Ceron Cat. Pl. Herb. (1892) 22, non Choisy.

A species common and widely distributed in the Philippines, extending from 700 to 1,500 m alt., here enumerated to call attention to the reduction of Pierre's species and to correct the identification in Ceron's Catálogo.

Celebes.

GORDONIA Ell.

Gordonia luzonica Vidal Rev. Pl. Vasc. Filip. (1886) 57.

Gordonia fragrans Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 95.

A species not uncommon in the mountains of Luzon, *G. fragrans* not being distinct from Vidal's species.

Gordonia Vidalii Szysz. in Engl. & Prantl Nat. Pflanzenfam. 3[6] (1893) 185. *G. acuminata* Vidal Rev. Pl. Vasc. Filip. (1886) 58, non Zoll.

This species must be excluded from the *Theaceæ*, as the type, *Vidal 1146*, is a sterile specimen of *Shorea* or *Hopea* (*Dipterocarpaceæ*), with a large foliaceous gall, which was mistaken by Vidal for a flower bud.

DIPTEROCARPACEÆ.

DIPTEROCARPUS Gaertn. f.

Dipterocarpus vernicifluus Blanco Fl. Filip. ed. 2 (1845) 31; Brandis in Journ. Linn. Soc. Bot. 31 (1895) 31; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 97.

D. velutinus Vidal Rev. Pl. Vasc. Filip. (1886) 59; Brandis l. c.

D. fulvus Blume Mus. Bot. 2 (1852) 37; Brandis l. c. 40.

This is a common and widely distributed endemic species, yielding most of the timber that enters the Manila market under the name of "panao." The specimens referred to this species by Vidal, Revision 59, are all sterile, and two of them are apparently *Dipterocarpus grandiflorus* Blanco. *D. velutinus* Vidal we consider to represent typical *D. vernicifluus* Blanco, and is accordingly reduced, as our large series of specimens agree both with Vidal's type specimen and with Blanco's description. *D. fulvus* Blume was based on a sterile specimen collected in the Philippines by Perrottet, and an examination of the type in Herb. Leiden shows it to be sapling leaves of *D. vernicifluus*.

PARASHOREA Kurz.

Parashorea plicata Brandis in Journ. Linn. Soc. Bot. 31 (1895) 104.

P. Warburgii Brandis l. c.

But one species is represented in all our Philippine material. *P. plicata* was based on *Vidal 76, 990*, and *2033*, all with flowers, while *P. Warburgii* was based on fruits alone. We have a specimen, *Bur. Sci. 3289 Ramos*, with mature fruit, from the same locality as the type of *P. plicata*, the leaf and branch characters agreeing perfectly with Vidal's specimens; at the same time the fruits are identical with the type specimen of *P. Warburgii*, which must accordingly be reduced to *P. plicata*. The species is not uncommon in the Philippines and is represented by the following additional specimens:

Luzon, Province of Sorsogon, *For. Bur. 4528 Zschokke*, May, 1906; *For. Bur. 5754 Pray*, December, 1906; Province of Rizal, Bosoboso, *Bur. Sci. 1461, 3289 Ramos*; Province of Laguna, Santa Maria Mavitac, *For. Bur. 10071 Curran*; Mount Banajao, *For. Bur. 8051 Curran & Merritt*; Malicboi, *Ritchie 51*; Guinayangan, *Hagger*; Province of Camarines Sur, Pasacao, *Ahern 104, 291*. Masbate, *Whitford 1673*. Catanduanes, *For. Bur. 6679 Pray*. Negros, Gimagaan River, *Whitford 1616*. Mindanao, Province of Surigao, *Ahern 456*; *For. Bur. 7563 Hutchinson*.

PENTACME A. DC.

Pentacme contorta (Vidal) Merrill & Rolfe comb. nov.

Shorea contorta Vidal Sinopsis Atlas (1883) 15, *t. 15, f. E;* Rev. Pl. Vasc. Filip. (1886) 88; Brandis in Journ. Linn. Soc. Bot. 31 (1895) 88; Merrill in Philip. Journ. Sci. 1 (1906) Suppl. 98.

Pentacme paucinervis Brandis in Journ. Linn. Soc. Bot. 31 (1895) 73.

There is no doubt as to the identity of the above two species, and accordingly Vidal's name, being the earlier, is here accepted and transferred to *Pentacme.* The specimens on which *Pentacme paucinervis* was based (*Vidal 79, 1166, 2176*) are all in flower, no fruit being present, while of the specimens of *Shorea contorta* examined by Brandis (*Vidal 987, 2159*) the former is with fruit and the latter with immature buds, the condition of the latter no doubt accounting for the fact that Brandis was unable to distinguish in it the floral characters of *Pentacme;* he states morover that *Shorea contorta* is anomalous in its floral structure. The species is common and widely distributed in the Philippines, yielding much of the timber commercially known as Lauan. In addition to the five specimens collected by Vidal, cited above, we have also examined the following extensive series: *Merrill 2772, 2697; For. Bur. 2970, 3199 Ahern's collector; Bur. Sci. 3258 Ramos; For. Bur. 504, 511, 519, 538, 605 Barnes; Whitford 293; For. Bur. 650, 653, 821, 1748 Borden.*

SHOREA Roxb.

Shorea Malaanonan (Blanco) Blume Mus. Bot. 2 (1852) 34; A. DC. in DC. Prodr. 16^2 (1868) 631; Brandis in Journ. Linn. Soc. Bot. 31 (1895) 103; F.-Vill. Nov. App. (1880) 21.

Dipterocarpus Malaanonan Blanco Fl. Filip. ed. 2 (1845) 312; ed. 3, 2: 214.

Mocanera Malaanonan Blanco Fl. Filip. ed. 1 (1837) 858.

Shorea polita Vidal Sinopsis Atlas (1883) 15, *t. 15. f. D;* Rev. Pl. Vasc. Filip. (1886) 61; Brandis in Journ. Linn. Soc. Bot. 31 (1895) 88.

LUZON, Province of Rizal, *Vidal 2155, 2168, 2166, 71; Loher 116; For. Bur. 1168, 436 Ahern's collector:* Province of Tayabas, *Merrill 2851, 2589:* Province of Nueva Ecija, *Vidal 989.*

Widely distributed in Luzon and rather variable. We are of the opinion that the above specimens are referable to Blanco's species and accordingly his specific name is accepted, Vidal's *Shorea polita* being here reduced.

ANISOPTERA Korth.

Anisoptera thurifera (Blanco) Blume Mus. Bot. 2 (1852) 42; Brandis in Journ. Linn. Soc. Bot. 31 (1895) 44.

After examining a large series of specimens we have come to the conclusion that *Anisoptera Vidaliana* Brandis is scarcely distinct from Blanco's species, there being no constant characters by which the two can be distinguished. The fruit of *A. Vidaliana* as separated by Brandis has broader wings than does that of *A. thurifera,* but even this character does not appear to be constant. Two other closely related species occur in the Philippines, which may later have to be reduced, these being *A. tomentosa* Brandis, represented also by *For. Bur. 2985 Ahern's collector,* characterized by its leaves being slightly tomentose beneath, and *A. calophylla* Perk., which differs from typical *A. thurifera* by scarcely more valid characters.

LYTHRACEÆ.

LAGERSTROEMIA Linn.

Lagerstroemia piriformis Koehne in Engl. Bot. Jahrb. 4 (1883) 32; Pflanzenreich 17 (1903) 267.

Lagerstroemia Batitinan Vidal Rev. Pl. Vasc. Filip. (1886) 139; Koehne, l. c.

Lagerstroemia hexaptera Vidal Sinopsis Atlas (1883) *t. 52, f. A.*, non Miq.

After an examination of Vidal's numbers 365 bis and 784, on which the description of *L. Batitinan* was based, and comparing them with a specimen of *Cuming 1675*, a cotype of *L. piriformis*, we are of the opinion that the two species are identical, and the older name is here retained. Koehne states, l. c. 267, that Vidal's species was unknown to him, and in his monograph the two are distinguished only by some trivial characters. The species yields a valuable timber which is of considerable commercial importance in the Philippines, and is universally known as *Batitinan*.

COMBRETACEÆ.

COMBRETUM Linn.

Combretum confusum Merrill & Rolfe sp. nov.

Foliis membranaceis, ovatis vel elliptico-ovatis, usque ad 11 cm longis, obscure acuminatis, nervis utrinque 7, subtus costa venulisque plus minus pilosis; spicis densis in paniculis terminalibus confertis, rhachidibus ramis ramulisque dense ferrugineo-pubescentibus; floribus 12 mm longis, 4-meris, calycis tubo elongato, fauce hirtello.

Scandent, the branches light-grayish-brown, terete, glabrous, or the younger ones slightly lepidote. Leaves membranous, ovate to elliptical-ovate, entire, the base rather broadly acute, the apex acute or obscurely acuminate, 8 to 11 cm long, 5 to 7 cm wide, minutely pustulate on both surfaces, glabrous above, beneath more or less pilose along the midrib, in the axils and on the basal portions of the primary nerves, ultimately glabrous or nearly so; nerves about 7 on each side of the midrib, rather prominent; petioles 1 to 1.5 cm long, slightly lepidote. Inflorescence terminal, paniculate, about 15 cm long, the lower branches 7 cm long or less, the rachis, branches, and branchlets rather densely ferruginous pubescent, the flowers densely spicately disposed at the ends of the branches. Flowers yellow, 4-merous, obscurely glandular-lepidote, about 12 mm long, the buds acute. Calyx 4-angled, gradually wider upward, expanded above and villous at the throat, 4-lobed, the lobes reflexed, ovate, acute, 3 mm long. Petals 4, oblong, truncate, slightly exceeding 2 mm in length. Stamens 8, exserted; filaments nearly 6 mm long; anthers about 1 mm long; style 10 to 12 mm long. Fruit unknown.

Luzon, Province of Rizal, Bosoboso, *For. Bur. 3130 Ahern's collector*, June, 1905.

A species apparently closely related to *Combretum sundaicum* Miq., but differing from the latter in its larger leaves, densely pubescent inflorescence, and other

characters. The type of the present species was the first number cited in the original description of *Combretum sexalatum* Merr.,[4] but that species being based on two different plants, and the specific name being derived from fruit characters, these fruiting specimens being those of *Aspidopteris orata* (*Malpighiaceae*), we consider the fruiting specimens to represent the type of *Combretum sexalatum*, and the flowering specimen previously considered under that name is here redescribed. The present species in leaf and stem characters bears a striking resemblance to *Aspidopteris orata*. (See p. 106.)

MELASTOMATACEÆ.

ASTRONIA Blume.

Astronia pulchra Vidal Rev. Pl. Vasc. Filip. (1886) 136.

Astronia glauca Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 31.

Types of both being compared at Kew, they were found to be identical, and *Astronia glauca* is here accordingly reduced.

ARALIACEÆ.

SCHEFFLERA Forst.

Schefflera odorata (Blanco) Merrill & Rolfe comb. nov.

Polyscias odorata Blanco Fl. Filip. (1837) 225.

Polyscias obtusa Blanco ? l. c. 226.

Paratropia crassa Blanco l. c. ed. 2 (1845) 158; ed. 3, **1**: 285.

Paratropia obtusa Blanco ? ll. cc. 159, 285.

Heptapleurum venulosum F.-Vill. Nov. App. (1883) 102; Vidal Sinopsis Atlas (1883) *pl. 55, f. E.;* Cat. Pl. Prov. Manila (1880) 32, non Seem.

Schefflera venulosa Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 110 non Harms.

LUZON, *Vidal 1436, 2931, 792: Loher 3591, 3592, 3593: Elmer 6414, 8312, 6058; Whitford 3, 62; Merrill 1886, 1670.* TICAO, *Vidal 2936.* MASBATE, *Merrill 3024.* LUBANG, *Merrill 973.* BASILAN, *For. Bur. 436 Hutchinson.* MINDANAO, *Copeland 594.*

A species very common and widely distributed in the Philippines, apparently endemic, but closely allied to the Malayan *Heptapleurum ellipticum* Miq. We are of the opinion that it is sufficiently distinct from that species, as well as from *H. venulosum* Seem., to which it has been referred by the above authors, and accordingly Blanco's specific name is here adopted.

In the original descriptions of *Heptapleurum Cumingii* Seem., and *H. caudatum* Vidal, there is an unfortunate confusion in the numbers cited, both descriptions being based on specimens representing two species, but neither description applying to the first number cited in each case, which was *Cuming 800.* The material of all the numbers of Cuming's collection has been examined in the Kew Herbarium and at the British Museum, and at the former place Vidal's material was also available, as well as the collections of Loher and the more recent collections made by American botanists. The following notes it is believed will clear up the confusion that has occurred regarding the species under discussion.

[4] *This Journal*, 1 (1906) *Suppl.* 212.

Leaves 5- to 10-foliolate.

Panicle-branches scattered along the common rachis; leaflets 7 to 10, strongly caudate-acuminate ..... 1. *S. caudata.*

Panicle-branches fascicled at the ends of the branches, no common rachis present; leaflets 5, slightly acuminate, 3-nerved at the base.. 2. *S. Cumingii.*

Leaves 3-foliolate; leaflets caudate-acuminate, not 3-nerved at the base. 3. *S. trifoliata.*

1. **Schefflera caudata** (Vidal) Merrill & Rolfe comb. nov.

Heptapleurum caudatum Vidal Phan. Cuming. Philip. (1885) 175; Rev. Pl. Vasc. Filip. (1886) 145, excl. Cuming 800.

Schefflera acuminatissima Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 109.

LUZON, Province of Albay, Tivi, *Vidal 793, 1429a*, the former being the type of the species ex descr.!: Province of Bataan, Mount Mariveles, *Whitford 172, 1222; For. Bur. 3005 Meyer.*

The original diagnosis of *Heptapleurum caudatum* Vidal, applies entirely to *Vidal 793*, and not at all to *Cuming 800*, although the latter is the first number cited, and as no type was indicated, *Cuming 800* would naturally be taken to represent the type of the species, unless the diagnosis was examined carefully and compared with the original specimens. *Schefflera acuminatissima* Merr., was described as "quite distinct from *Heptapleurum caudatum* Vidal," owing to the fact that the conception of Vidal's species in Manila was based on a specimen of *Cuming 800*. As a matter of fact, however, the type of this species is identical with *Vidal 793*, which we consider to be the type of *Schefflera caudata*.

2. **Schefflera Cumingii** (Seem.) Merrill & Rolfe comb. nov.

Heptapleurum Cumingii Seem. Journ. Bot. 3 (1865) 81; Rev. Hederac. (1868) 45, excl. Cuming 800.

Seemann describes this species as follows: "Foliolis 5 ellipticis acuminatis v. ovato-ellipticis longe acuminatis integerrimis 3-plinerviis; paniculis terminalibus pube stellato albido vestitis; drupis obovatis, 5-locularibus. Philippine Islands (Cuming! n. 800 et 1293)."

As was the case with *Schefflera caudata* (Vidal), *Cuming 800* is the first specimen cited, and would therefore naturally be taken to be the type of the species. However, in 5 sheets of *Cuming 800* that we have examined, including Seemann's type material at the British Museum, all the leaves are 3-foliolate, and although they are long-acuminate, they are not "3-plinerviis." In four specimens of *Cuming 1292* examined, the leaves are 5-foliolate, and although not long-acuminate, are strongly "3-plinerviis." It is apparent that Seemann drew up his description from both specimens, but mostly from the second number cited, the characters of which predominate in his diagnosis, and which we consider to be the type of the species. *Cuming 800*, while the first specimen cited in the original descriptions of both the above species, was really described in neither, and is here described as a new species. Seeman cites the number 1293, an error for 1292.

3. **Schefflera trifoliata** Merrill & Rolfe sp. nov.

Scandens; foliolis 3, glabris, submembranaceis, 10 ad 20 cm longis, oblongis vel oblongo-ovatis, integris, caudato-acuminatis; paniculis terminalibus, ramis elongatis, multifloris, furfuraceis; floribus superis fasciculatis, prope ramulorum basin umbellatis.

Scandent, glabrous, branches light-gray. Leaves alternate, trifoliolate,

the petioles 3 to 8 cm long, somewhat dilated at the base, the petiolules 1.5 to 4 cm long. Leaflets oblong to oblong-ovate, entire, the apex caudate-acuminate, the acumen 1.5 to 2 cm long, submembranous, dull, the nerves 8 to 10 on each side of the midrib, the secondary ones and reticulations nearly as prominent as the primary nerves, all evident on both surfaces. Inflorescence terminal, its branches few, 20 to 25 cm long, springing from the apices of the branchlets, somewhat furfuraceous. Flowers numerous, the pedicels 4 to 5 mm long, those on the upper parts of the branches in 3- to 6-flowered fascicles, toward the base frequently in pedunculate umbels, the peduncles 8 mm long or less. Fruits oblong, 6 mm long, 3 mm wide, 5-sulcate.

Luzon, Province of Tayabas, *Cuming 800* (type): Province of Albay, Tivi, *Vidal 1429:* Province of Camarines Sur, Tigaon, *Vidal 1430*; Sipocot, *Vidal 794.*

OLEACEÆ.

JASMINUM Linn.

Jasminum pseudopinnatum Merrill & Rolfe sp. nov. § *Unifoliolata.*

Scandens; ramis ramulis petiolisque pubescentibus; foliis distichis, ovatis, membranaceis, subtus costa excepta glabris, ovatis, acuminatis, pinnatinerviis; inflorescentiis terminalibus, 1- ad 3-floris; floribus breviter pedicellatis; calyce cylindraceo, usque ad 3.5 mm longo, 4-dentato; corollae tubo 1.5 ad 1.8 cm longo, laciniis 7, lanceolatis, 10 ad 12 mm longis.

Scandent, the branches slender, terete, flexuous, the older ones light-gray, the younger ones brownish, the branchlets spreading and with the opposite leaves having the appearance of a 4- to 6-jugate pinnate leaf. Leaves ovate, glabrous except on the midrib beneath, which is slightly pubescent, the base broad and rounded or acute, acuminate at the apex, membranous, 2 to 5 cm long, 1 to 3 cm wide; nerves about 5 on each side of the midrib, distant, slender, anastomosing, the reticulations very lax; petioles 2 to 3 mm long. Inflorescence terminal, 1- to 3-flowered, the flowers short-pedicelled. Flowers white. Calyx cylindrical, about 3.5 mm long, glabrous, 4-toothed, the teeth less than 0.5 mm long. Corolla-tube slender, 1.5 to 1.8 cm long, the lobes 7, lanceolate, acute or acuminate, 10 to 12 mm long, 3 mm wide. Anthers oblong-lanceolate, apiculate, about 5 mm long.

Luzon, Province of Rizal, Bosoboso, *Bur. Sci. 1111 Ramos,* July, 1906; without locality, *Marave 181,* November, 1904.

Manifestly allied to *Jasminum aculeatum* (Blanco) Walp., but differing from that species by its few-flowered, not paniculate inflorescence, smaller, fewer-nerved leaves, shorter petioles, somewhat larger flowers, decidedly larger anthers, and fewer calyx-teeth.

Jasminum dolichopetalum Merrill & Rolfe sp. nov. § *Unifoliolata.*

Scandens, glabrum; foliis lanceolatis vel anguste elliptico-lanceolatis, glabris, membranaceis vel chartaceis, subtrinerviis, basi cuneatis, apice sensim anguste caudato-acuminatis; inflorescentiis terminalibus, pauciforis, breviter pedunculatis; floribus fasciculatis vel umbellatis; calycis laciniis 5, anguste lanceolatis, usque ad 1 mm longis; corollae tubo 13 mm longo, laciniis 10, linearibus, acuminatis, usque ad 3 cm longis, 1.5 ad 2 mm latis.

Glabrous throughout, scandent, the branches slender, smooth, brown. Leaves lanceolate to narrowly elliptical-lanceolate, membranous or chartaceous, the base cuneate, the apex gradually and narrowly caudate-acuminate, 6 to 10 cm long, 1.5 to 3 cm wide, the midrib prominent beneath and with a pair of submarginal basal nerves, anastomosing with the few distant lateral nerves, the reticulations very lax. Inflorescence terminal, few-flowered, the flowers white, 2 to 4, fasciculate or umbellate at the ends of the branches, the pedicels 3 to 3.5 cm long. Calyx short, the lobes 5, about 1 mm long, the corolla-tube about 13 mm long, slender, the lobes 10, very narrow and elongated, about 3 cm long, 1.5 to 2 mm wide. Anthers oblong-lanceolate, apiculate, 3 mm long.

Luzon, Province of Rizal, Bosoboso, *Bur. Sci. 995 Ramos,* June, 1906.

A very characteristic species, distinguished by its narrow, long-acuminate, glabrous leaves, few-flowered terminal inflorescence, long pedicels and very long corolla lobes.

LOGANIACEÆ.

MITRASACME Labill.

Mitrasacme nudicaulis Reinw. ex Blume Bijdr. (1826) 849; A. DC. Prodr. 9 (1845) 12; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 80; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1889) 117.

Luzon, District of Lepanto, Mount Data, *Merrill 4486.*

New to the Archipelago, and differing from the common and widely diffused *Mitrasacme alsinoides* in that its leaves are confined to a basal rosette.

Eastern India to southern China and Malaya.

GENTIANACEÆ.

HOPPEA Willd.

Hoppea dichotoma Willd. in Ges. Nat. Fr. Berl. Neue Schrift. 3 (1801) 435; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 100.

Luzon, Province of Benguet, Loo, *Loher 5045.*

A most interesting addition to our knowledge of the Asiatic element in the flora of northern Luzon, the genus containing but two species, both previously known only from British India.

APOCYNACEÆ.

CHONEMORPHA G. Don.

Chonemorpha elliptica (Blanco) Merrill & Rolfe comb. nov.

Tabernaemontana elliptica Blanco Fl. Filip. (1837) 115; ed. 2 (1845) 83; ed. 3, 1:152; F.-Vill. Nov. App. (1883) 132.

Chonemorpha macrophylla Merr. in Govt. Lab. Publ. 29 (1905) 45, non Don.

LUZON, Province of Rizal, Bosoboso, *Merrill 2704*; *For. Bur. 1141 Ahern's collector*; *Bur. Sci. 1065 Ramos*; *Loher 3881*; San Mateo, *Vidal 3265*.

The Philippine form cannot with propriety be referred to *Chonemorpha macrophylla* G. Don, as it has flowers about one-half the size of those of the latter and differs in some other characters. As the specimens above cited represent a different species, Blanco's specific name is here adopted, because this is certainly the plant that Blanco described under the name *Tabernaemontana elliptica*.

ALYXIA R. Br.

Alyxia lucida Wall. in Roxb. Fl. Ind. ed. Carey & Wall. 2 (1824) 540; Hook. f. Fl. Brit. Ind. 3 (1882) 635; King & Gamble in Journ. As. Soc. Beng. 74[2] (1907) 418.

CULION, *Merrill 614*, December, 1902.

Malay Peninsula to Sumatra and Borneo; new to the Philippines.

WRIGHTIA R. Br.

Wrightia calycina A. DC. Prodr. 8 (1844) 406; Miq. Fl. Ind. Bat. 2 (1856) 433.

GUIMARAS, *For. Bur. 228 Gammill*. MASBATE, *Merrill 3082, 3049*. PALAWAN, *For. Bur. 4510 Curran*.

The above specimens agree very closely in all essential characters with authentic specimens of this species from Timor, in Herb. Kew.

Timor.

ASCLEPIADACEÆ.

ISCHNOSTEMMA King & Gamble.

Ischnostemma carnosum (R. Br.) Merrill & Rolfe comb. nov.

Oxystelma carnosum R. Br. Prodr. (1810) 462.

Vincetoxicum carnosum Benth. Fl. Austral. 4 (1869) 331.

Cynanchum carnosum Schltr. in Perk. Frag. Fl. Philip. (1904) 120.

Ischnostemma selangorica King & Gamble in Journ. As. Soc. Beng. 74[2] (1907) 532.

LUZON, *Loher 4039, 4040*: Province of Bataan, Lamao River, *Williams 387*, December, 1903.

In 1907 King and Gamble described the above monotypic genus, based on specimens collected in Selangor by Ridley and the specimens collected by Loher in Luzon, cited above. In 1904, however, Schlechter had identified the second of Loher's two numbers as *Oxystelma carnosum* R. Br., and transferred the species to *Cynanchum*. In working over the material at Kew, the same number of Loher's collection being found cited under both the above genera, Mr. N. E. Brown, specialist on *Asclepiadaceæ* at Kew, was asked to compare the specimens with Robert Brown's type of *Oxystelma carnosum*. Both the type in the British

Museum and the duplicate type at Kew were examined, and Mr. Brown informed us that Loher's and Ridley's plants were undoubtedly referable to Robert Brown's species, which was however, in his opinion, not a *Cynanchum*. We have accordingly here accepted the genus *Ischnostemma*, adopting the earliest specific name available.

Australia, Luzon, and the Malay Peninsula.

IPOMOEA Linn.

Ipomoea quinata R. Br. Prodr. (1810) 486; Choisy in DC. Prodr. 9 (1845) 385; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 214; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 162.

Luzon, Province of Benguet, *Loher 2143*, *2144*.

Eastern India to southern China and north Australia; not previously reported from the Philippines.

Ipomoea hispida (Vahl) R. & S. Syst. 4 (1819) 238.

Convolvulus hispidus Vahl Symb. 3 (1794) 29.

Ipomoea eriocarpa R. Br. Prodr. (1810) 484; Choisy in DC. Prodr. 9 (1845) 369; Benth. Fl. Austral. 4 (1869) 426; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 204.

Luzon, Province of Benguet, Bued River, *Merrill 4270*, November, 1905, a narrow-leaved form.

Widely distributed in the tropics of the Old World from Asia to Australia; not previously reported from the Philippines.

Ipomoea involucrata Beauv. Fl. Owar. 2 (1807) 52, *t. 89*.

Ipomoea pileata Roxb. Fl. Ind. 1 (1832) 504; Choisy in DC. Prodr. 9 (1845) 365; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 203; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 162.

Culion, *Merrill 542*, December, 1902.

Tropical Africa and Asia; new to the Philippines.

MERREMIA Dennst.

Merremia vitifolia (Burm.) Hallier f. in Engl. Bot. Jahrb. 16 (1893) 552; Prain in Journ. As. Soc. Bengal 74[2] (1905) 303.

Convolvulus vitifolius Burm. Fl. Ind. 1 (1768) 45, *t. 18, f. 1*.

Ipomoea vitifolia Sweet Hort. Brit. ed. 2 (1830) 372; Choisy in DC. Prodr. 9 (1845) 361; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 213.

Palawan (Paragua), Ewiig River, *Merrill 733*, February, 1902; *Bur. Sci. 802 Foxworthy*, April, 1906. Balabac, *Bur. Sci. 483 Mangubat*, March, 1906.

British India to the Malay Archipelago; new to the Philippines.

Merremia bufalina (Lour.) comb. nov.

Convolvulus bufalinus Lour. Fl. Cochinchin. 1 (1790) 109.

Ipomoea bufalina Choisy in Mém. Soc. Phys. Genèv. 6 (1833) 452; DC. Prodr. 9: 360.

Ipomoea Riedeliana Oliv. in Hook. Icones 15 (1883) 19, *pl. 1424*.

Merremia Riedeliana Hallier f. in Engl. Bot. Jahrb. 18 (1904) 552.

Luzon, Province of Rizal, Montalban, *Merrill 5040*, March, 1906; Novaliches, *Loher 4156*, February, 1891; Province of Union, Banang, *Elmer 5622*, February, 1904.

Cochin China and the Malay Archipelago; new to the Philippines.

ANISEIA Choisy.

Aniseia martinicensis (Jacq.) Choisy Convolv. Rar. (1838) 144; DC. Prodr. 9 (1845) 430; Hallier f. in Engl. Bot. Jahrb. 18 (1895) 96 et Bull. Herb. Boiss. 5 (1897) 382; Prain in Journ. As. Soc. Beng. 74[2] (1905) 301.

Convolvulus martinicensis Jacq. Select. Stirp. Am. (1763) 20, *t. 17.*

Convolvulus uniflorus Lam. Encycl. Meth. 3 (1789) 544.

Ipomoea uniflora R. & S. Syst. 4 (1819) 247; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 201.

PHILIPPINES, without locality, *Vidal 3356*, in Herb. Kew.

Widely distributed in the tropics; new to the Philippines.

BORRAGINACEÆ.

HELIOTROPIUM Linn.

Heliotropium strigosum Willd., var. **brevifolia** (Wall.) Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 151.

LUZON, Province of Zambales, Iba, *Merrill 328*, June, 1902; near Manila, *Wilkes Expedition*, in U. S. National Herbarium; without locality, *Loher 1544.*

Western Asia, Malacca and Australia; new to the Philippines.

Heliotropium bracteatum R. Br. Prodr. (1810) 493; Benth. Fl. Austral. 4 (1869) 397; DC. Prodr. 9 (1845) 547.

Heliotropium cyrtostachyum Miq. Fl. Ind. Bat. 2 (1859) 924.

MINDANAO, District of Davao, Davao, *Copeland 538*, March, 1904.

Java to northern Australia; new to the Philippines.

CYNOGLOSSUM Tourn.

Cynoglossum furcatum Wall. in Roxb. Fl. Ind. ed. Carey & Wall. 2 (1824) 6; DC. Prodr. 10 (1846) 149; Clarke in Hook. f. Fl. Brit. Ind. 4 (1883) 155; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 149.

LUZON, Province of Benguet, Bued River, *Merrill 4299*, November, 1905.

Not previously recorded from the Philippines and the second species of the genus to be found in Luzon, differing from the more common *C. micranthum* Desf., in having the hairs on the under surface of the leaves and on the stem reflexed.

Afghanistan, throughout India to Ceylon, China and Japan.

LABIATÆ.

CALAMINTHA Lam.

Calamintha umbrosa (Bieb.) Benth. in DC. Prodr. 12 (1848) 232; Hook. f. Fl. Brit. Ind. 4 (1885) 650; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 284.

Calamintha repens Benth. l. c. 233.

Melissa umbrosa Bieb. Fl. Taur. Cauc. 2 (1808–19) 63.

Stachys rubisepala Elm. Leafl. Philip. Bot. 1 (1908) 338.

LUZON, Province of Benguet, Tabio, *Loher 4184, 4185;* Panai, *Bur. Sci. 2748, 2846, 4357, 4358, 4389 Mearns:* District of Lepanto, Mount Data, *Merrill 4534.*

Caucasus Mountains, India, and Ceylon to Java, China, Japan, and Formosa, the first representative of the genus to be found in the Philippines.

SCROPHULARIACEÆ.

HEMIPHRAGMA Wall.

Hemiphragma heterophyllum Wall. Tent. Fl. Nepal. (1826) 16. *t. 8;* Cat. (1828) no. 3895; Trans. Linn. Soc. 13: 612; Benth. in DC. Prodr. 10 (1856) 429; Hook. f. Fl. Brit. Ind. 4 (1884) 289; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 192.

Veitera dentata Elmer Leafl. Philip. Bot. 1 (1906) 15.

LUZON, District of Lepanto, Mount Data, *Loher 5047, 5048; Merrill 4510;* Province of Benguet, Mount Santo Tomas (Tonglon) *Elmer 6239,* May, 1905; *Mearns s. n.* December, 1906; Pauai, *Bur. Sci. 4302, 4307 Mearns,* July, 1907.

The genus is here first reported from the Philippines, and is a striking example of the eastward extention of the Himalayan flora to the highlands of northern Luzon; erroneously ascribed by Elmer to *Veitera* (*Rubiaceae*).

Temperate Himalaya from Garwhal to Bhotan, Khasia Mountains, Yunnan and Formosa.

LIMNOPHILA R. Br.

Limnophila hirsuta (Heyne) Benth. in DC. Prodr. 10 (1846) 388; Hook. f. Fl. Brit. Ind. 4 (1884) 268; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 186.

Stemodia hirsuta Heyne in Wall. Cat. (1828) no. 3930; Benth. Scroph. Ind. (1835) 24.

MINDANAO, District of Davao, *Copeland 426,* March, 1904, in open wet places.

British India to Hongkong and the Malay Archipelago; not previously reported from the Philippines.

Limnophila sessiliflora (Vahl) Blume Bijdr. (1826) 750; Benth. in DC. Prodr. 10 (1846) 389; Hook. f. Fl. Brit. Ind. 4 (1884) 270; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 186.

Hottonia sessiliflora Vahl Symb. 2 (1791) 36.

LUZON, Province of Benguet, *Loher 4350;* Baguio, *Elmer 5755; Merrill 4439; Bur. Sci. 3795 Mearns;* Province of Ilocos Norte, *Bur. Sci. 2271 Mearns,* January, 1907. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 941,* February, 1907.

British India to Japan and the Malay Archipelago; an interesting aquatic plant not previously reported from the Philippines.

COMPOSITÆ.

ANAPHALIS DC.

Anaphalis contorta (Don) Hook. f. Fl. Brit. Ind. 3 (1881) 284.

Antennaria contorta Don in Bot. Reg. 7 (1821) *t. 605.*

Gnaphalium contortum Ham. ex Spreng. Syst. Veg. 3 (1826) 479.

Anaphalis tenella DC. Prodr. 6 (1837) 273.

Gnaphalium tenellum Wall. Cat. (1828) no. 2941, nomen.

Anaphalis cinnamomea Elmer Leafl. Philip. Bot. 1 (1906) 120, non Clarke.

LUZON, Province of Benguet, Pauai, *Bur. Sci. 4329 Mearns,* July, 1907; Mount Tonglon, *For. Bur. 5043 Curran,* August, 1906; *Elmer 6281,* May, 1904; District of Lepanto, Mount Data, *Merrill 4539,* November, 1905.

Temperate and subalpine Himalaya, the Mishmi Hills and the Khasia Mountains.

Anaphalis adnata DC. Prodr. 6 (1837) 274; Hook. f. Fl. Brit. Ind. 3 (1881) 282; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1888) 425.

Luzon, Province of Benguet, *Loher 3710;* Bagnio, *Merrill 4334;* District of Lepanto, Mount Data, *Merrill 4549.*

Mountains of northern India to Martaban, Burma and Kwangtung. This species and the preceding have already been mentioned from Luzon by C. B. Robinson.[5]

GNAPHALIUM Linn.

Gnaphalium japonicum Thunb. Fl. Jap. (1784) 311; DC. Prodr. 6 (1837) 237; Benth. Fl. Austral. 3 (1866) 653; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1888) 427.

Gnaphalium oblancifolium Elmer Leafl. Philip. Bot. 1 (1906) 123.

Luzon, Province of Benguet, *Loher 3714;* Mount Santo Tomas, *Elmer 6556,* June, 1904; Bugias, *Merrill 4663,* October, 1905; Panai, *Bur. Sci. 4348 Mearns,* July, 1907.

Japan and China to Australia and New Zealand. *G. oblancifolium* Elmer, can not be distinguished from the typical form.

Gnaphalium hypoleucum DC. in Wight. Contr. (1834) 21; Prodr. 6 (1837) 222; Hook. f. Fl. Brit. Ind. 3 (1881) 288.

Luzon, Province of Benguet, Bued River, *Merrill 4276,* October, 1905; District of Lepanto, Mount Data, *Merrill 4493.* November, 1905.

Temperate Himalaya to Japan and China; new to the Philippines.

ARTEMISIA Linn.

Artemisia capillaris Thunb. Fl. Jap. (1784) 309; DC. Prodr. 6 (1837) 126; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1888) 442.

Artemisia parviflora Rolfe in Journ. Bot. 23 (1885) 213; Vidal Rev. Pl. Vasc. Filip. (1886) 163; Ceron Cat. Pl. Herb. (1892) 103; Elmer Leafl. Philip. Bot. 1 (1906) 141, non Roxb.

The Philippine form is now represented at Kew by a full series of specimens collected by Vidal, Loher, Elmer, and Merrill, and after a careful examination of this material and comparison with the rich Indian and Chinese collections at Kew, we have come to the conclusion that the Philippine form must be referred to Thunberg's species rather than to Roxburgh's, the former being also very closely allied to *Artemisia scoparia* Waldst.

Manchuria to Kamtschatka and Japan, Pescadores, Formosa and southern China.

ANISOPAPPUS Hook. & Arn.

Anisopappus chinensis (Linn.) Hook. & Arn. Bot. Beech. Voy. (1841) 196; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1888) 431.

Verbesina chinensis Linn. Sp. Pl. (1753) 901; DC. Prodr. 5 (1836) 618.

Chrysogonum philippinense Elmer Leafl. Philip. Bot. 1 (1906) 161.

Culion, *Merrill 514,* December, 1902.

The Culion specimen on which Elmer based his *Chrysogonum philippinense,* does not belong in that genus, but is *Anisopappus,* not specifically distinct from *A. chinensis.*

Kwangtung, Hongkong and the Shan States.

[5] Journ. N. Y. Bot. Garden 8 (1907) 115.

COSMOS Cav.

Cosmos sulfureus Cav. Icon. 1 (1791) 56, *t.* 79; F.-Vill. Nov. App. (1883) 118.

Corcopsis Drummondii Elmer Leafl. Philip. Bot. 1 (1906) 172, non Torr. & Gray.

A species introduced from tropical America and now spontaneous in the Philippines, although not nearly as common as *C. caudatus* H. B. K. The specimens cited by Elmer are certainly *Cosmos sulfureus* Cav., which we consider to be a true *Cosmos*, and only remotely resemble *Corcopsis Drummondii* Torr. & Gray.

BIDENS Linn.

Bidens bipinnata Linn. Sp. Pl. (1753) 832; DC. Prodr. 5 (1836) 603; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1888) 434.

Bidens pilosa L. var. *bipinnata* Hook. f. Fl. Brit. Ind. 3 (1881) 309.

Luzon, Province of Benguet, *Merrill 4308*.

Widely distributed in the warmer parts of the world; new to the Philippines.

Bidens tripartita Linn. Sp. Pl. (1753) 831; DC. Prodr. 5 (1836) 594; Hook. f. Fl. Brit. Ind. 3 (1881) 309; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1888) 436.

Luzon, Province of Benguet, *Loher 3637*.

Western Europe and northern Africa to China and Japan; new to the Philippines.

EPALTES Cass.

Epaltes australis Less. in Linnaea 5 (1831) 148; Benth. Fl. Austral. 3 (1866) 530; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1888) 423; Elmer Leafl. Philip. Bot. 1 (1906) 108.

Sphaeromorphaea Russeliana Elmer l. c. 140, non DC.

Luzon, *Loher 3612, 5086:* Province of Rizal, Caloocan, *Merrill 3655*, November, 1903.

The type of A. DeCandolle's genus *Sphaeromorphaea* is a plant collected in southern India by Russel and described by DeCandolle in Deless. Ic. Sel. Pl. 4. *t.* 49 as *S. Russeliana*. In the Prodromus[6] he placed under this species as the var. *β glabrata*, a form collected for or by Royle in northwestern India, of which nothing more is known at present. Under his new genus he included further (1) *S. petiolaris*, a Port Jackson gathering of Gaudichaud's, which is identified by Bentham & Hooker[7] with *Epaltes australis* Lessing, non DC., and (2), but doubtfully, *Centipeda orbicularis* Lour., to which at least in part, belongs the material included under *Myriogyne minuta* Less.[8]

In the Genera Plantarum, species one and two of the Prodromus were duly reduced to the genera *Epaltes* Lessing, and *Centipeda* Loureiro, respectively, but *S. Russeliana*, the type of the genus, was left undisposed of. It was taken up again in the Flora of British India, fresh material having been meantime received from central India, collected by the late C. B. Clarke in the Chota Nagpore country. *S. Russeliana* is apparently a species of *Epaltes*, and manifestly akin to *E. australis*, but distinct from that and probably endemic in the Western

[6] 6 (1827) 140.

[7] Gen. Pl. 2:294.

[8] Prodr. 6 (1827) 139.

Peninsula. The plant from Siam seems to be not "*Russeliana*," but *S. australis* which is widely diffused throughout the Malayan and Pacific regions, and to which the Philippine specimens mentioned above must be referred. (J. R. D.)

SENECIO Linn.

Senecio luzoniensis Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 244.

This is evidently an endemic species representing the series of forms usually placed under *S. sarracenicus* or *S. nemorensis*, which extend from central and southeastern Europe through northern China to western China. The Luzon form is sufficiently distinguished from Chinese *S. nemorensis* by the sharper angles at which the secondary nerves of the leaf are given off from the midrib and their far shallower curvature. (J. R. D.)

GYNURA Cass.

Gynura rubiginosa (Elmer) J. R. Drummond comb. nov.

Senecio rubiginosus Elmer Leafl. Philip. Bot. 1 (1906) 154.

Luzon, Province of Benguet, Mount Santo Tomas, *Elmer 6246*.

I cannot see how this plant can be generically separated from *Gynura Vidaliana* Elmer, which belongs to a characteristic Indonesic group of closely allied forms. (J. R. D.)

Gynura Vidaliana Elmer Leafl. Philip. Bot. 1 (1906) 144.

Luzon, *Vidal 1499, 1510, 3135; Loher 3697, 3701, 3702; Micholitz s. n.; Merrill 4593, 4844*.

These apparently represent a single, rather variable species, but more material is needed to dispose of *Merrill 3937* from Mount Arayat, which appears possibly to be distinct. However it is possible that this species, with *G. purpurascens* DC., *G. aurantiaca* DC., possibly also *G. nepalensis* DC., and *G. Finlaysoniana*, constitute but forms of the officinal *G. Pseudo-China* DC. (J. R. D.)

Gynura sarmentosa DC. Prodr. 6 (1837) 298; F.-Vill. Nov. App. (1883) 120; Hook. f. Fl. Brit. Ind. 3 (1881) 335; Vidal Phan. Cuming. Philip. (1885) 122; Rev. Pl. Vasc. Filip. (1886) 163.

Gynura affinis Turcz. in Bull. Soc. Nat. Mosc. 24[1] (1851) 201; F.-Vill. l. c. 120.

Gynura scabra Turcz. l. c.

Senecio mindorensis Elmer Leafl. Philip. Bot. 1 (1906) 155.

This widely distributed species is well represented in the Kew herbarium, and we are of the opinion that the two species described by Turczaninow, based on Cuming's material, as well as *Senecio mindorensis* Elmer, are all referable to typical *Gynura sarmentosa* DC. We have not been able to identify the plant collected by Copeland, no. 1258, which was referred by Elmer, l. c. 147 to DeCandolle's species, and it is possibly not a *Gynura*.

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(Concluded from second page of cover.)

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No. 33, 1905, Biological Laboratory.—Further Observations on Fibrin Thrombosis in the Glomerular and in Other Renal Vessels in Bubonic Plague. By Maximilian Herzog, M. D.

[1] *No. 34, 1905.*—I. Birds from Mindoro and Small Adjacent Islands. II. Notes on Three Rare Luzon Birds. By Richard C. McGregor.

No. 35, 1905.—I. New or Noteworthy Philippine Plants, IV. II. Notes on Cuming's Philippine Plants in the Herbarium of the Bureau of Government Laboratories. III. Hackel, "Notes on Philippine Grasses." IV. Ridley, "Scitimineæ Philippinenses." V. Clarke, "Philippine Acanthaceæ." By Elmer D. Merrill, Botanist.

No. 36, 1905.—A Hand-List of the Birds of the Philippine Islands. By Richard C. McGregor and Dean C. Worcester.

LIST OF PREVIOUS PUBLICATIONS OF THE MINING BUREAU (NOW DIVISION OF MINES OF THE BUREAU OF SCIENCE).

1890.—Descripción física, geológica y minera en bosquejo de la Isla de Panay por D. Enrique Abella y Casariego, Inspector General de Minas del Archipiélago.

1890.—Memoria descriptiva de los manantiales minero-medicinales de la Isla de Luzon, estudiados por la comisión compuesta de los Señores D. José Centeno, Ingeniero de Minas y Vocal Presidente, D. Anacleto del Rosario y Sales, Vocal Farmacéutico, y D. José de Vera y Gómez, Vocal Médico.

1893.—Estudio descriptivo de algunos manantiales minerales de Filipinas ejecutado por la comisión formada por D. Enrique Abella y Casariego, Inspector General de Minas D. José de Vera y Gómez, Médico, y D. Anacleto del Rosario y Sales, Farmacéutico; precedido de un prólogo escrito por el Excmo. Sr. D. Angel de Avilés, Director General de Administración Civil.

1893.—Terremotos experimentados en la Isla de Luzón durante los meses de Marzo y Abril de 1892, especialmente desastrosos en Pangasinán, Unión y Benguet. Estudio ejecutado por D. Enrique Abella y Casariego, Inspector General de Minas del Archipiélago.

1901.—The Coal Measures of the Philippines. Charles H. Burritt.

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1903, Bulletin No. 3.—Report on a Geological Reconnoissance of the Iron Region of Angat, Bulacan. H. D. McCaskey, B. S.

1904.—Fifth Annual Report of the Mining Bureau. H. D. McCaskey.

1905.—Sixth Annual Report of the Chief of the Mining Bureau. H. D. McCaskey.

1905, Bulletin No. 4.—A Preliminary Reconnoissance of the Mancayan-Suyoc Mineral Region, Lepanto, P. I. A. J. Eveland, Geologist.

1905, Bulletin No. 5.—The Coal Deposits of Batan Island. Warren D. Smith, B. S., M. A., Geologist.

DIVISION OF MINES.

1908.—The Mineral Resources of the Philippine Islands, with a Statement of the Production of Commercial Mineral Products during the year 1907, issued by Warren D. Smith, Chief of the Division of Mines.

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NEW PHILIPPINE PLANTS FROM THE COLLECTIONS OF MARY STRONG CLEMENS, I

By Elmer D. Merrill
(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

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(Concluded on third page of cover.)

NEW PHILIPPINE PLANTS FROM THE COLLECTIONS OF MARY STRONG CLEMENS, I.

By Elmer D. Merrill.

(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

From December, 1905, to October, 1907, Chaplain Joseph Clemens of the Seventeenth United States Infantry, accompanied by his wife, was stationed at Camp Keithley, Lake Lanao, Mindanao, and during this time Mrs. Clemens made extensive botanical collections which were forwarded from time to time to this herbarium for study. In the two years during which collections were made, somewhat over 1,200 numbers of plants were sent to Manila, besides a very extensive supplementary collection of unnumbered material.

Lake Lanao is located at an altitude of about 760 meters above the sea, and Camp Keithley is situated near the lake on the ridge between it and the Sulu Sea, the highest point on the reservation being about 815 meters above sea level. The region is subject to heavy rainfall, and during parts of the year fogs are very prevalent, so that the humidity is relatively high. The district was entirely unexplored botanically, and the collection, as was to be expected, has shown an unusually high percentage of novelties, containing many genera hitherto unknown from the Philippines, several apparently undescribed genera, many species new to the Archipelago, and a great number of undescribed species, while the range of many plants, previously known only from Luzon, has been extended to Mindanao. A number of novelties from this collection have been included in my previous papers, among them several new species, as well as genera and species new to the Philippines. The material still contained so much of interest that it was thought advisable to prepare and publish a series of two or three papers, for the greater part based on this collection.

The Lake Lanao region, politically, is one of the most turbulent districts in the Philippines, and has been under firm control during the recent years of American occupation only, and after several campaigns against the fanatical Moros who inhabit the region. Spanish authority was only nominal before the year 1898, while even at the present date the district can not be considered a safe one for the traveler. Minor

outbreaks against the constituted authority were of not infrequent occurrence during the period while the collections here considered were being made, so that it was unsafe to go far from the military post without an escort. In addition to the element of personal danger attending botanizing in the region, the humidity is so high that good specimens could be prepared only with difficulty. Under the circumstances Mrs. Clemens is to be congratulated on the extent and value of the material which she secured.

The first set of the collection is deposited in the Herbarium of the Bureau of Science, where the types of the species here described are to be found. With the exception of the first set, and some specimens that have been sent to various specialists for study, the collection remains at the disposition of the collector.

URTICACEÆ.

LEUCOSYKE Zoll. & Mor.

Leucosyke candidissima (Blume) Wedd. in DC. Prodr. 16[1] (1869) 235[26].

Urtica candidissima Blume Bijdr. (1825) 498.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens*, September, 1907.

A very striking species, previously known only from Java, the third of the genus to be found in the Philippines.

MORACEÆ.

FICUS Linn.

Ficus clementis Merrill sp. nov. § *Urostigma*.

Arbor procera, glabra; ramulis crassis, annulatis, angulatis; foliis coriaceis, oblongis vel elliptico-oblongis, breviter obtuseque acuminatis, basi acutis vel rotundatis, usque ad 20 cm longis, longe petiolatis; nervis utrinque ca. 7; receptaculis sessilibus, axillaribus, solitariis vel binis, ovoideis vel ellipsoideis, 2 ad 2.5 cm longis, basi grosse 3-bracteatis, bracteolis involucrantibus, usque ad receptaculi medium porrectis.

A very large tree, glabrous throughout. Branches thick, reddish-brown, angular, with many annular scars. Leaves oblong or elliptical-oblong, coriaceous, shining, 20 cm long or less, 7 to 10 cm wide, entire, apex shortly and obtusely acuminate, base rounded or acute, usually rather abruptly narrowed at both ends; primary nerves about 7 on each side of the midrib, anastomosing near the margins, and with alternating rather distinct secondary nerves, the reticulations rather close; petioles 5 to 7 cm long, the very young branches with numerous deciduous membranous lanceolate 8 cm long stipules, the apical scales on older branches coriaceous, ovate, short-acuminate, 1.5 to 2 cm long. Receptacles solitary or in pairs in the leaf axils, sessile, ovoid or ellipsoid, 2 to 2.5 cm long, when young entirely enclosed in the basal bracts, apex rounded, the ostiole

obscure; basal bracts broadly ovate or reniform, coriaceous, rounded, imbricate, about 1.5 cm wide, reaching to about the middle of the mature receptacles. Male flowers numerous, pedicellate; the perianth of two coriaceous ovate lobes 1 mm long, about equaling the solitary stamen; anther 1.5 mm long, subsessile.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 703, 421*, September, March, 1906, and without numbers, February and September–October, 1907.

A species allied to *Ficus procera* Reinw., *F. rigida* Miq., and *F. involucrata* Bl., well characterized, however, by its very large involucrate basal bracts and obscure ostiole.

Ficus cordatula Merrill sp. nov. § *Urostigma.*

Arbor magna, glabra, ramulis exceptis; foliis coriaceis, ellipticis vel oblongo-ovatis, breviter acuminatis, basi cordatis, 20 ad 28 cm longis, nervis utrinque 10 ad 12, prominentibus; receptaculis axillaribus, sessilibus, glabris, ellipsoideis vel oblongo-ovoideis, ca. 3 cm longis, basi 3-bracteatis, bracteis plus minus hirsutis, 7 mm longis, 10 ad 12 mm latis.

A large tree, glabrous except the branchlets which are more or less hirsute, the branches brown or gray, angular, stout, marked with annular scars. Leaves elliptical to oblong-ovate, coriaceous, shining above, 20 to 28 cm long, 9 to 15 cm wide, entire, or the margins slightly undulate, apex short and abruptly acuminate, the base rather broad, rounded, cordate, the sinus narrow, the lobes somewhat overlapping; nerves 10 to 12 on each side of the midrib, very prominent, anastomosing, distant, the reticulations distinct, the base with two stout nerves and several short fainter ones; petioles stout, 5 to 7 cm long; stipules ovate, acute or acuminate, hirsute, 2 to 2.5 cm long. Receptacles axillary, sessile, glabrous, ellipsoid or oblong-ovoid, about 3 cm long, 2 cm thick, the base with three broad bracts which are slightly hirsute, about 7 mm long, 10 to 12 mm wide. Male flowers few, only near the ostiole, about 5 mm long, the pedicels hirsute; perianth 2-lobed, inclosing the nearly sessile anther. Gall flowers sessile or pedicelled, the pedicels hirsute, the perianth inclosing the turgid 2 mm long ovary.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1089*, June, 1907, and without number, September–October, 1907.

A species allied to *Ficus altissima* Blume and *F. annulata* Blume, well characterized by its large sessile fruits and cordate leaves.

Ficus puncticulata Merrill sp. nov. § *Eusyce* ?

Arbor parva; ramulis, foliis subtus in nervis, petiolisque pauce hirsutis; foliis subcoriaceis, ovatis vel oblongo-ovatis, nitidis, 4 ad 6 cm longis, basi late rotundatis vel leviter cordatis, apice acuminatis, subtus minutissime puncticulatis; nervis subtus prominentibus, utrinque 3, ascendentibus; receptaculis axillaribus, sessilibus, solitariis, ca. 5 mm diam., glabris vel minute scaberrimis.

A small tree, the branches gray or reddish, the branchlets slender,

reddish-brown, sparingly hirsute, becoming glabrous. Leaves alternate, ovate or oblong-ovate, subcoriaceous, shining above, 4 to 6 cm long, 2 to 3.5 cm wide, entire, the margins somewhat recurved, base broad, rounded, sometimes slightly cordate, apex acuminate, the acumen blunt, beneath minutely and densely puncticulate; nerves three on each side of the midrib, very prominent beneath, distant, curved-ascending, obscurely anastomosing, the reticulations rather distinct; petioles 2 to 3 mm long, sparingly hirsute. Receptacles axillary, solitary, globose, 5 mm in diameter or less, glabrous or nearly so, red. Male flowers not seen. Gall flowers (?) sessile, the perianth of three narrowly ovate, reddish, pellucid-punctate lobes 1 mm long or less, the ovary elliptical-ovoid, compressed, the styles short, united into a mass in the middle of the receptacle.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1164*, September, 1907.

A species manifestly allied to *Ficus ramentacea* Roxb., and undoubtedly of the section *Eusyce*, although the male flowers are unknown. Closely allied to *Ficus tayabensis* Elm., which was placed by Elmer in the section *Sycidium*, differing from that species in its sessile receptacles and fewer nerved leaves.

PROTEACEÆ.

HELICIA Lour.

Helicia graciliflora Merrill sp. nov.

Arbor parva, ca. 6 m alta; foliis elliptico-lanceolatis, submembranaceis, tenuiter acuminatis, subintegris vel pauce distanter dentatis, rariter grosse lobatis; racemis tenuibus, usque ad 20 cm longis, plus minus ferrugineo-hirsutis vel pilosis; floribus tenuissimis, 16 mm longis, ca. 1 mm diam., pauce pilosis.

A small tree about 6 m high. Branches slender, terete, grayish-brown, the young branchlets rather densely but deciduously brown-pilose or tomentose. Leaves elliptical-lanceolate, 10 to 14 cm long, 2.5 to 4.5 cm wide, submembranous, sharply and slenderly acuminate, the base acute, the margins subentire or with distant scattered teeth, rarely with one or two large lobes, glabrous above, beneath, especially on the nerves and midrib, more or less deciduous-brown-pilose; nerves about 7 on each side of the midrib, prominent, anastomosing, the reticulations lax; petioles 1.5 to 2 cm long, slender, the blade often decurrent as a very narrow margin. Racemes very slender, many flowered, 20 cm long or less, the rachis, pedicels and flowers more or less brown-pilose with deciduous hairs. Flowers very slender, about 16 mm long, 1 mm or less in diameter.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, April and September, 1907.

A very characteristic species, readily recognizable by its pubescence and very slender flowers. Among the Philippine species it is most closely allied to *Helicia loranthoides* Presl, but very distinct from that species.

LORANTHACEÆ.

LORANTHUS Linn.

Loranthus ovatifolius Merrill sp. nov. § *Dendropthoe.*

Glaber; foliis ovatis, acuminatis, subcoriaceis, nitidis, basi late cordatis; racemis axillaribus, solitariis, confertis; floribus tenuibus, ca. 2 cm longis, 5-meris.

Glabrous throughout, branches terete, slender, pale-grayish-brown, lenticellate. Leaves opposite, ovate to broadly ovate, subcoriaceous, shining on both surfaces, 6 to 8 cm long, 4 to 6 cm wide, apex acuminate, rarely subacute, base broad, rather strongly cordate; nerves 5 or 6 on each side of the midrib, indistinct, irregular, the reticulations obscure; petioles 2 to 3 mm long. Inflorescence axillary, solitary, congested, about 3 cm long, the flowers 3–1 on 2–3 mm long lateral branches which are racemosely disposed, the rachis 1 to 1.5 cm long. Flowers scarlet, slender, about 2 cm long, one sessile, the others on each branchlet short-pedicellate, each subtended by a broadly ovate, acute or obtuse, concave bracteole about 2 mm long. Corolla cylindrical, about 1.5 mm in diameter, not swollen, 5-lobed, lobes extending nearly to the base, less than 1 mm wide; filaments 1.5 mm long; anthers equaling the filaments. Calyx oblong, 2 mm long, 1 mm thick, somewhat sulcate and angular, the limb short, 5-toothed; style about 2 cm long.

Mindanao, without locality, on the seacoast, *Mrs. Clemens 1195*, October, 1907.

A species well characterized by its ovate glabrous shining broadly cordate leaves, congested inflorescence and 5-merous slender flowers.

MAGNOLIACEÆ.

TALAUMA Juss.

Talauma pubescens Merrill sp. nov.

Arbor ca. 15 m alta; ramis ramulis stipulis petiolis foliis subtus bracteisque plus minus dense pubescentibus; foliis elliptico-ovatis vel oblongo-ovatis, acuminatis, chartaceis vel subcoriaceis, 15 ad 30 cm longis, nervis utrinque ca. 20; floribus albis ca. 4 cm longis; petalis 9, glabris, anguste oblongo-obovatis vel subspatulatis, interioribus minoribus.

A tree about 15 m high, the branches terete, rather stout, dark-colored, pubescent, in age glabrous, the branchlets densely fulvous-pubescent. Leaves elliptical-ovate to oblong-ovate, chartaceous to subcoriaceous, 15 to 30 cm long, 8 to 14 cm wide, base rounded, apex rather short-acuminate, above shining and glabrous, beneath more or less pubescent with scattered hairs, in age subglabrous; nerves prominent, about 20 on each side of the midrib, anastomosing near the margin of the leaf: petioles densely pubescent, 2 to 3.5 cm long; stipules deciduous, linear-lanceolate, 8 or 9 cm long, densely fulvous-hirsute outside. Flowers white, fragrant, the buds inclosed in a deciduous, broadly ovate, acuminate, densely pubescent bract

3.5 to 4 cm long, the peduncles 3 to 4 cm long, densely pubescent. Sepals glabrous, oblong-obovate, obtuse, about 3.5 cm long, 1.4 cm wide. Petals usually 9, similar to the sepals, the inner gradually smaller, glabrous, the innermost ones subspatulate. Stamens indefinite, curved, 10 to 12 mm long. Carpels many, densely fulvous-pubescent. Mature fruit oblong-ovoid, 4.5 to 6 cm long, the carpels about 1 cm long, rounded, not apiculate, slightly pubescent, the seeds about 6 mm long.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 686*, September–October, 1906, and without numbers, March, May, June, and September, 1907.

A characteristic species recognizable by its pubescence and its obtuse carpels.

ANONACEÆ.

OXYMITRA Blume.

Oxymitra longiflora Merrill sp. nov.

Foliis oblongo-obovatis vel elliptico-obovatis, apice obtusis, basi leviter cordatis, subtus plus minus castaneo-pubescentibus, nervis utrinque ca. 16; floribus axillaribus, solitariis, usque ad 7 cm longis.

Scandent, the branches terete, lenticellate, dark-brown and more or less dark-brown-pubescent, the ultimate branchlets, petioles, pedicels and nerves on the under surface of the leaves densely so. Leaves oblong-obovate to elliptical-obovate, 18 to 20 cm long, 7 to 11 cm wide above the middle, the apex broad, rounded or obtuse or subtruncate, somewhat narrowed below the middle to the slightly cordate base, subcoriaceous, shining and glabrous above except the somewhat pubescent midrib and nerves, beneath glaucous, the midrib nerves and reticulations densely dark-brown-pubescent; nerves about 16 on each side of the midrib, very prominent, parallel, the reticulations distinct, parallel. Flowers axillary, solitary, the pedicels stout, 0.5 to 2 cm long, with an oblong-ovate acuminate bracteole at the lower one-third. Sepals 3, ovate, acute or acuminate, 1 cm long, 8 mm wide, densely pubescent on both surfaces. Outer petals lanceolate or linear-lanceolate, 7 cm long, 11 mm wide at the base, gradually narrowed upwards, the midrib prominent, pubescent outside, glabrous within and slightly concave at the base; inner three petals oblong-ovate, sharply acuminate, fleshy, coriaceous, glabrous, 9 to 10 mm long, 5 to 6 mm wide. Stamens numerous, 2.2 mm long, the connectives oblique, overlapping. Carpels numerous, about 1.5 mm long, densely villous, the glabrous styles thickened upward, the stigma slightly villous; ovules 1. Fruit oblong-ellipsoid, somewhat pubescent, acute, 1 cm long or less.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, June, 1907, in flower and *no. 689*, September, 1906, in fruit.

Oxymitra paucinervis Merrill sp. nov.

Foliis oblongis vel oblongo-lanceolatis, acuminatis, basi rotundis vel acutis, nervis utrinque ca. 8, valde obliquis; floribus axillaribus, 5.5 cm longis.

A scandent shrub, the branches terete, dark-brown, slender, glabrous, the branchlets densely ferruginous-pubescent. Leaves oblong to oblong-lanceolate, subcoriaceous, 7 to 14 cm long, 2 to 4.5 cm wide, not or but slightly narrowed toward the rounded, rarely acute base, the apex acuminate, glabrous above except the somewhat pubescent midrib, beneath glaucous, glabrous except on the slightly pubescent midrib and nerves; nerves very prominent, curved-ascending, strongly oblique, about 8 on each side of the midrib, the reticulations very obscure; petioles densely pubescent, becoming nearly glabrous, about 2 mm long. Flowers axillary, solitary, their pedicels short, pubescent, elongated in fruit. Sepals pubescent on both sides, broadly triangular-ovate, acute or acuminate, about 5 mm long and broad. Outer petals lanceolate, 5.5 cm long, 8 mm wide, narrowed above, fleshy, coriaceous, glabrous inside, pubescent outside, the midrib prominent, somewhat concave at the base; inner petals about 1 cm long, 4 mm wide, swollen and strongly concave at the base, long and gradually acuminate, coriaceous, somewhat pubescent outside on the upper half. Stamens many, 1.2 mm long, the connectives oblique, overlapping. Carpels many, ferruginous-villous, 1 mm long; styles slightly thickened upwards, glabrous. Fruit ellipsoid or oblong-ovoid, 1 cm long or less, slightly pubescent, acute or apiculate, with a single seed.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September, 1907, in flower and fruit (type), also from the same locality, *Mrs. Clemens 520*, May, 1906, and without numbers, June and September, 1906.

GONIOTHALAMUS Hook. f. & Thoms.

Goniothalamus philippinensis Merrill sp. nov.

Arbor parva, glabra; foliis oblongis, coriaceis, nitidis, nervis utrinque ca. 17; floribus magnis, petalis exterioribus late ovatis, 4 ad 5.5 cm longis, interioribus crassis, usque ad 1.5 cm longis, dense cinereo-pubescentibus; stylis integris.

A small tree, glabrous throughout except the flowers; branches slender, terete, light-brown or grayish. Leaves oblong, coriaceous, shining, 15 to 20 cm long, 4 to 7.5 cm wide, rather abruptly narrowed to both the acute base and slightly acuminate apex, the margins subparallel; nerves about 17 on each side of the midrib, spreading, anastomosing, not prominent, the reticulations obscure; petioles stout, 8 mm long or less. Flowers pale-green, solitary, axillary, their pedicels stout, about 2 cm long, sparingly pubescent. Calyx lobes broadly triangular-ovate, acute, the

calyx about 1.5 cm in diameter. Outer three petals broadly ovate or ovate, 4 to 5.5 cm long, 3.5 to 4 cm wide, coriaceous, nearly glabrous except the basal portion outside, which is pubescent, acute or slightly acuminate; inner three petals 2 mm thick on the margins, almost woody, ovate, acute, connivent, 1 to 1.5 cm long, glabrous within, outside shining and densely gray-pubescent. Stamens indefinite, 1.5 to 2 mm long. Carpels about 12, oblong, 2.5 mm long, appressed-pubescent; styles about 2 mm long, enlarged above, the stigma oblique, entire.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 1049*, June, 1907. Without locality, *Cuming 1746*, distributed as *Goniothalamus giganteus* Hook. f. & Thoms.

A species closely allied to *Goniothalamus giganteus* Hook. f. & Thoms., but differing in its more numerously nerved, differently shaped leaves, entire stigmas, and other characters.

MELODORUM Hook. f. & Thoms.

Melodorum clementis Merrill sp. nov.

Ramulis foliis paniculis floribusque plus minus ferrugineo-pubescentibus; foliis oblongo-ellipticis, obtusis, nervis utrinque 28 ad 30; floribus paniculatis, ca. 11 mm longis.

Scandent, branches terete, brown or gray, rather slender, lenticellate, glabrous, the branchlets somewhat ferruginous-pubescent. Leaves oblong-elliptical, coriaceous, 12 to 20 cm long, 4 to 8.5 cm wide, base and apex rounded, in age shining above and nearly glabrous, the younger ones somewhat pubescent, beneath rather densely ferruginous-pubescent; nerves 28 to 30 on each side of the midrib, very prominent beneath, the reticulations distinct; petioles slightly pubescent, 1 cm long or less. Panicles terminal and axillary, densely ferruginous-pubescent, the flowers fasciculately disposed. Flowers yellow or cream-colored, their pedicels 1 cm long or less and with a small bracteole. Sepals pubescent, triangular-ovate, acute or slightly acuminate, about 2 mm long. Petals 6, valvate, the three outer 10 to 11 mm long, 5 mm wide below, ferruginous-pubescent outside, glabrous within, the base slightly enlarged and concave, somewhat narrowed above the middle, acute or blunt, the three inner ones similar but glabrous, slightly shorter and from 3 to 3.5 mm wide. Stamens indefinite, 1 to 1.5 mm long, the connectives oblique, overlapping. Carpels about 10, villous, the style also villous; ovules 5, parietal. Fruit globose, 1.5 to 2 cm long, deciduously ferruginous-pubescent; seeds irregularly compressed, shining.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, July, 1907, (type), also from the same locality, *Mrs. Clemens 1097*, June, 1907, and without number, September–October, 1907.

DREPANANTHUS Maingay.

Drepananthus philippinensis Merrill sp. nov.

Arbor; foliis glabris, oblongo-ellipticis, acuminatis, usque ad 20 cm longis, nervis utrinque ca. 7; sepalis ovatis, intus glabris, extus pubescentibus; petalis ca. 18 mm longis.

A large tree (Clemens), 6 m high (Merritt), the branches terete, grayish, glabrous, the branchlets somewhat ferruginous-pubescent. Leaves coriaceous, 12 to 20 cm long, 5 to 8 cm wide oblong-elliptical, rather sharply acuminate, the base acute to rounded, shining, glabrous, sparingly pubescent on the midrib beneath; nerves about 7 on each side of the midrib, prominent, curved-ascending, the reticulations distinct; petioles 1 to 2 cm long. Peduncles axillary, or from axils of fallen leaves, few-flowered, short. Flowers yellowish-green. Sepals ovate, about 5 mm long, acute or acuminate, pubescent outside, glabrous within. Petals 6, similar, the outer three about 18 mm long, the basal portion concave, orbicular, the free portion about 14 mm long and 4 mm wide below, oblong-lanceolate, coriaceous, pubescent, narrowed above to the blunt apex, reflexed, the inner three similar but more connivent. Anthers indefinite, 1.2 mm long. Carpels 1.8 mm long, villous; ovules 4; styles about 1 mm long. Fruit ellipsoid or ovoid, about 2 mm long, glabrous, black; seeds 3 or 4, flattened, compressed.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1016*, April, 1907, also June and July, 1907, without numbers. MINDORO, near Lake Naujan, *For. Bur. 6892, 6896 Merritt*, April, 1907.

The first species of the genus to be found in the Philippines, well characterized by its few-nerved leaves. The other two species of the genus are confined to the Malay Peninsula and Sumatra.

PITTOSPORACEÆ.

PITTOSPORUM Solander.

Pittosporum clementis Merrill sp. nov.

Arbor usque ad 18 m alta; foliis lanceolatis, oblongo-oblanceolatis, vel elliptico-oblongis, valde acuminatis, basi sensim attenuatis, glabris, usque ad 14 cm longis, membranaceis, glabris, nitidis; inflorescentiis infra folia e ramis denudatis, 3 cm longis; floribus umbellulatis; calyce obtuse 5-dentato; ovario biloculari, dense villoso, sessili; fructibus compressis, orbicularibus, apiculatis, ca. 1 cm longis, bivalvatis.

A tree about 18 m high, glabrous except the inflorescence. Branches terete, gray or brownish, rather slender. Leaves membranous, lanceolate oblong-oblanceolate or elliptical-oblong, shining, glabrous, 9 to 14 cm long, 2.5 to 5.5 cm wide, apex rather slenderly and sharply acuminate, base gradually attenuate, the margins obscurely crenulate; nerves about 7

on each side of the midrib, not prominent, scarcely more prominent than are the rather dense brownish reticulations; petioles 2 cm long or less. Inflorescence from the branches below the leaves and from the leaf-axils, about 3 cm long, pubescent, the peduncles solitary or in pairs, slender, about 1 cm long, each bearing two or three short branches, the flowers in three- to six-flowered umbels at the ends of the branches, the pedicels 2 to 4 mm long. Calyx cup-shaped, about 2 mm long, slightly pubescent or glabrous, with 5 rounded teeth 0.5 mm long. Petals (in bud) oblong, 3 mm long, 1 mm wide; anthers 1.3 mm long. Ovary sessile, densely, villous, 2-celled. Fruit orbicular, compressed, about 1 cm in diameter, apiculate, slightly hirsute, ultimately glabrous.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 768, 892*, September, 1906, and January, 1907, also without numbers, March, May and September, 1907.

Well characterized by its glabrous, membranous, sharply acuminate leaves, lateral, rather few-flowered inflorescence, and orbicular, compressed fruits. Some of the specimens are indicated by the collector as trees, while others are indicated as epiphytes, but I can detect no difference between them.

Pittosporum epiphyticum Merrill sp. nov.

Glabra, epiphytica vel pseudo-epiphytica; foliis oblongo-oblanceolatis vel elliptico-lanceolatis, coriaceis, 20 ad 25 cm longis, nitidis, acuminatis, integris, basi plus minus attenuatis, acutis, nervis utrinque ca. 14; fructibus e ramis demudatis, breviter pedicellatis, solitariis vel fasciculatis, leviter compressis, apice apiculato-acuminatis, basi cordatis, ca. 2.5 cm longis.

Epiphytic or pseudo-epiphytic, eventually partly terrestial, glabrous. Branches stout, gray, glabrous. Leaves oblong-oblanceolate or elliptical-lanceolate, coriaceous, shining, rather strongly acuminate, the base somewhat attenuate, acute, entire, the margins slightly revolute, 20 to 25 cm long, 6 to 8 cm wide; nerves about 14 on each side of the midrib, not much more distinct than are the secondary nerves and rather dense reticulations; petioles 2 to 4 cm long. Fruits heart-shaped, borne on the branches below the leaves, short-pedicellate, somewhat compressed, glabrous, 2.5 cm long, 2 cm wide and nearly as thick, the apex apiculate-acuminate, the base cordate, 2-valved, solitary, or two or three at each node, the pedicels about 3 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1040*, April, 1907, and without number, September, 1907.

A species with the habit of, and closely allied to *Pittosporum resiniferum* Hemsl., which is widely distributed on the mountains of Luzon, differing from that species by its much larger leaves and differently shaped fruits. Its habit, from the collector's notes, is similar to that of Hemsley's species, which is very like that of most species of *Ficus* of the section *Urostigma*, that is, starting as an epiphyte or pseudo-epiphyte, and eventually reaching the ground and becoming terrestrial, or partly terrestrial, and in the course of time probably killing its host.

ROSACEÆ.

RUBUS Linn.

Rubus clementis Merrill sp. nov.

Scandens, ramis ramulis inflorescentiisque plus minus pubescentibus et aculeis brevibus reflexis armatis; foliis trifoliolatis; paniculis terminalibus, gracilibus, usque ad 60 cm longis, pendulis; calycibus dense pubescentibus.

Scandent. Branches terete, rather slender, reddish-brown and with the branchlets more or less pubescent and armed with scattered reflexed short spines. Leaves trifoliolate, their petioles 5 to 7 cm long, somewhat pubescent, aculeate, the petiolules of the lateral leaflets about 5 mm long, of the terminal one aculeate and 2 to 3 cm long; leaflets ovate to elliptical-ovate, chartaceous, 8 to 12 cm long, 4.5 to 6.5 cm wide, base rounded, apex slenderly acuminate, the margins above rather strongly serrate, the teeth apiculate, glabrous except the nerves of both surfaces, which are somewhat pubescent, the midrib beneath with few spines; nerves 7 or 8 on each side of the midrib, curved-ascending, very prominent beneath, the reticulations prominent, subparallel. Panicles terminal, rather slender, pendulous, 60 cm long or less, the lower branches 10 cm long or less, the rachis branches and branchlets pubescent and with scattered reflexed spines, the branches distant, spreading, few-flowered, gradually smaller upward. Flowers white or greenish-white, the bracts and bracteoles ovate-lanceolate, acuminate, about 2 mm long, the pedicels densely pubescent, 2 to 6 mm long. Buds globose, densely gray-pubescent. Sepals broadly ovate, about 5 mm long, 5 mm wide at the base, short-acuminate. Petals glabrous, orbicular-obovate, apex broad, rounded, base somewhat acute, 6 to 7 mm long. Stamens, carpels, and styles glabrous.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 740*, September, October, 1906, and without number, January, 1907, altitude about 800 m.

A species characterized by its long pendulous panicles which sway in the breeze, its trifoliolate strongly veined leaves, with prominent teeth, slender acuminate apex, etc.

RUTACEÆ.

MELICOPE Forst.

Melicope monophylla Merrill sp. nov.

Arbor parva; ramulis paniculis et subtus foliis pauce pubescentibus vel subglabris; foliis simplicibus, oppositis, oblongo-ellipticis vel anguste obovato-ellipticis, apice rotundatis, basi cuneatis, 15 ad 23 cm longis, nervis utrinque 14 ad 18, prominentibus, anastomosantibus; paniculis axillaribus, ca. 13 cm longis; floribus parvis, 3.5 mm longis; staminibus 8, inaequalibus.

A tree about 10 m high or less. Branches terete, light-gray, glabrous, the branchlets slightly hirsute or subglabrous, glandular, often slightly compressed. Leaves opposite, simple, the petiole 1.5 to 3 cm long, the petiolule 1 to 1.5 cm long, the blade 15 to 23 cm long, 6 to 11 cm wide, oblong-elliptical or narrowly obovate-elliptical, subcoriaceous, somewhat shining, glabrous above, somewhat pubescent and with prominent glands beneath, the apex rounded, sometimes retuse, the base cuneate; nerves 14 to 18 on each side of the midrib, prominent, anastomosing, the reticulations distinct, lax. Panicles axillary, many flowered, 13 cm long or less, sparingly pubescent. Pedicels about 1 mm long. Calyx 4-lobed, broadly ovate, acute, about 0.3 mm long. Petals 4, valvate, the tip inflexed, narrowly oblong, 3 to 3.5 mm long, about 1 mm wide. Stamens 8, four with filaments 2.5 to 3.5 mm long, the alternating four with filaments 1.5 to 2 mm long; anthers about 0.6 mm long. Ovary villous, depressed-globose; styles very short; stigmas minute. Fruit of 2 to 4 dehiscent rugose cocci, each coccus about 3 mm in diameter.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 491*, April, 1906, also *no. 409 bis*, March, 1906 and without numbers, May and November, 1906; District of Cotabato, *For. Bur. 3931 Hutchinson*, March, 1906.

Apparently allied to *Melicope helferi* Hook. f., but distinct; a species well characterized by its simple leaves.

PARAMIGNYA Wight.

Paramignya mindanaensis Merrill sp. nov.

Scandens, glabra, ramulis floribusque exceptis; foliis oblongo-ellipticis, 9 ad 12 cm longis, acuminatis; spinis solitariis, axillaribus, glabris, recurvis, ca. 1 cm longis; floribus axillaribus; solitariis vel binis, ca. 17 mm longis; filamentis plus minus pubescentibus.

A scandent shrub, nearly glabrous, the branches terete, yellowish-green, glabrous, slender, the branchlets slightly pubescent. Leaves alternate, oblong-elliptical, glabrous, subcoriaceous, 9 to 12 cm long, 3 to 6 cm wide, shining, base rounded or acute, apex acuminate; nerves not prominent, anastomosing, scarcely more distinct than are the secondary ones and reticulations; petioles about 1 cm long; spines axillary, solitary, rather stout, glabrous, somewhat recurved, about 1 cm long. Flowers axillary, solitary or in pairs, the slender pedicels 1 to 1.5 cm long. Calyx cupular, slightly pubescent, about 5 mm long and wide, the 5 teeth about 1.5 mm long, rounded. Petals white, imbricate, oblong, about 12 mm long, 5 mm wide, glabrous. Stamens 10; filaments thickened, somewhat pubescent, about 7 mm long; anthers 4 mm long. Disk cylindrical, about 2 mm long and thick, crenulate. Ovary and style about 10 mm long, somewhat pubescent, the ovary 5-angled, 5-celled,

the style stout. Fruit (immature) 1.5 to 2 cm long, glabrous, usually curved.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, June and July, 1907, and *no. 591*, June, 1906.

BURSERACEÆ.

CANARIUM Linn.

Canarium racemosum Merrill sp. nov. § *Choriandra.*

Arbor ca. 15 m alta; foliis imparipinnatis, ca. 7-jugatis, foliolis oblongis, obtusis vel obscure acuminatis, ca. 20 cm longis, denticulatis, nervis utrinque 14 ad 20; inflorescentiis axillaribus, racemosis; floribus 3-meris, ca. 1 cm longis; fructibus 3.5 ad 4 cm longis, oblongis, triangularibus.

A tree about 15 m high. Branches much thickened, about 2 cm in diameter above, densely brown-pubescent. Leaves 80 cm long or less, odd-pinnate, about 7-jugate, rachis and petiole stout, angular, more or less brown-pubescent. Leaflets oblong, 10 to 23 cm long, 6 to 9 cm wide, subcoriaceous, shining on both surfaces, the upper surface somewhat pilose-hirsute on the midrib and with a few scattered hairs on the lamina, the under surface with scattered hairs on the nerves and reticulations, margins denticulate, apex obtuse or obscurely short-acuminate, base rounded to subcuneate; nerves 14 to 20 on each side of the midrib, prominent, anastomosing, the reticulations rather coarse, very distinct; petiolules pubescent, 1 cm long or less. Inflorescence of solitary axillary racemes 20 cm long or less, densely pubescent, the flowers borne above the middle. Flowers pinkish, 3-merous. Calyx pubescent, the lobes 3, elliptical-ovate, acute or slightly acuminate, 5 mm long and wide, densely ferruginous-pubescent outside, the pedicels about 5 mm long, bracteoles none. Petals 3, oblong-ovate, coriaceous, acute, about 10 mm long, 5 mm wide, densely pubescent outside, keeled, valvate. Stamens 6, 8 to 9 mm long, densely villous, inserted outside the disk and free from it; disk 3 to 3.5 mm long, very densely hirsute-villous. Ovary ovoid, 5 mm long, 3-celled, densely villous. Fruit narrowly ovoid, 3.5 to 4 cm long, acute, strongly triangularly compressed, when mature nearly or quite glabrous, the immature ones with numerous stiff brown hairs.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September, 1907.

A characteristic species apparently most closely allied to *Canarium asperum* Benth., of north Celebes. Readily recognized by its strongly-nerved leaves, large flowers, racemose inflorescence, and triangular fruits.

Canarium reticulatum Merrill sp. nov.

Arbor ca. 20 m alta; foliis 2–4-jugatis, imparipinnatis, foliolis elliptico-oblongis vel ovato-oblongis, subtus dense valdeque reticulato-venosis,

pilosis; floribus sessilibus, 3-meris, spicatis, spicis axillaribus, solitariis, 4–10 cm longis; fructibus oblongo-ovoideis, 1.5 ad 1.8 cm longis, glabris.

A tree about 20 m high. Branches light-gray, glabrous, the younger ones more or less densely dark-brown- or ferruginous-pubescent. Leaves 2- to 4-jugate, odd pinnate, about 30 cm long, the petiole and rachis rather densely pubescent; leaflets elliptical-oblong to ovate-oblong, coriaceous, shining and glabrous above except on the somewhat pubescent midrib, beneath rather strongly pilose on the nerves and reticulations, the reticulations rather dense and very prominent, apex acute or short-acuminate, base cuneate to somewhat rounded, often inequilateral, margins minutely denticulate, 10 to 15 cm long, 4 to 8 cm wide; nerves very prominent, 16 to 20 on each side of the midrib, spreading, curved, parallel, the reticulations subparallel; petiolules pubescent, 5 mm long or less. Spikes axillary, solitary, 4 to 10 cm long, usually densely pubescent, stout, many flowered. Flowers sessile, buds globose, each subtended by two or three ovate basal bracteoles about 1.5 mm long. Mature flowers not seen. Petals three. Stamens six. Sepals in fruit broadly orbicular, rounded, 5 mm wide, 4 mm long, pubescent on both surfaces. Fruit oblong-ovoid, 1.5 to 1.8 cm long, light-gray, rugose, glabrous, obtuse, not compressed or angled.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 1150*, September, 1907.

A species well characterized by its very strongly veined and reticulate leaves and spicate inflorescence. Mature flowers not available, and therefore its proper section is uncertain.

Canarium clementis Merrill sp. nov.

Arbor; foliis imparipinnatis, ca. 60 cm longis, 5-jugatis; foliolis elliptico-oblongis, acutis vel obscure acuminatis, subtus ferrugineo-pubescentibus, valde reticulatis; inflorescentiis axillaribus, paniculatis, ca. 30 cm longis, inflorescentiae ramis primariis usque ad 15 cm longis; floribus trimeris, sessilibus, fasciculatis; fructibus oblongo-ovoideis, 1 ad 1.5 cm longis.

A large tree, the branches gray, glabrous or slightly pubescent. Leaves 50 to 70 cm long, odd pinnate, about 5-jugate, the rachis and petiole subterete, glabrous or only slightly pubescent when young; leaflets oblong-elliptical, 12 to 24 cm long, 5 to 9 cm wide, acute or obscurely short-acuminate, margins obscurely denticulate, base cuneate to obtuse frequently somewhat inequilateral; above shining, glabrous or nearly so, except the pubescent midrib and nerves, beneath ferruginous and rather densely pubescent; nerves 15 to 20 on each side of the midrib, very prominent beneath, parallel, spreading, curved, the reticulations prominent. Panicles axillary, 30 cm long or less, when young densely ferruginous-pubescent, their primary branches 15 cm long or less. Flowers sessile, fascicled, the buds ovoid. Calyx 3 mm long, 2.5 mm wide, pubescent, 3-toothed, teeth ovate, acute, about 1 mm long. Petals 3,

nearly glabrous, oblong-ovate, acute or obscurely broadly acuminate, 4 mm long, 2.5 mm wide. Stamens 6, free; filaments 2 mm long; anthers 1.2 mm long. Ovary glabrous or nearly so. Disk wanting. Fruit oblong-ovoid, 1 to 1.5 cm long, 7 to 8 mm thick, glabrous, rugose, gray, not compressed or angular.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, February, March, 1907, also *no. 759*, September, 1906, and *no. 1175a*, September, 1907.

A species well characterized by its paniculate inflorescence, fasciculate sessile flowers, and its leaflets which are usually strongly ferruginous beneath and densely pubescent or puberulent.

SANTIRIA Blume.

Santiria glabra Merrill sp. nov. § *Eusantiria.*

Arbor, omnibus partibus glabratis; foliis imparipinnatis, 1–3-jugatis, foliolis oblongo-ovatis vel oblongis, acuminatis, 6 ad 9 cm longis, nervis utrinque ca. 7; paniculis axillaribus, e basi ramosis; floribus minutis, antheris dorsifixis; staminibus liberis, extra discum insertis.

A tree, glabrous throughout. Branches light-gray, slender, terete. Leaves odd pinnate, 1- to 3-jugate, the rachis and petiole 10 cm long or less; leaflets oblong-ovate to oblong, subcoriaceous, shining on both surfaces, paler beneath, 6 to 9 cm long, 2.5 to 4 cm wide, apex rather long and gradually acuminate, the acumen blunt, base acute, often somewhat inequilateral; nerves about 7 on each side of the midrib, somewhat prominent beneath, anastomosing, the reticulations lax; petiolules about 1 cm long, slender. Panicles axillary, solitary, 4 to 6 cm long, branched from the base. Flowers small. Calyx 3-lobed, lobes broadly triangular-ovate, acute. Petals 3, orbicular-ovate, obtuse, 2 mm wide at the base, about 1.7 mm long. Stamens 6, free, inserted outside the fleshy 6-ridged disk, filaments very short; anthers 0.5 mm long. Style very short.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, April, 1907.

A species well characterized by being glabrous throughout; the second one of the genus to be found in the Philippines.

MELIACEÆ.

CLEMENSIA Merrill gen. nov.

Flores polygamo-dioici, 8-meri, majusculi. Calyx cupularis, grosse 4-dentatus vel lobatus. Petala 8, in aestivatione subvalvata, spatulata, inferne cum tubo staminco plus minus connata. Stamina in tubum cylindricum, laciniatum, petalis breviorem, intus sub apice 20-antheriferum coalita, antheris plus minus hirsutis, cum tubi laciniis alternantibus. Discus in floribus hermaphroditis nullus, in floribus masculinis brevissime annulatus. Ovarium liberum, hirsutum, 5-loculare, loculis 1-ovulatis. Stylus elongatus, hirsutus, stigmate capitato terminatus. Fructus indehiscens, 5-locularis. Semina crassa. Cotyledones crassae,

superpositae, plantula transversali intra cotyledones inclusa. Arbor, foliis pinnatis. Inflorescentia axillaris, paniculata, elongata, pendula.

Clemensia macrantha Merrill sp. nov.

Arbor parva, 4 ad 6 m alta; foliis pinnatis, ca. 8-jugatis, usque ad 140 cm longis; foliolis oppositis vel alternis, ovatis vel oblongis, subcoriaceis, 20 ad 35 cm longis, acutis vel breviter acuminatis, nervis utrinque 16 ad 20; paniculis axillaribus, pendulis, elongatis, ramis brevibus; floribus majusculis, dense fulvo-hirsutis, 3.5 ad 4 cm longis, ca. 2 cm diam., brevissime pedicellatis; calyce cupulato, 2 ad 2.5 cm longo; petalis 8, spatulatis, 3 ad 4 cm longis; tubo staminifero cylindrico, 2 cm longo, 20-laciniato, intus villoso; antheris 20.

A small tree 4 to 6 m high. Leaves pinnate, 140 cm long or less, the petiole and rachis stout, dark-colored, somewhat pubescent, becoming subglabrous, the rachis somewhat produced and frequently bearing a few undeveloped leaflets at the apex; leaflets alternate below, opposite above, oblong or the lower ones ovate, some more or less falcate, 20 to 35 cm long, 9 to 12 cm wide, submembranous, somewhat shining, the apex acute or short-acuminate, the base usually inequilateral, subacute to rounded, the midrib and lateral nerves on both surfaces rather densely hirsute, otherwise nearly glabrous; nerves 16 to 20 on each side of the midrib, prominent, anastomosing near the margin, the reticulations subparallel, distinct, rather lax; petiolules stout, more or less pubescent, 5 mm long or less. Panicles elongate, axillary, pendulous, 90 cm long or less, when young rather densely fulvous-pubescent, becoming subglabrous in age, their branches few, short, 6 cm long or less. Buds densely fulvous-tomentose, each subtended by a deciduous, lanceolate, 5 to 8 mm long, bracteole. Flowers polygamo-dioecious, very large, yellowish-brown, 3.5 to 4 cm long and about 2 cm in diameter, the calyx and petals very densely fulvous-hirsute or tomentose, the pedicels short. Calyx cupular, 2 to 2.5 cm long, 2 cm in diameter, irregularly coarsely 4-toothed or lobed, the lobes 5 to 7 mm long, 6 to 8 mm wide. Petals 8, spatulate, 3 to 4 cm long, 6 to 10 mm wide above, obtuse, much narrowed below and more or less connate with each other and with the staminal tube, coriaceous, keeled in the middle portion and glabrous inside. Staminal tube somewhat angular, cylindrical, about 2 cm long, 7 mm in diameter, glabrous outside, villous within, somewhat constricted above, the margin with 20 erect narrowly oblong, usually lobed, more or less hirsute teeth, 5 to 6 mm long, about 0.8 mm wide. Anthers 20, alternating with the calyx teeth, 5 mm long, more or less hirsute on the back. Ovary ovoid, densely hirsute, 5-celled, each cell 1-ovuled, 5 to 6 mm in diameter; style about 17 mm long, narrowed upwards, densely hirsute in the lower two-thirds; stigma globose, 2 mm in diameter. Staminate flowers similar to the perfect ones, but

the style glabrous, ovary aborted, and a short, annular, glabrous disk present. Fruit obovoid, indehiscent, woody, 4 to 5 cm long, strongly rugose when dry, densely fulvous-hirsute or tomentose, indehiscent, 5-celled, each cell with a thick 2.5 cm long seed.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens* 725, September–October, 1906, and additional material without numbers collected in January, February, March, April, June, and September, 1907.

A striking genus, apparently allied to *Chisocheton* and *Dysoxylum*, but very distinct from both, and so far as I am able to determine, from all others in the family, well characterized by its very large flowers, 5-celled ovary, 20 stamens which are hirsute, 20-toothed staminal tube, and 5-celled indehiscent fruit.

According to the collector, an erect, unbranched, or slightly branched tree, 4 to 6 m high, the trunk 5 to 10 cm in diameter, the leaves crowded at the apex of the trunk, the inflorescence axillary, pendulous.

CHISOCHETON Blume.

Chisocheton clementis Merrill sp. nov.

Arbor maxima, glabra, inflorescentiis exceptis; foliis alternis, usque ad 60 cm longis, 2- ad 5-jugatis; foliolis subcoriaceis, pallidis, elliptico-oblongis vel oblongis, 15 ad 30 cm longis, oppositis, breviter acuminatis, nervis utrinque ca. 10; paniculis axillaribus, foliis subaequalibus, puberulis, ramosis; floribus ca. 15 mm longis, extus dense adpresso-hirsutis.

A tree reaching a height of 30 m. Branches thickened, reddish-brown, glabrous. Leaves 60 cm long or less, 2- to 4-jugate, the rachis produced and puberulent at the tip and with few undeveloped leaflets; leaflets opposite, elliptical-oblong or oblong, subcoriaceous, glabrous, pale, 15 to 30 cm long, 7 to 10 cm wide, sometimes slightly falcate, apex short-acuminate, base acute or rounded, slightly inequilateral; nerves about 10 on each side of the midrib, prominent beneath, the reticulations lax; petiolules 1 cm long or less. Panicles axillary, about as long as the leaves, the lower branches 15 cm long or less, puberulent, few-flowered. Calyx cup-shaped, rugose, densely pubescent, about 4 mm long and wide, truncate or obscurely toothed, the pedicels short and thick. Petals 5, linear-lanceolate, thick, about 16 mm long, 2 mm wide, glabrous inside, densely appressed-hirsute outside, recurved in anthesis. Staminal tube cylindrical, densely hirsute, about 12 mm long, 3 mm in diameter, cleft at the apex into 6 oblong, truncate teeth, 3.5 mm long, 1.5 mm wide. Stamens 6, alternating with the teeth of the staminal tube; anthers 3 mm long. Disk none or very short. Style 12 mm long, hirsute, 5-sulcate, gradually narrowed upwards; stigma capitate, 1 mm in diameter.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, July and September, 1907.

A species well characterized by its hirsute flowers and the curious prolongation of the leaf-rachis, with undeveloped leaflets. Resembling *Chisocheton cumingianus* (C. DC.) Harms, but the flowers very different.

Chisocheton fulvus Merrill sp. nov.

Arbor parva, ramis ramulis petiolis paniculis et subtus foliolis plus minus fulvo-pubescentibus vel hirsutis; foliis imparipinnatis, 40 ad 60 cm longis, ca. 5-jugatis, rhachidibus dense hirsuto-pubescentibus; foliolis oblongis, usque ad 20 cm longis, submembranaceis, acuminatis, basi inaequalibus, acutis, supra, costa excepta, glabra, subtus plus minus hirsutis; paniculis axillaribus, foliis brevioribus; floribus polygamo-dioicis, 4-meris; ovario dense hirsuto.

A small tree, the branches, branchlets, leaves and inflorescence more or less fulvous-pubescent or hirsute. Leaves alternate, odd pinnate, 10 to 60 cm long, about 5-jugate, the petiole and rachis densely hirsute-pubescent; leaflets submembranous, oblong, opposite, 20 cm long or less, 4.5 to 8 cm wide, the apex rather slenderly and sharply acuminate, the base inequilateral, acute, somewhat shining above and glabrous except the rather densely pubescent midrib and lateral nerves, beneath hirsute, sometimes falcate; nerves distinct, 15 or less on each side of the midrib; petiolules 5 mm long or less, densely fulvous-hirsute. Panicles axillary, 30 cm long or less, narrow, the lower branches 4 to 6 cm long, the rachis, branches, branchlets and pedicels densely fulvous-hirsute-pubescent, the flowers densely racemose-fasciculately disposed on the ultimate branchlets. Flowers about 1 cm long, the calyx cup-shaped, membranous, 2 to 2.5 mm long, 2 mm in diameter, slightly hirsute, obscurely toothed. Petals 4, narrowly oblong or oblanceolate, glabrous or nearly so, 9 to 11 mm long, 1.5 to 1.8 mm wide. Staminal tube cylindrical, 8 mm long, glabrous outside, somewhat hirsute within, the teeth oblong-lanceolate, 2.5 mm long, 0.5 mm wide; anthers 5 or more, alternating with the teeth, 2 mm long. Disk none. Ovary ovoid, densely hirsute, 4-celled; style about 6 mm long, hirsute; stigma capitate. In the staminate flowers the ovary is aborted and a short annular glabrous disk is present. Fruit immature, somewhat hirsute.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1046*, May, 1907, also *Mrs. Clemens 554, 583, 1062*, and three sheets without numbers, May and June, 1906–7.

AGLAIA Lour.

Aglaia costata Merrill sp. nov. § *Hearnia*.

Arbor ca. 10 m alta, ramis foliis paniculisque plus minus brunneo-lepidotis; foliis alternis, imparipinnatis, 4- vel 5-jugatis; paniculis diffusis, usque ad 30 cm longis, dense ferrugineo-lepidotis; floribus paucis, pedicellatis, lepidotis; fructibus ovoideis vel ellipsoideis, 2 ad 2.5 cm longis, rugosis et valde longitudinaliter 10-sulcatis.

A tree about 10 m high, the branches and branchlets densely brown-lepidote. Leaves alternate, 35 to 50 cm long, the petiole, rachis, petiolules and under surfaces of the leaflets more or less densely brown-lepidote;

leaflets opposite, oblong, submembranous, 12 to 20 cm long, 4 to 8 cm wide, apex acuminate, base acute, inequilateral, rather dull, glabrous above, except the midrib which is lepidote, beneath with scattered lepidote scales, densely lepidote on the midrib; nerves 10 on each side of the midrid, prominent beneath, obscurely anastomosing near the margins, the reticulations netted, indistinct; petiolules densely brown-lepidote, about 5 mm long. Panicles 30 cm long or less, diffuse, the rachis, branchlets, pedicels and flowers densely brown-lepidote, the lower branches frequently 15 cm long, the upper ones gradually shorter. Flowers few, three to five on each ultimate branchlet, racemosely disposed, the pedicels 3 to 5 mm long. Calyx 3.5 to 4 mm in diameter, the lobes broadly orbicular or reniform, rounded, about 2 mm wide, imbricate. Petals 5, imbricate, coriaceous, concave, glabrous, ovate to orbicular-ovate, about 3 mm long. Staminal tube free, glabrous, short, truncate, about 1.5 mm long, 2 mm in diameter. Stamens 5, inserted on the margin of the tube, exserted, the anthers sessile, broadly triangular-ovate, 1 mm long. Ovary oblong-ovoid, glabrous, 1.5 mm long. Fruit ovoid or ellipsoid, densely and minutely brown-lepidote, 2 to 2.5 cm long, about 2 cm thick, rugose and strongly longitudinally 5-sulcate, 5-celled, woody.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 568*, May, 1906, and without numbers, May, June, and September, 1907.

A species well characterized by its densely brown-lepidote branches, inflorescence and fruits, the last strongly 10-sulcate.

Aglaia pallida Merrill sp. nov. § *Euaglaia*.

Arbor ca. 25 m alta, plus minus stellato-lepidota; foliis alternis, imparipinnatis, ca. 40 cm longis, 4-jugatis; foliolis pallidis, membranaceis, ellipticis vel oblongo-ellipticis, acuminatis, 15 ad 20 cm longis; paniculis majusculis, 40 ad 50 cm longis, diffusis, multifloris; floribus pedicellatis, racemosis, 5-meris; tubo staminea libero.

A tree about 25 m high, the branches glabrous, the petioles, rachis and inflorescence rather densely brownish-lepidote-stellate-pubescent, the lower surfaces of the leaflets with few stellate hairs. Branches terete, light-gray. Leaves alternate, about 40 cm long, odd pinnate, 4-jugate; leaflets pale, membranous, elliptical to oblong-elliptical, 15 to 20 cm long, 6 to 8 cm wide, the apex acuminate, the base sometimes narrowed, equilateral and slightly cordate; nerves 15 to 19 on each side of the midrib, prominent beneath, the reticulations lax, obscure; petiolules stout, 2 to 3 mm long. Panicles diffuse, 40 to 50 cm long, the lower branches about 20 cm long, the upper ones gradually shorter, rather densely stellate-pubescent, many flowered. Flowers racemosely disposed on the ultimate branchlets, their pedicels about 1 mm long. Calyx about 1 mm in diameter, 5-toothed, the teeth rounded, 0.2 mm long. Petals 5, orbicular or broadly-ovate, obtuse, concave, glabrous, 1 mm long. Staminal tube glabrous, globose or obovoid, 11 mm in diameter, truncate, free. Anthers

5, inserted on the lower half of the tube, included, 0.2 mm long. Ovary villous.

Mindanao. Lake Lanao, Camp Keithley, *Mrs. Clemens 1228*, September, 1907.

A species well characterized by its diffuse panicles which exceed the leaves in length, and thinly membranous very pale leaves. Apparently allied to *Aglaia heterandra* Turcz., but very different from that species.

WALSURA Roxb.

Walsura multijuga King in Journ. As. Soc. Beng. 64[2] (1895) 83; Valeton in Icon. Bogor. 2 (1906) 156, *t. 135*.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September, October, 1907.

The specimens from Mindanao agree almost perfectly with III E 46 and III F 23 of the Botanical Garden at Buitenzorg, distributed as *Walsura quadriloculoris* Valeton, and which Valeton, l. c., considers to be identical with *Walsura multijuga* King.

Malacca, Sumatra, and Banca; new to the Philippines.

DYSOXYLUM Blume.

Dysoxylum triangulare Merrill sp. nov.

Arbor parva, ca. 10 m alta; foliis ca. 65 cm longis, imparipinnatis, 8-jugatis; foliolis pallidis, costa nervisque plus minus hirsutis; racemis e ramis vetustioribus oriundis, brevibus, hirsutis, paucifloris; floribus 4-meris; petalis extus glabris; staminibus 6; fructibus glabris, valde 3-costatis, triangularibus, ca. 2 cm longis.

A tree about 10 m high, the branches brown, glabrous, the ultimate branchlets more or less puberulent or slightly hirsute. Leaves alternate, about 65 cm long, odd pinnate, 8-jugate, the petiole, rachis and petiolules rather densely hirsute-pubescent; leaflets pale, submembranous, elliptical-ovate to oblong-ovate, 10 to 18 cm long, 4 to 7 cm wide, the apex acute or obscurely acuminate, the base subacute to rounded or slightly cordate, the midrib and nerves on both surfaces somewhat hirsute, and with scattered hairs on the lower surface; nerves about 12 on each side of the midrib, prominent; petiolules 5 mm long or less. Racemes from the larger branches, several from the same protuberance, slightly hirsute, about 2 cm long, the pedicels about 1.5 mm long. Calyx about 3 mm in diameter, somewhat cup-shaped, obscurely toothed, slightly hirsute. Petals 4, narrowly oblong, glabrous, about 7 mm long, 2 mm wide. Staminal tube cylindrical, 7 mm long, the apex 6-toothed, the teeth 1.5 mm long, truncate; anthers 6, alternating with the teeth, 0.8 mm long. Disk about 1.5 mm long. Ovary hirsute; style 6 mm long, slightly hirsute below; stigma capitate. Fruit glabrous, orange-yellow when mature, about 2 cm long, 1.5 mm thick, pointed, triangular in cross section, with three strong ribs or keels running from the base to the apex, 3-celled, each cell 1-seeded.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 981*, March, 1907 (fruit), June, 1907 (flowers).

A species allied to *Dysoxylum cumingianum* C. DC., but well characterized by its strongly 3-keeled, triangular fruits.

Dysoxylum pyriforme Merrill sp. nov.

Arbor parva, ramulis foliisque plus minus dense hirsutis; foliis alternis, ca. 60 cm longis, 10-jugatis; racemis caulinibus, 2 ad 4 cm longis, pauce hirsutis; floribus 4-meris; fructibus anguste pyriformibus dense brunneo-lepidotis, ca. 2 cm longis.

A small tree, the branches stout, gray or brownish, the branchlets gray, lepidote, the ultimate tips densely hirsute. Leaves alternate, about 60 cm long, 10-jugate, odd pinnate, the petiole and rachis densely hirsute; leaflets opposite, oblong or oblong-lanceolate, 6 to 14 cm long, 2 to 3.5 cm wide, submembranous, apex acuminate or rarely acute, base subacute or rounded, sometimes inequilateral, dark above and densely hirsute on the midrib and lateral nerves, and with few hairs on the surface, beneath pale and densely hirsute; nerves 12 to 15 on each side of the midrib, rather distinct; petiolules about 1 mm long. Racemes on the larger branches and trunk, solitary or two or three from the same protuberance, 2 to 4 cm long, few flowered, slightly hirsute, the pedicels slender, about 3 mm long. Calyx ellipsoid, about 5 mm long, constricted at the apex, entire or obscurely toothed. Petals 4, oblong, about 5 mm long, 2 mm wide, hirsute outside. Staminal tube glabrous, cylindrical, 3.5 mm long, cleft to the middle into 8 oblong 1 mm wide truncate teeth; anthers 8, alternate with the teeth, 1 mm long. Disk cylindrical, 1.7 mm long, truncate. Ovary densely hirsute; style short, glabrous; stigma disciform, 1 mm in diameter. Fruit narrowly pyriform, about 2 cm long, obtuse, somewhat sulcate when dry, dehiscent, densely brown-lepidote.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1221, 1100*, September, June, 1907.

A species allied to *Dysoxylum cumingianum* C. DC., readily distinguished however by its many-jugate leaves, racemose inflorescence and quite different fruits.

ELAEOCARPACEÆ.

ELAEOCARPUS Linn.

Elaeocarpus octopetalus Merrill sp. nov.

Arbor ca. 23 m alta; foliis elliptico-ovatis, glabris, coriaceis, subintegris, ca. 20 cm longis; racemis axillaribus, solitariis; floribus ca. 1 cm longis, sepalis 8, extus dense cinereo-pubescentibus, petalis 8, integris; antheris aristatis; ovario 2-loculari.

A tree about 23 m high, glabrous except the inflorescence, the branches terete, rather thick, gray or brownish. Leaves elliptical-ovate, 16 to 20

cm long, 7 to 11 cm wide, glabrous, coriaceous, shining, base acute, apex broadly short-acuminate, acumen blunt, the margins very obscurely crenate or entire; nerves about 9 on each side of the midrib, prominent, the reticulations rather dense; petioles 5 to 7 cm long. Racemes axillary, solitary, 7 to 9 cm long, the rachis, pedicels and sepals densely appressed-gray-pubescent. Pedicels about 1 cm long, in fruit 1.5 to 2 cm long, bracteoles none or fugacious. Sepals 8, lanceolate, somewhat acuminate, valvate, about 11 mm long, 3 mm wide, keeled and glabrous inside, except along the somewhat pubescent margins. Petals 8, lanceolate, induplicate, about 8 mm long, 3 mm wide, densely villous, especially inside, acute or acuminate, entire. Stamens about 40; filaments 1.5 mm long; anthers linear, minutely scabrid, somewhat curved, about 4.5 mm long, the apex aristate, the awn nearly 1.5 mm long. Ovary ovoid, densely villous, 2-celled, each cell several-ovuled. Fruit ovoid, glabrous, shining, dark blue, about 1.3 cm long, 8 or 9 mm in diameter, obtuse, with a bony 1-celled stone.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1148*, September, 1907.

A very characteristic species, differing from all others in the genus in its 8 petals and sepals, for which a new section is necessary, which I call **Octelaeocarpus.**

Elaeocarpus mindanaensis Merrill sp. nov. § *Dicera.*

Arbor parva, ramis ramulis foliis racemis calycibusque plus minus dense ferrugineo-pubescentibus; foliis elliptico-ovatis vel oblongo-ovatis, acuminatis, nervis utrinque ca. 8; racemis axillaribus, multifloris; petalis 5, fimbriatis, extus basi parce villosis; staminibus obtusis; ovario 3-loculari.

A small tree, rather densely pubescent, the branches terete, glabrous in age, the younger parts densely ferruginous-pubescent. Leaves subcoriaceous, elliptical-ovate to oblong-ovate, 8 to 16 cm long, 4 to 8.5 cm wide, the apex acuminate, base acute to somewhat rounded, the margins irregularly crenate-dentate, the teeth small, glabrous above in age, except on the pubescent midrib and nerves, beneath rather densely pubescent; nerves 8 on each side of the midrib, very prominent beneath, the reticulations also very distinct; petioles densely pubescent, 2 to 3.5 cm long. Racemes axillary, solitary, 10 cm long or less, the rachis, bracteoles, pedicels and sepals densely pubescent. Pedicels about 8 mm long, each subtended by a deciduous linear 8 or 9 mm long bracteole, each bracteole with two or three small lobes. Sepals oblong, 6 mm long, 3.5 mm wide. Petals about 7 mm long, cuneate, glabrous except for a few hairs on the lower portion outside, fimbriate to the middle. Stamens about 30; filaments about 1.5 mm long, minutely

pubescent; anthers narrowly oblong, scabrid, about 1.7 mm long, the cells equal, obtuse, not at all produced and with no terminal tuft of hairs. Ovary ovoid, densely villous, 3-celled; style villous below, attenuate, about 4 mm long. Fruit narrowly ellipsoid or oblong-obovoid, red when fresh, 2 to 2.5 cm long, about 1.2 cm thick, densely ferruginous-pubescent, acute or obtuse, 1-celled, the walls thick and bone-like.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 910*, April, January, 1907, also without numbers, May, June, and September, 1907.

A species well characterized by its uniform and dense pubescence.

MALVACEÆ.

HIBISCUS Linn.

Hibiscus paludosus Merrill sp. nov. § *Furcaria.*

Suffruticosus, erectus, omnibus partibus densissime fulvo-hirsutis; ramis ramulis foliisque subtus ad nervos plus minus aculeatis; foliis coriaceis, longe petiolatis, cordatis, 3- ad 5-lobatis, 5 ad 7 cm longis latisque; floribus purpureis, axillaribus, pedunculatis, solitariis, ca. 5 cm longis; bracteis 10, 1 ad 1.5 cm longis, linearibus, simplicibus.

Suffrutescent, erect, branched, very densely fulvous-hirsute throughout, the indumentum stellate. Branches terete, aculeate. Leaves orbicular to ovate, 5 to 7 cm long and wide, base cordate, usually 3- to 5-lobed, the lobes broad, ovate, acute, the margins denticulate, both surfaces very densely fulvous-stellate-hirsute, beneath on the nerves with a few scattered small spines, coriaceous; nerves distinct; petioles 10 cm long or less, densely hirsute and more or less aculeate. Flowers axillary, solitary, purple, their pedicels stout, about 5 mm long. Bracteoles 10, linear, 1 to 1.5 cm long, simple, densely hirsute. Calyx lobes 1.5 cm long, 6 or 7 mm wide at the base, gradually narrowed to the acuminate apex, hispid, glandular, the mid-nerve and the lateral marginal ones very prominent. Petals about 5 cm long, 2.5 cm wide, inequilaterally obovate, much narrowed below, more or less hispid outside, densely so at the base inside, strongly about 15-nerved. Staminal column about 3 cm long, antheriferous throughout; filaments 1.5 mm long; anthers 1 mm long. Fruit ovoid, acuminate, about 1.5 cm long, densely hispid with long fulvous hairs. Seeds glabrous or nearly so, more or less compressed, angular, about 3 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 874*, November, 1906, also without numbers, January and June, 1907, in swamps.

A species manifestly allied to *Hibiscus diversifolius* Jacq., which is widely distributed in the tropics, differing from that species in its very dense, fulvous-hirsute indumentum, its pedicellate flowers and in its strongly hirsute mature fruits.

MELASTOMATACEÆ.

MEDINILLA Gaudich.

Medinilla monantha Merrill sp. nov.

Frutex epiphytica, glabra; floribus axillaribus, solitariis, longe tenuiter pedicellatis, 4-meris; foliis oppositis, sessilibus, acuminatis, lanceolatis, valde 3-nervis.

A glabrous epiphytic shrub. Branches slender, terete, reddish-brown or grayish. Leaves opposite, sessile, lanceolate, subcoriaceous, 3 to 4.5 cm long, 8 to 12 mm wide, base acute, apex long-acuminate, acumen rather slender, blunt, the margins somewhat revolute; nerves 3, very prominent, extending from the base to the apex of the leaf. Flowers axillary, solitary, on very slender 10 to 14 mm long pedicels, each pedicel bearing two pairs of linear 1 to 1.5 mm long bracteoles. Calyx cup-shaped, about 3 mm long and wide, with 4 linear, acuminate, 1 mm long teeth, contracted abruptly below into a 3 mm long pseudostalk, one pair of bracteoles at the base of the pseudostalk, one between these and the base of the pedicel. Petals and stamens not seen. Style 5 mm long. Fruit ovoid, about 4.5 mm long, 4 mm thick, glabrous, the calyx teeth persistent.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 1136*, July, 1907, also, without number, September, 1907.

A very striking species, characterized by its small lanceolate 3-nerved leaves, and long-pedicellate, solitary, axillary flowers, the pedicels being supplied with two pairs of bracteoles, indicating that apparently the inflorescence is a reduced cyme. Allied to *Medinilla myrtiformis* Triana, but very distinct from that species.

Medinilla bicolor Merrill sp. nov.

Frutex erectus vel scandens; ramulis paniculis et subtus foliis plus minus ferrugineo-plumoso-stellato-tomentosis; foliis oblongis, 20 ad 30 cm longis, breviter acuminatis, oppositis, 5-nerviis; paniculis axillaribus, tenuibus, 13 ad 20 cm longis; floribus 4-meris.

An erect or scandent shrub, the branches gray, glabrous, terete, the branchlets more or less ferruginous-plumose-stellate-tomentose. Leaves opposite, oblong, short-acuminate, the base subacute or rounded, 20 to 30 cm long, 5.5 to 7 cm wide, subcoriaceous, when dry pale above and reddish-brown beneath, glabrous above, beneath rather densely ferruginous-stellate-plumose-tomentose; nerves 5, prominent beneath, the inner pair extending to the apex of the leaf, the outer pair to about the upper three-fourths, reticulations obsolete; petioles stout, 1 to 1.5 cm long, ferruginous-pubescent when young. Panicles axillary, slender, the rachis and branches rather densely stellate-tomentose, the hairs somewhat plumose, spreading, the rachis very slender, its branches spreading, slender, 1 to 1.5 cm long, each bearing about three flowers, the branches usually

in whorls of three, the bracts and bracteoles subulate, 1.5 to 3 mm long, the pedicels about 3 mm long. Calyx ovoid, about 5 mm in diameter, rugose when dry, the limb slightly produced, obscurely 4-toothed, glabrous. Petals 4, broadly irregularly obovate, 4 to 4.5 mm long, 3 to 3.5 mm wide, obtuse, glabrous. Stamens 8, subequal; filaments 2.5 mm long; anthers 3 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 514*, 885, April, 1906, January, 1907.

A species apparently allied to *Medinilla corallina* Cogn., of Borneo (ex descr.), well characterized by its ferruginous-stellate-plumose pubescence, the leaves reddish-brown beneath and pale above, and its slender panicles.

MELASTOMA Burm.

Melastoma lanaense Merrill sp. nov.

Frutex erectus, ramis ramulis petiolisque plus minus dense ferrugineo-hirsutis et squamulis parvis, ovatis vel lanceolatis, acuminatis, plus minus ciliatis, obtectis; foliis elliptico-ovatis vel late ellipticis, acuminatis, 5-nerviis, subcoriaceis, subtus plus minus hirsutis, et paleis numerosis lanceolatis, patulis, acuminatis, praesertim ad nervos obsitis; calycis lobis tubum aequantibus, dentibus subulatis, penicillatis, 2.5 mm longis alternantibus, paleolis lanceolatis, penicillato-acuminatis, plus minus denticulatis vel pauce fimbriatis, 2 mm longis, subpatulis, non fasciculatis, dense obtectis; floribus 5-meris, ca. 3 cm longis.

An erect shrub, the branches, branchlets and petioles rather densely ferruginous-hirsute and with numerous ovate or lanceolate, acuminate, somewhat ciliate, more or less spreading or appressed scales. Leaves elliptical-ovate to broadly elliptical, subcoriaceous, 8 to 17 cm long, 3 to 8.5 cm wide, apex acuminate, base acute, dull, above with numerous more or less appressed subulate scales, beneath more or less hirsute, and with scattered, ovate, more or less ciliate, usually appressed scales, especially on the nerves; nerves 5, prominent, the cross-nervules numerous, parallel, slightly curved; petioles 1.5 to 3.5 cm long. Flowers 5-merous, pink, usually in threes, short-pedicellate or subsessile. Calyx tube 1.5 cm long, 8 mm thick, the lobes 5, lanceolate, acuminate, 1.5 cm long, 4 mm wide, the alternating teeth linear-lanceolate, penicillate-acuminate, 2.5 mm long, 1 mm wide at the base, the margins more or less ciliate-lacerate, the tube and backs of the teeth densely covered with closely imbricate, lanceolate, penicillate-acuminate paleæ, about 2 mm long, 0.7 mm wide, their margins denticulate and often somewhat fimbriate, not fasciculate, their upper portions somewhat spreading. Petals obovate, 2.5 cm long, 1.8 cm wide, rounded, the apical margins ciliate-hispid. Anthers 7 mm long, the appendage to the connective about 1.4 mm long. Bracts and bracteoles, if any, caducous.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, July and September, 1907, and *no. 836*, November, 1906.

MEMECYLON Linn.

Memecylon venosum Merrill sp. nov.

Arbor parva; ramulis tenuibus, tetragonis, angustissime 4-alatis; foliis subsessilibus, elliptico-ovatis, 6 ad 10 cm longis, valde acuminatis, basi late rotundatis vel cordatis, valde 3-nerviis, nervis lateralibus regulariter arcuatis; cymis axillaribus; floribus in apice ramulorum capitato-umbellatis.

A small tree, the branches terete, slender, reddish-brown, the branchlets slender, 4-angled and narrowly winged on the angles. Leaves subsessile, elliptical-ovate, coriaceous, shining, 6 to 10 cm long, 3 to 5 cm wide, the base broad, round or cordate, the apex strongly acuminate, acumen blunt, about 1 cm long; primary nerves 8 or 9 on each side of the midrib, very prominent, spreading, arcuate-anastomosing and forming a pair of lateral nerves, the reticulations coarse, very prominent; petioles very short. Cymes axillary, solitary, about 4 cm long, the peduncles 1.5 cm long, the branches whorled, each bearing a subglobose umbellate head of many flowers about 1 cm in diameter. Pedicels about 3 mm long. Calyx funnel shaped, truncate, 2 mm long and wide. Petals orbicular-ovate or subreniform, about 1.3 mm long, sometimes 1.5 mm wide. Filaments 2 mm long; anthers 1.2 mm long.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 432*, September, 1906, also three sheets without numbers, same date and locality.

A species closely allied to *Memecylon paniculatum* Jack, differing from that species in its differently shaped much more acuminate and shorter leaves, more prominent reticulations, and shorter inflorescence.

ARALIACEÆ.

BOERLAGIODENDRON Harms.

Boerlagiodendron mindanaense Merrill sp. nov.

Arbor glabra, 5 ad 6 m alta; foliis fere ad basin palmato 10–14–lobatis, coriaceis vel subcoriaceis, basi cordatis, lobis irregulariter et grosse incisis; floribus 5- vel 6-meris; fructibus in capitula ovoidea vel ellipsoidea 3 ad 4 cm longa congestis.

A tree 5 to 6 m high (Copeland), 10 m high (Clemens), glabrous throughout. Leaves 60 cm long or less, coriaceous or subcoriaceous, palmately 10- to 14-lobed, the lobes reaching nearly to the base, 8 to 15 cm wide, oblong, irregularly toothed and coarsely irregularly incised, acuminate, the base cordate; petiole 50 cm long or less, stout, with about three prominent crests at the base. Umbels compound, the peduncles stout, about 9 cm long, each subtended by oblong, coriaceous, about 3 cm long, more or less setose bracts, bearing at the apex a central sessile head of sterile flowers, subtended by bracts similar to the basal ones but shorter, and two lateral branches about 9 cm long, these lateral branches with a

pair of ovate 1 cm long bracts at about the middle and each with a terminal head of perfect flowers 1.5 to 2 cm in diameter. Sterile flowers, in the middle sessile head, many, pedicellate; the pedicels 1 to 2 cm long, with numerous basal bracteoles. Perfect flowers in the lateral heads many, sessile, crowded in dense ovoid heads, subtended by numerous small bracteoles. Calyx somewhat funnel-shaped, more or less angular, 3 mm long, 2 mm thick, truncate. Petals 5 or 6, oblong, in bud 4 mm long. Stamens 5 or 6. Ovary 5- or 6-celled. Fruit crowded in dense ovoid or ellipsoid heads 3 to 4 cm long, 2.5 to 3 cm thick, the individual fruits narrowly obovoid, strongly 5- or 6-ridged, 5- or 6-celled, the ridges acute.

MINDANAO, District of Davao, *Copeland 464*, March, 1904; District of Zamboanga, *Ahern 398*, March, 1901; Lake Lanao, Camp Keithley, *Mrs. Clemens 1191*, September, 1907; District of Zamboanga, Sax River, *Williams 2150*, February, 1905. Specimens collected by *Hallier* near Zamboanga, Mindanao, and on Basilan Island in January and February, 1904, may prove to be the same species.

A species recognizable by its very large 10- to 14-lobed leaves and 5- or 6-merous flowers.

Boerlagiodendron clementis Merrill sp. nov.

Arbor vel arbuscula; foliis glabris, submembranaceis, 20 ad 30 cm longis, palmato 5–7-lobatis, lobis irregulariter grosse sinuatis, acuminatis, inflorescentiis subglabris vel glabris; floribus 4-meris.

A shrub or tree, glabrous or nearly so. Leaves 20 to 30 cm long, glabrous, submembranous, truncate or cordate at the base, palmately 5- to 7-lobed, the lobes reaching to within 3 to 5 cm of the base, the sinuses broad, rounded, the lobes 6 to 8 cm wide, irregularly toothed and each with two or three large lateral lobules, these lobules ovate to oblong, toothed, acuminate, 2.5 to 4 cm long; petioles about 40 cm long, and with three or four crests at the base. Umbels compound, the peduncles 10 to 12, 2 to 3 cm long, subtended at the base by numerous oblong, deciduous, coriaceous, strigose bracts 1 to 1.5 cm long, the peduncles nearly glabrous, bibracteolate at the apex and bearing a sessile central head of sterile flowers and two lateral branches 2 to 2.5 cm long, each branch bibracteolate at about the middle and bearing a dense globose head of perfect flowers 1 cm in diameter or less, the bracteoles in both kinds of heads minute or wanting. Perfect flowers sessile. Calyx oblong, about 2 mm long, 1 mm thick, more or less quadrangular, glabrous, truncate. Petals 4, in bud 3 mm long. Stamens 4. Ovary 4-celled. Sterile flowers pedicelled, pedicels about 5 mm long, glabrous, ovaries ovoid, 3- or 2-celled. Fruit ovoid, about 7 mm long, 4-sulcate and 4-angled, 4-celled.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 91*, January, 1906; *For. Bur. 3921 Hutchinson*, March, 1906.

A species recognizable by its 5- to 7-lobed leaves, nearly glabrous inflorescence, absence of bracteoles in the flower-heads, and by its 4-merous flowers. Among the Philippine forms most closely allied to an undescribed species from Luzon.

SCHEFFLERA Forster.

Schefflera macrantha Merrill sp. nov.

Inflorescentiis terminalibus; ramulis crassis, usque ad 20 cm longis, dense cinereo-leprosis; umbellulis breviter pedunculatis, 3–8-floris; floribus 9- vel 10-meris, pro genere magnis, calyce ca. 6 mm diam.; foliolis ca. 9, oblongis, acuminatis, 18 ad 23 cm longis, glabris.

Scandent, the ultimate branches 1 to 1.5 cm thick, glabrous, with numerous, imbricated, 1 cm long bracts, near the tip. Leaves alternate, petioles stout, about 30 cm long, glabrous, inflated at the base, the petiolules 5 to 6 cm long; leaflets about 9, oblong or oblong-ovate, coriaceous, glabrous, somewhat shining, base rounded, apex rather abruptly short-sharp-acuminate, entire; nerves about 18 on each side of the midrib, spreading, freely anastomosing, the reticulations and secondary lateral nerves nearly as prominent as the primary ones. Inflorescence terminal, the common rachis apparently not produced, the branches 20 cm long or less, thick, densely covered with scurfy, ashy or brownish scales, the flowers borne in small umbels scattered along the branches, 3 to 8 in each, the peduncles stout, 3 mm long or less, the pedicels about 5 mm long and like the flowers densely scurfy. Calyx cup-shaped, about 6 mm in diameter, truncate. Petals 9 or 10, thick, connivent, oblong-lanceolate, acute or acuminate, scurfy outside, 4 to 4.5 mm long, 1.5 mm wide. Stamens 9 or 10, the filaments very thick, 0.5 mm long; anthers ellipsoid, 2 mm long. Ovary 9- or 10-celled, upper portion above the calyx cone-shaped, truncate.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, in forests, altitude about 750 m, June, 1907.

A species well characterized by its large 9- or 10-merous flowers, densely scurfy inflorescence and 9-foliolate leaves.

Schefflera clementis Merrill sp. nov.

Glabra, inflorescentiis exceptis; ramis crassiusculis apices versus bracteis lanceolatis 5 ad 7 cm longis obtectis; foliis ca. 6-foliolatis, foliolis coriaceis lanceolatis vel oblongo-lanceolatis, caudato-acuminatis, integris, usque ad 23 cm longis; inflorescentiis terminalibus, paniculatis, ramis plus minus furfuraceis, 20 ad 40 cm longis; floribus umbellulatis, 5-meris.

Scandent, glabrous except the inflorescence, the branches thickened, gray, glabrous, and toward their apices covered with numerous light-gray glabrous lanceolate, coriaceous, 5 to 7 cm long bracts or persistent stipules. Leaves about 6-foliolate, the petioles 24 cm long or less; leaflets coriaceous, glabrous, shining, lanceolate to oblong-lanceolate, 16 to 23 cm long, 5 to 7 cm wide, entire, apex shortly caudate-acuminate, base rounded or acute; nerves spreading, the primary ones scarcely more distinct than are the secondary ones and the reticulations; petiolules 5 to 6 cm long. Rachis of the inflorescence somewhat elongated, the branches more or less

furfuraceous, 20 to 40 cm long, each branch subtended by a linear-lanceolate, acuminate, pubescent bract, 1.5 to 2 cm long. Flowers numerous, disposed in many-flowered umbels, which are arranged along the primary branches, their peduncles 5 to 10 mm long, the pedicels slender, 3 to 4 mm long. Calyx disciform, about 1.7 mm in diameter, obscurely 5-toothed. Petals 5, ovate, 1.5 to 1.8 mm long, 1 to 1.3 mm wide, acute, 3-nerved, more or less united. Stamens 5; filaments 2.5 to 3 mm long; anthers 0.5 mm long. Ovary 5-celled.

MINDANAO. Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, June, 1907, and *no. 366*, March, 1906.

A species well characterized by its thickened branches which bear numerous lanceolate bracts or persistent stipules, its elongated panicle-branches and rather large leaves. Apparently allied to *S. caudata* (Vid.) Merr., but very distinct from that species.

Schefflera mindanaensis Merrill sp. nov.

Glabra; foliis 8-foliolatis, foliolis submembranaceis, oblongo-ellipticis, acuminatissimis, basi cuneatis, margine irregulariter grosse sinuato-serratis, dentibus apiculatis; inflorescentiis terminalibus, paniculatis, pauce ramosis, ramulis usque ad 25 cm longis; floribus in umbellulis dispositis, 9-meris.

Glabrous throughout, scandent, the branches rather slender, light-gray. Leaves 8-foliolate, their petioles about 20 cm long, dark-brown, not inflated at the base, the petiolules rather slender, 2.5 to 5 cm long; leaflets submembranous, oblong-elliptical, somewhat shining, dark when dry, apex sharply acuminate, base cuneate, often slightly inequilateral, the margins rather strongly and irregularly sinuate-serrate, the teeth distant, apiculate; nerves about 8 on each side of the midrib, distinct beneath, the reticulations lax. Inflorescence terminal, its branches few, three or less, 20 cm long or less, spreading, the flowers arranged in 3- to 6-flowered umbels along the branches, the peduncles and pedicels slender, each 1 cm long or less. Calyx funnel-shaped, about 3.5 mm in diameter, truncate. Petals 9, oblong-lanceolate, 3 or 3.5 mm long, about 1.3 mm wide, somewhat connivent. Stamens 9; filaments 1 mm long, anthers about 1.5 mm long. Ovary 9- to 11-celled, the portion above the calyx a truncate cone.

MINDANAO. Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September–October, 1906.

A species resembling in leaf characters *Schefflera insularum* (Seem.) Harms, but sufficiently distinct from that species.

Schefflera gigantifolia Merrill sp. nov.

Foliis ca. 7-foliolatis, foliolis oblongis, usque ad 40 cm longis, 15 cm latis, caudato-acuminatis, marginibus irregulariter grosse sinuato-dentatis; inflorescentiae ramis usque ad 60 cm longis.

Scandent, glabrous except the inflorescence. Leaves about 7-foliolate,

the leaflets oblong, coriaceous, caudate-acuminate, base rounded or subacute, margins coarsely and irregularly sinuate-dentate, somewhat shining above, dull beneath, 25 to 40 cm long, 10 to 15 cm wide; nerves about 16 on each side of the midrib, very prominent beneath; petioles very stout, 65 cm long or less; petiolules 7 to 11 cm long. Complete inflorescence unknown, its branches stout, 60 cm long or less, scurfy, becoming nearly glabrous in infrutescence. Flowers in 10- to 20-flowered umbels which are racemosely arranged along the branches, their peduncles rather slender, scurfy, about 1.5 cm long, a single lanceolate, acuminate, 1 cm long bract at the base of each ultimate branchlet or peduncle; pedicels about 1 cm long. Calyx hemispherical, with 6 shallow truncate teeth. Petals and stamens not seen, probably 6. Ovary 6-celled; style short, cylindrical, 0.5 mm long. Fruit ovoid or ellipsoid, about 4 mm long, 6-sulcate, the resulting ridges acute.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 717, 931*, September–October, 1906, and February, 1907; Province of Misamis, Mount Malindang, *For. Bur. 4565 Mearns & Hutchinson*, May, 1906.

A most characteristic species, readily recognizable by its very large leaves and large inflorescence.

Schefflera gracilipes Merrill sp. nov.

Glabra; foliis ca. 8-foliolatis, foliolis oblongis vel oblongo-ellipticis, integris, acuminatis, usque ad 9 cm longis; inflorescentiis terminalibus, rhachidibus 4 ad 6 cm longis, ramis numerosis, 15 ad 25 cm longis, gracilibus; floribus minutis, 5-meris.

Scandent, glabrous throughout, the branches light-gray, terete, rather slender. Leaves about 8-foliolate, the petioles 8 to 10 cm long, slender, the stipules 8 mm long, clasping the stems; leaflets oblong to oblong-elliptical, rather sharply acuminate, base acute, entire, 5 to 9 cm long, 2 to 3 cm wide, coriaceous, shining; nerves 4 or 5 on each side of the midrib, not prominent, irregular, scarcely more distinct than are the secondary nerves and reticulations; petiolules slender, 2 to 4 cm long. Panicles terminal, the common rachis 4 to 6 cm long; branches numerous, slender, 15 to 25 cm long, each subtended by a lanceolate, acuminate, somewhat mealy bract 1 to 1.3 cm long. Flowers small, disposed in subcapitate 8- to 12-flowered umbels, the ultimate branchlets of the inflorescence or peduncles very slender, 2 cm long or less, each subtended by a small bracteole, the pedicels 2 mm long or less. Calyx small, about 0.8 mm in diameter, disciform, minutely 5-toothed. Petals 5, narrowly ovate, acute, 1.5 mm long, 0.8 mm wide, 3-nerved. Stamens 5; filaments 1 mm long; anthers about 1 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September–October, 1906.

A species well characterized by its elongate and very slender branches and ultimate branchlets, and by its minute flowers.

Schefflera obliqua Merrill sp. nov.

Glabra; foliis 5-foliolatis, foliolis late ovatis vel oblongo-ovatis, nitidis, integris, apice caudato-acuminatissimis, basi late truncato-obliquis, rariter subacutis; paniculis terminalibus, ramulis patentibus; floribus 5-meris, petalis coalitis.

Scandent, glabrous throughout, the branches somewhat thickened, gray, strongly lenticellate. Leaves 5-foliolate, their petioles 8 to 10 cm long, petiolules 3 to 12 cm long, that of the middle leaflet longer than the lateral ones; stipules 1 to 1.5 cm long, inflated, clasping; leaflets glabrous, shining, papyraceous, 10 to 20 cm long, 5 to 10 cm wide, broadly ovate to ovate-oblong, entire, the apex very sharply caudate-acuminate, the base various, usually very broad and truncate, oblique, the angles rounded, rarely subacute, the middle leaflet equilateral, the four lateral ones strongly inequilateral; nerves about 13 on each side of the midrib, not prominent, the reticulations obscure. Panicles terminal, the common rachis elongate, the lateral branches spreading, usually 15, about 20 cm long, elongate in fruit, the flowers in about 12-flowered umbels, the ultimate branchlets or peduncles 2 cm long, frequently with supplementary fascicles of flowers at about the middle, the pedicels 5 mm long or less. Calyx shallow, truncate. Petals entirely coalesced forming an ovoid mitre-like corolla 3 mm long and 3 mm in diameter, blunt at the apex. Stamens 5; filaments very short; anthers about 2 mm long. Ovary 5- or 6-celled; style none. Fruit ovoid, yellowish-red, somewhat fleshy, nearly 1 cm long, broad at the base, apex acute, 5- or 6-sulcate, the resulting ridges rounded.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 876*, in flower, January, 1907, in fruit March, 1907: Province of Surigao, Surigao, *Bolster 377*, August and October, 1906, specimens immature and somewhat smaller than the type, but manifestly the same species.

A most characteristic form, recognizable by its very peculiarly shaped leaves, large fruits and united petals.

Schefflera simplicifolia Merrill sp. nov.

Glabra, foliis simplicibus, foliolis lanceolatis vel oblongo-lanceolatis, acuminatis, usque ad 16 cm longis, margine irregulariter leviter repandis; paniculis terminalibus, ramis elongatis, pauciflоris; floribus 5-meris, petalis liberis, reflexis.

Scandent, glabrous throughout, the branches slender, terete, light-gray. Leaves simple, the petiole 1.5 to 2 cm long, the petiolule very short. Leaves lanceolate to oblong-lanceolate, subcoriaceous, 9 to 16 cm long, 2 to 5 cm wide, apex acuminate, base rounded or subacute, margins slightly and irregularly repand; nerves not prominent, the primary ones scarcely differentiated from the secondary ones and reticulations. Panicles terminal, the common rachis 2 to 3 cm long, the branches few, usually in pairs, elongate, slender, the primary ones 8 to 13 cm long,

each bearing at its apex 4 to 6 umbellately-disposed branchlets 1 to 3 cm long, these in turn bearing the 4- to 6-flowered umbels, the pedicels about 1 cm long. Calyx cup-shaped, truncate, 2 mm long. Petals 6, free, reflexed, glabrous, narrowly ovate, acute, 1.8 long, 1 to 1.2 mm wide. Stamens 6, alternating with the petals; filaments 0.5 mm long; anthers 1 mm long. Ovary 6-celled; style conical, very short. Fruit suborbicular or ovoid, about 5 mm long, apiculate, 6-sulcate, the resulting ridges subacute.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, in flower and fruit, September–October, 1907, and from the same locality *Mrs. Clemens 1143*, July, 1907.

A most characteristic species, at once recognizable by its simple leaves, diffuse panicles and 6-merous flowers, the petals free, reflexed. The only other species in the genus with simple leaves, known to me, is *Schefflera aveuis* (Seem.) Harms, from Singapore.

Schefflera ovoidea Merrill sp. nov. § *Cephaloschefflera*.

Foliolis ca. 8, glabris, oblongis vel oblongo-ellipticis, breviter acuminatis, integris, usque ad 22 cm longis; fructibus in capitula densa ovoidea 3 ad 3.5 cm longa congestis, numerosis, loculis 8 vel 9.

Scandent, glabrous throughout. Leaves 8-foliolate, petioles elongated, petiolules 4 to 6 cm long; leaflets oblong to elliptical-oblong, glabrous, coriaceous, entire, somewhat shining, base acute, apex short-acuminate, 18 to 22 cm long, 8 to 10 cm wide; primary nerves about 10 on each side of the midrib, distinct beneath, spreading-ascending, the secondary nerves somewhat prominent. Complete inflorescence not seen, the branches, in fruit, very stout, 1.5 to 2 cm in diameter, 70 cm long, each bearing about 14 ovoid dense heads 3 to 3.5 cm long. Mature heads subsessile, the individual fruits indefinite, 8- or 9-celled, the free portions conical, truncate, angular, about 2 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1037*, May, 1907.

A species resembling *Schefflera blancoi* Merr., but differing from that species in its elongated branches, larger heads and more numerously-celled fruits, those in *S. blancoi* being usually, if not always, 5-celled. It is apparently more closely allied to *S. cephalotes* Harms, of the Malay Peninsula, than to *S. blancoi*, but seems sufficiently distinct from that species. The mature fruits or heads are very suggestive of those of some species of *Pandanus* in the group of *P. fascicularis* Lam.

ERICACEÆ.

RHODODENDRON Linn.

Rhododendron clementis Merrill sp. nov.

Arbor glabra; foliis subcoriaceis, elliptico-oblongis, obtusis, usque ad 16 cm longis, nitidis, subtus squamulis parvis notatis; floribus aurantiacis, 4.5 ad 5 cm longis latisque, glabris; staminibus 10, in parte inferiori plus minus pubescentibus; ovario oblongo, glabro, 5-loculari.

A tree, the branches terete, reddish-brown or grayish, the younger ones

dark-reddish-brown, glabrous. Leaves elliptical-oblong, 9 to 16 cm long, 4.5 to 8 cm wide, subcoriaceous, shining, somewhat paler beneath, entirely glabrous above, beneath with numerous scattered small lepidote glands, the base acute, the apex usually broad, rounded, rarely subacute or obscurely acuminate; nerves about 10 on each side of the midrib, not prominent, somewhat ascending, reticulating; petioles stout, 1 to 1.5 cm long. Flowers orange-colored, 5 to 10 or more at the apices of the branches on a short stout rachis, the buds covered by numerous membranous, shining, deciduous, elliptical bracts about 3 cm long, forming ellipsoid heads 3 to 3.5 cm long; pedicels glabrous, 2 to 3 cm long. Calyx disciform, 5-toothed. Corolla glabrous, 4.5 to 5 cm long and wide, the tube about 2 cm long, somewhat broadened upwards, the lobes 2.5 cm long, 2 cm wide, elliptical-obovate, rounded. Stamens 10; filaments 2.5 to 2.8 cm long, more or less pilose below, glabrous above; anthers 5.5 to 7 mm long. Ovary oblong, glabrous, 5 mm long, 5-celled; style glabrous, 1 cm long; stigma capitate, 2 mm in diameter. Immature fruit glabrous.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 732*, October, 1906, also without numbers, November, 1906, and October, 1907.

A species characterized by its orange flowers, oblong-elliptical obtuse leaves, which are but slightly lepidote beneath, its glabrous ovaries, etc.

VACCINIUM Linn.

Vaccinium lanaense Merrill sp. nov.

Arbor vel arbuscula, glabra, epiphytica; foliis coriaceis, ovatis vel oblongo-ovatis, 6 ad 11 cm longis, acuminatis, basi valde 5–7-nerviis; floribus axillaribus, fasciculatis, parvis, corolla ca. 2 mm longa, cylindrica, glabra; fructibus ovoideis, 4–5 mm diam.

An epiphytic shrub or tree, glabrous throughout, the branches light-gray or pale-brown, terete. Leaves ovate to oblong-ovate, rarely ovate-lanceolate, 6 to 7 cm long, 2 to 6 cm wide, coriaceous, shining, apex rather strongly acuminate, base rounded to subacute, the margins entire, somewhat revolute; nerves basal or subbasal, prominent, 5, sometimes with an additional submarginal pair, the interior pair leaving the midrib shortly above the base and extending nearly to the apex of the leaf, the reticulations obscure; petioles stout, about 3 mm long. Flowers in axillary 2- to 5-flowered fascicles, the pedicels glabrous, 3 to 4 mm long, each subtended by a pair of small somewhat sheathing bracteoles. Calyx glabrous, 2 to 2.5 mm long, the limb short, somewhat spreading, the lobes broadly orbicular-ovate, acute or acuminate, about 0.7 mm long. Corolla glabrous, cylindrical, short, 2.5 mm long or less, the teeth broadly ovate, about 1 mm long. Stamens 10; filaments 1.5 mm long or less, slightly hirsute, the anthers about 1.2 mm long. Style glabrous, deciduous, 2 mm long; stigma capitate. Fruit ovoid, glabrous, 4 to 5 mm in diameter.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 431*, March and June, 1906, also without numbers, September–October, 1906, September, 1907, and October, 1907.

An epiphytic species, growing on *Ficus*, in leaf-characters, shape, size, texture and venation, very close to *Vaccinium apoanum* Merr., but entirely different in floral characters, well distinguished by its small entirely glabrous flowers.

RUBIACEÆ.

HEDYOTIS Linn.

Hedyotis parva Merrill sp. nov.

Frutex erectus, glaber, ca. 1 m altus; foliis lanceolatis vel oblongo-lanceolatis, 1 ad 2.5 cm longis, acuminatis, basi acutis, membranaceis, breviter petiolatis; floribus axillaribus, glomerato-verticillatis, subsessilibus, ca. 7 mm longis; stipulis setoso-acuminatis, subintegris vel pauce pectinato-setosis.

An erect much branched shrub, glabrous throughout, about 1 m high. Branches slender, brown or grayish, 4-angled, the branchlets gray or reddish-brown. Leaves lanceolate or oblong-lanceolate, membranous, 1 to 2.5 cm long, 5 to 10 mm wide, the base acute, the apex acuminate; nerves very faint, two or three on each side of the midrib; petioles 1 to 2 mm long; stipules short, setose-acuminate, subentire or slightly setose-pectinate. Flowers white, in few-flowered axillary sessile or subsessile fascicles or cymes, the bracts oblong, obtuse, foliaceous, about 3 mm long. Calyx tube ovoid, less than 1 mm long, the lobes oblong-ovate, about 1.4 mm long. Corolla about 6 mm long, the tube cylindrical, slightly pilose within, the lobes oblong-ovate, acute, about 1.5 mm long. Filaments 1.5 mm long; anthers 1 mm long. Capsule, including the erect calyx lobes, about 3 mm long.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4576 Mearns & Hutchinson*, May, 1906; Lake Lanao, Camp Keithley, *Mrs. Clemens 461*, April, 1906. NEGROS, Mount Silay, *For. Bur. 4234 Everett*, February, 1906; *Whitford 1519*, May, 1906; Canlaon Volcano, *Banks s. n.*, June, 1906.

A species with the general aspect of *Hedyotis microphylla* Merr., but with axillary sessile or subsessile inflorescence.

HYDNOPHYTUM Jack.

Hydnophytum angustifolium Merrill sp. nov.

Ramis tenuibus, usque ad 60 cm longis, diffusis, junioribus furfuraceis, plus minus angulatis; floribus axillaribus fasciculatis, minutis, ca. 2 mm longis; foliis coriaceis, lanceolatis vel anguste lanceolatis, glabris, 5 ad 10 cm longis, 6 ad 18 mm latis; nervis lateralibus obsoletis.

Tuber irregular, at least 15 cm in diameter, brown or grayish, unarmed. Stems several, diffusely branched, at least 60 cm long, gray or brown, slender, the branches elongated, the younger ones brown and furfuraceous, somewhat angled. Leaves lanceolate or narrowly lanceolate, 5 to 10 cm long, 6 to 18 mm wide, coriaceous, glabrous, sessile or subsessile, pale

when dry, somewhat shining, gradually narrowed to both base and apex, the tip acute or blunt, the midrib prominent beneath, the lateral nerves obsolete or very obscure. Flowers fascicled, axillary, white. Calyx cylindrical, 1 mm long and wide, truncate. Corolla 2 mm long, inside slightly barbate at the middle. Anthers 0.7 mm long. Style 1.2 mm long. Fruit red, somewhat fleshy when fresh, 1 cm long or less, about 4 mm in diameter at the base, gradually narrowed upward, apparently 1-celled and with a single seed.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, May, June, 1907 and April, 1906: District of Zamboanga, San Ramon, *Copeland s. n.*, March, 1905.

A very characteristic species, readily recognizable by its narrow sessile leaves, the nerves of which are obsolete or nearly so, and its elongated fruits.

RANDIA Linn.

Randia olaciformis Merrill sp. nov.

Frutex scandens, inermis; foliis ellipticis vel elliptico-ovatis, glabris vel subtus in axillis barbatis, nitidis, acuminatis, subcoriaceis, 6 ad 9 cm longis; nervis utrinque 5, subtus prominentibus, ascendentibus; cymis 3 ad 4 cm longis, plus minus hirsutis, axillaribus terminalibusque; floribus albis, ca. 1.5 cm longis, hirsutis; corollae lobis imbricatis, ca. 10 mm longis; stigmatibus elongatis, integris.

A scandent unarmed shrub, the flowers white, turning yellow in age. Branches terete, slender, dark-colored, ultimately glabrous, the young branchlets more or less appressed-hirsute. Leaves elliptical to elliptical-ovate, glabrous, except beneath in the vein axils, which are usually barbate, shining, subcoriaceous, base rounded or acute, apex acuminate, 6 to 9 cm long, 3 to 5 cm wide; nerves 5 on each side of the midrib, prominent beneath, ascending, somewhat curved, the reticulations somewhat distinct, rather close, petioles 5 to 8 mm long, glabrous or somewhat pubescent; stipules oblong-ovate, acute, 5 mm long or less, usually somewhat pubescent, persistent. Cymes axillary and terminal, peduncled, 4 cm long or less, the peduncles, branches, pedicels, bracts, bracteoles and flowers somewhat hirsute. Calyx somewhat urceolate, 4 mm long, the limb with 5, oblong or elliptical, obtuse, 1.8 mm long lobes. Corolla tube cylindrical, 7 mm long, 2.5 mm thick, the lobes 5, imbricate and twisted, narrowly oblong, about 10 mm long, 2.8 mm wide, obtuse. Filaments short; anthers lanceolate, twisted, about 10 mm long, sparingly pubescent. Ovary 2-celled, each cell many-ovuled; style and stigma 18 mm long, the stigma cylindrical, elongated, entire, 8 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 1220*, September, 1907.

A characteristic species, recognizable by its shining leaves with prominent ascending veins, which are usually barbate in the axils beneath, and by its cylindrical, elongated, entire styles. Very similar in gross characters to *Olax imbricata* Roxb., whence its specific name.

Randia pulcherrima Merrill sp. nov.

Frutex scandens, inermis, ca. 10 m altus; ramulis inflorescentiis et subtus foliis parce hirsutis; foliis subsessilibus, coriaceis, oblongis, breviter acuminatis, basi auriculato-cordatis, 15 ad 20 cm longis, nervis utrinque ca. 10, prominentibus, supra impressis; cymis axillaribus, 5 ad 6 cm longis, densiflоris; floribus pulcherrimis, roseis, crassis, 3 cm longis, petalis extus dense villosis, nitidis.

A scandent shrub about 10 m high. Branches unarmed, terete or slightly angled, light-gray or brownish, glabrous, the branchlets sparingly ferruginous-hirsute. Leaves coriaceous, oblong, 15 to 20 cm long, 5 to 7 cm wide, somewhat shining, glabrous above, slightly hirsute on the midrib and nerves beneath, short-acuminate, the base somewhat narrowed and prominently auriculate-cordate, subclasping; nerves about 10 on each side of the midrib, very prominent on both surfaces, impressed above, anastomosing, the reticulations lax; petioles very short, stout, not exceeding 2 mm in length. Cymes axillary, usually solitary, 5 to 6 cm long, somewhat ferruginous-hirsute, densely flowered. Flowers pink, 3 cm long. Calyx nearly 1.5 cm long, narrowly funnel-shaped, slightly hirsute, truncate and with 5 minute obscure teeth, about 5 mm in diameter at the mouth. Corolla-tube about 1 cm long, and with the lobes very densely pale-appressed-villous outside, the throat inside densely hirsute. Ovary 2-celled, each cell many-ovuled; style and stigma nearly 3 cm long, the stigma narrowly oblong, entire. Fruit ovoid or ellipsoid, glabrous, nearly 1.5 cm long when mature.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens* 765, September, 1906, and without number, March, 1907. Luzon, Province of Tayabas, *For. Bur.* 7863 *Curran & Merritt*, November, 1907; *Elmer* 9127, May, 1907.

A very characteristic species, recognizable by its densely flowered axillary cymes, long flowers, the corolla densely villous, pale and shining, and by its strongly nerved, subsessile and prominently auriculate-cordate leaves.

LASIANTHUS Jack.

Lasianthus clementis Merrill sp. nov.

Arbor parva vel arbuscula; ramis ramulis foliisque plus minus olivaceo-vel sordide fulvo-pubescentibus; foliis papyraceis, elliptico-oblongis, tenuiter acuminatis, basi acutis; nervis utrinque 5 vel 6, subtus prominentibus; stipulis deciduis; floribus axillaribus, solitariis vel fasciculatis, plus minus villosis, 3 mm longis, bracteis nullis vel minutis.

A shrub or small tree, the branches and branchlets slender, terete, densely olivaceous or dirty-yellowish or brownish-pubescent. Leaves papyraceous, elliptical-oblong, rather abruptly slenderly acuminate, base acute, 7 to 9 cm long, 2 to 4 cm wide, somewhat shining, glabrous above, beneath more or less densely olivaceous-pubescent on the midrib nerves and reticulations; nerves 5 or 6 on each side of the midrib, prominent

beneath, curved-ascending, the reticulations subparallel, distinct; petioles pubescent, 2 to 3 mm long; stipules deciduous. Flowers axillary, solitary or two or three in an axil, sessile or subsessile, white. Calyx villous, 2 mm in diameter, 5-toothed. Corolla-tube cylindrical, about 3 mm long, somewhat pubescent, the lobes 5, rarely 6, spreading, villous, ovate-lanceolate, 2 mm long; anthers about 1 mm long. Ovary 5-celled. Fruit bright-blue, subglobose, 3 or 4 mm in diameter, slightly hirsute. Bracts none or minute.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 561, 846*, May and November, 1906, and without number, September, 1907.

A species well characterized by its olivaceous or dirty-yellowish pubescence, sessile flowers, and absence of bracts.

WILLIAMSIA Merrill gen. nov.

Flores hermaphroditi. Calycis tubus ovoideus vel globosus; limbus 4- rarius 5-dentatus, persistens. Corolla coriacea, tubo brevi, fauce villosa; limbi lobi 5–7, valvati. Stamina 7, corollae fauce inserta, filamentis brevibus; antherae dorso affixae. Discus tumidus, annularis. Ovarium 5–7-loculare; stylus brevis, apice 5–7-lobatis. Bacca 5–7-locularis, polysperma. Semina minuta. Arbor parva, fere glaberrima. Folia opposita, petiolata, oblongo-lanceolata, acuminata, penninervia. Stipulae elongatae, intrapetiolares. Flores axillares, sessiles, solitarii vel fasciculati; bracteis 2, superpositis, plus minus cupularibus, 4-dentatis, involucrantibus.

Williamsia sablanensis (Elmer) Merrill comb. nov.

Urophyllum sablanense Elmer Leafl. Philip. Bot. 1 (1906) 39.

LUZON, Province of Benguet, Sablan, *Elmer 6131*, April, 1904 (type); Baguio, *Elmer 8551*, March, 1907; *Williams 1028*, October, 1904. MINDANAO, District of Zamboanga, *Copeland 1642*, February, 1905; Sax River, *Williams 2336*, February 15, 1905; Lake Lanao, Camp Keithley, *Mrs. Clemens 531*, May, 1905, and without number, July, 1907.

This new genus is manifestly allied to *Urophyllum*, but is at once distinguished from that genus by its sessile, axillary, solitary or fascicled flowers, and the presence at the base of the calyx of two cupular, imbricate, 4-toothed bracts, inclosing the base of the calyx, the lower one the smaller. It seems to be even more closely allied to *Gonyanera* Korth., but is readily distinguished from that genus by its more numerous ovary cells. Dedicated to Mr. R. S. Williams of the New York Botanical Garden, who made extensive botanical collections in the Philippines from October, 1903, to July, 1905.

PREVIOUS PUBLICATIONS OF THE BUREAU OF GOVERNMENT LABORATORIES—Concluded.

(Concluded from second page of cover.)

No. 32, 1905.—Biological Laboratory: I. Intestinal Hæmorrhage as a Fatal Complication in Amœbic Dysentery and Its Association with Liver Abscess. By Richard P. Strong, M. D. II. The Action of Various Chemical Substances upon Cultures of Amœbæ. By J. B. Thomas, M. D., Baguio, Benguet. *Biological and Serum Laboratories:* III. The Pathology of Intestinal Amœbiasis. By Paul G. Woolley, M. D., and W. E. Musgrave, M. D.

No. 33, 1905, Biological Laboratory.—Further Observations on Fibrin Thrombosis in the Glomerular and in Other Renal Vessels in Bubonic Plague. By Maximilian Herzog, M. D.

No. 34, 1905.—I. Birds from Mindoro and Small Adjacent Islands. II. Notes on Three Rare Luzon Birds. By Richard C. McGregor.

No. 35, 1905.—I. New or Noteworthy Philippine Plants, IV. II. Notes on Cuming's Philippine Plants in the Herbarium of the Bureau of Government Laboratories. III. Hackel, "Notes on Philippine Grasses." IV. Ridley, "Scitimineæ Philippinenses." V. Clarke, "Philippine Acanthaceæ." By Elmer D. Merrill, Botanist.

No. 36, 1905.—A Hand-List of the Birds of the Philippine Islands. By Richard C. McGregor and Dean C. Worcester.

The previous publications of the Bureau were given out as bulletins in serial number pertaining to the entire Bureau. These publications, if they are desired, can be obtained by applying to the librarian of the Bureau of Science, Manila, P. I., or to the Director of the Bureau of Science, Manila, P. I. Correspondents will confer a favor by returning to the Bureau any previous publications which they may have in duplicate, as a number of bulletins are now out of print.

LIST OF PREVIOUS PUBLICATIONS OF THE MINING BUREAU (NOW DIVISION OF MINES OF THE BUREAU OF SCIENCE).

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1893.—Estudio Descriptivo de algunas manantiales minerales de Filipinas ejecutado por la comisión formada por D. Enrique Abella y Casariego, Inspector General de Minas, D. José de Vera y Gómez, Médico, y D. Anacleto del Rosario y Sales, Farmacéutico; precidido de un prólogo escrito por el Excmo. Sr. D. Angel de Avilés, Director General de Administración Civil.

1893.—Terremotos experimentados en la Isla de Luzón durante los meses de Marzo y Abril de 1892, especialmente desastrosos en Pangasinán, Unión y Benguet. Estudio ejecutado por D. Enrique Abella y Casariego, Inspector General de Minas del Archipiélago.

1901.—The Coal Measures of the Philippines. Charles H. Burritt.

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PHILIPPINE FREYCINETIA

THE OAKS OF THE PHILIPPINES

THE GENUS RADERMACHERA HASSK., IN THE PHILIPPINES

By Elmer D. Merrill

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

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(Concluded on third page of cover.)

PHILIPPINE FREYCINETIA.

By Elmer D. Merrill.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

Philippine *Pandanaceae* had received little attention before the year 1900 either from collectors or systematists. However, in 1900, Warburg published his monograph of the family,[1] recognizing three genera, *Sararanga,* a monotypic genus, its single species, *S. sinuosa* Hemsl., known only from the Solomon Islands and New Guinea, *Freycinetia* with 62 species, extending from Ceylon and Burma to Formosa, Malaya, northern Australia, Polynesia, and the Hawaiian Islands, with 7 species in the Philippines, and *Pandanus* with 156 species, extending from tropical Africa to tropical Asia, Malaya, Australia, and Polynesia, with but a single species definitely recorded from the Philippines, and five Philippine species described by Blanco considered as doubtful ones.

Before the publication of Warburg's monograph four species of *Freycinetia* had been described from the Philippines by various authors, Warburg adding three additional ones, but recent collections have added a considerable number of species of the genus to the known Philippine flora, while a second species of *Sararanga,* (*S. philippinensis Merr.*), has been found on the east coasts of Luzon and Samar, and a large number of species of *Pandanus* have been described and the status determined of most of Blanco's imperfectly described species.

In Martelli's recent paper on the Philippine species of *Pandanus*[2] twenty-three species with several varieties are recognized as occurring in the Archipelago, beside three doubtful species, while more recent collections have added two or three additional ones to the list. As many of the species of *Pandanus* and *Freycinetia* are very local, it is very probable that we do not know more than one-half the species of either genus actually growing in the Philippines.

The first species of *Freycinetia* described from the Philippines was *F. luzonensis* Presl Epim. Bot. (1851) 238, but previously Gaudichaud had figured, but not described, what is apparently the same species

[1] Pflanzenreich 3 (1900) 1–97.

[2] *This Journal* 3 (1908) *Bot.* 59–72.

under the name of *F. cumingiana,* and also a second Philippine species, *F. sphaerocephala,* in the Botany of the Voyage of the Bonite, Atlas, 1843. In 1883, Naves in the Novissima Appendix to the third edition of Blanco's Flora de Filipinas, 285, 286, enumerates four species, which are all, with the possible exception of *F. luzonensis,* admitted on erroneous identifications, and can be ignored. He reduced *Tillandsia pseudo-ananas* Blanco to *Freycinetia insignis* Blume, but this is a manifest error, as an examination of Blanco's description shows conclusively that *Tillandsia pseudo-ananas* can not be a *Freycinetia,* but is probably a *Pandanus,* and possibly the same as *P. copelandii* Merr. Blanco did not consider any species of *Freycinetia* in his Flora de Filipinas.

Having recently had an opportunity to examine the types or authentic material of all the Philippine species considered by Warburg, in the herbaria at Kew and Berlin, it became evident that a certain number of recently described forms were invalid, three of the species described by Mr. Elmer, and one by myself. In justice to Mr. Elmer, however, it is manifest that the determination of two of his species as new, *F. lucbanensis* and *F. confusa,* was due to errors in Warburg's monograph, the former being identical with *F. ferox* Warb., the leaves of the type of which are about 1 m long but described as 30 cm long, the latter being the same as *F. vidalii* Hemsl. The affinity of the latter was recognized by Mr. Elmer, but Hemsley's species was placed by Warburg in the wrong section of the genus, the type being a very immature specimen.

In view of the fact that a recent paper has been published on Philippine *Pandanus,* it has been thought advisable to prepare a list of the known species of the other large genus in the family, *Freycinetia,* giving also a provisional key to the species. Twenty-four species are recognized, all of which are endemic in the Philippines, so far as is known, giving the Archipelago a far greater known number of species than any other geographical region in which the genus is found. Luzon alone has eighteen species, while the region about Mount Banajao, Province of Tayabas, Luzon, is remarkable in having no less than eleven species of the genus, more than are known from any single island in the Malayan region; New Guinea and the Malay Peninsula coming first with but eight species, Celebes next with seven, Java with six, Borneo and New Caledonia with four each, Sumatra with three, and various other islands with one or two species each. The above distribution list is based largely on Warburg's monograph, and the number of species actually known from some of the above islands may be larger than the figures given, while undoubtedly a great many undescribed forms remain to be collected.

Stigmas 1 to 3, usually 2. § Oligostigma.
Leaves about 1 m long, 5 to 8 cm wide.
Leaves long and gradually acuminate; syncarps 3-nate, about 3 cm in diameter. 1. *F. ferox*
Leaves abruptly acuminate; syncarps 3- or 4-nate, 5 to 7 cm in diameter. 2. *F. maxima*
Leaves much less than 1 m long.
Leaves oblong, 3.5 to 4.5 cm wide, abruptly short-acuminate.. 3. *F. oblongifolia*
Leaves lanceolate or linear-lanceolate, 2.5 cm wide or less, usually slenderly long-acuminate.
Leaves 10 to 15 cm, rarely 18 cm long..... 4. *F. luzonensis*
Leaves 20 to 60 cm long.
Syncarps 2 cm long or less; leaves about 40 cm long, 5 to 6 mm wide. 5. *F. ridalii*
Syncarps 4 to 11 cm long.
Mature syncarps about 4 cm long.
Leaves about 20 cm long..... 6. *F. robinsonii*
Leaves 40 to 50 cm long..... 7. *F. curranii*
Mature syncarps 7 to 11 cm long.
Syncarps 4–6-nate, about 7 cm long; leaves 20 to 30 cm long. 8. *F. multiflora*
Syncarps ternate, about 11 cm long; leaves 40 to 60 cm long. 9. *F. auriculata*
Stigmas 3 to 10. § Pleiostigma.
Syncarps cylindrical, 3 to 5 times as long as broad.
Leaves 2 cm wide or less.
Leaves 20 to 25 cm long, gradually narrowed upwards to the long and slenderly acuminate apex; syncarps binate or ternate, 2.5 to 3.5 cm long ..... 10. *F. palawanensis*
Leaves 10 to 18 cm long, not caudate-acuminate; syncarps 4-nate or 5-nate, 2 cm long or less..... 11. *F. jagorii*
Leaves 2.5 to 5.5 cm wide.
Leaves abruptly short-acuminate.
Leaves 30 to 40 cm long, margins scabrous near the base and apex only, the median portions smooth..... 12. *F. philippinensis*
Leaves about 1 m long, margins scabrous throughout..... 13. *F. rigida*
Leaves gradually and slenderly long-acuminate.
Leaf margins scabrous only near the base and apex..... 14. *F. scabripes*
Leaf margins scabrous throughout.
Leaf base dilated, the stipule free above..... 15. *F. dilatata*
Leaf base not dilated, the stipule attached along one side throughout its length ..... 16. *F. negrosensis*
Syncarps globose or subglobose.
Leaves 4 to 5 cm wide, abruptly short-acuminate.
Leaves strongly auricled at the base..... 17. *F. merrillii*
Leaves not auricled at the base..... 18. *F. megacarpa*
Leaves not exceeding 2 cm in width.
Leaves 2 to 3 mm wide..... 19. *F. monocephala*
Leaves 7 to 20 mm wide.
Leaves 6 cm long or less..... 20. *F. sphaerocephala*
Leaves exceeding 6 cm in length.
Leaves 1.5 to 2 cm wide.
Leaves 9 to 13 cm long..... 21. *F. rostrata*
Leaves about 20 cm long..... 22. *F. warburgii*
Leaves less than 1 cm wide.
Leaves less than 10 cm long..... 23. *F. ensifolia*
Leaves 15 to 25 cm long..... 24. *F. williamsii*

1. **Freycinetia ferox** Warb. Pflanzenreich 3 (1900) 33.

Freycinetia lucbanensis Elm. Leaf. Philip. Bot. 1 (1907) 212.

Luzon, without locality, *Warburg s. n.*, in Herb. Berol. (type), carbon impression in Herb. Bur. Sci.: Province of Tayabas, Lucban, *Elmer 8230*, May, 1907, type of *Freycinetia lucbanensis* Elm.

The species described by Elmer is identical with that of Warburg, but neither specimen is mature. In the original description of the species Warburg erroneously describes the leaf as 30 cm long, but the type, which I have examined in Herb. Berol., has leaves about 1 m long, Warburg's "30 cm" being a typographical error for, probably, 80 cm. Because of this error, Mr. Elmer did not recognize the identity of his plant with Warburg's species. The type of *F. ferox Warb.* was from central Luzon, probably Tayabas Province.

2. **Freycinetia maxima** sp. nov. § *Oligostigma.*

Robusta, scandens, ramis circiter 3 cm diametro, teretibus; foliis numerosis, dense imbricatis, flaccide-coriaceis, utrinque reticulatis, 0.5 ad 1 m longis, 7 ad 8 cm latis, anguste oblongo-lanceolatis vel lanceolatis, apice abrupte breviter acuminatis, basi paullo augustatis ibique marginibus membranaceis pallidis vel purpureis 6 ad 15 cm longis, usque ad 2 cm latis, instructis, totis marginibus valde spinuloso-serratis, costa subtus, in partibus superioribus, spinulosis. Spadicibus fructiferis ternis vel quaternis, oblongo-ellipsoideis vel anguste oblongo-obovoideis, 15 cm longis, 6 ad 7 cm diametro, leviter longitudinaliter sulcatis vel subcylindraceis; pedunculis circiter 2.5 cm longis, 1 cm crassis; fructibus immaturis linearibus, 1.5 cm longis, 1 mm diametro; stigmatibus 2 vel 3.

Luzon, Province of Tayabas, Malicboi, *For. Bur. 10754 Curran*, July 22, 1908: Albay-Sorsogon, Adumoy Hills, *For. Bur. 12381 Curran*, June, 1908.

A species apparently most closely allied to the preceding and to *Freycinetia latispina* Warb., of Celebes, but distinct from both, and from all other described forms. It is remarkable for its large leaves, which are relatively broad, strongly reticulate, on their margins and in the upper part of the lower surface of the midrib, strongly spinescent, but more especially remarkable for its very large syncarps, each composed of several thousand fruits.

3. **Freycinetia oblongifolia** sp. nov. § *Oligostigma.*

Robusta, scandens, circiter 4 m alta; ramis teretibus, 1 cm crassis; foliis submembranaceis, oblongis vel oblongo-lanceolatis, circiter 20 cm longis, 4 ad 5 cm latis, basi angustatis, haud vaginantibus; apice breviter abrupteque acuminatis, margine prope basin apicemque denticulatis, in media parte inermibus. Inflorescentiis terminalibus, spadicibus femineis ternis vel quaternis, bracteis multis imbricatis roseis, acutis vel acuminatis, marginibus costisque glabris vel apicem versus dentatis, exterioribus 1 ad 2 cm longis, circiter 1.5 cm latis, interioribus 6 ad 8 cm longis, 2.5 ad 3 cm latis, circumdatis. Spadicibus fructiferis, cylindraceis, aurantiacis, circiter 7 cm longis, 2 cm latis; fructibus circiter 2.5 mm diametro basi plus minus succulentis, supra lignosis, angulatis; stigmatibus 2.

Mindanao, Province of Surigao, Surigao, *Bolster 342, 249*, May and February, 1906, in forests, 100 to 130 m altitude.

4. **Freycinetia luzonensis** Presl Epim. Bot. (1851) 238; Warb. in Pflanzenreich **3** (1900) 35; Miq. Fl. Ind. Bat. **3** (1859) 172; Vidal Phan. Cuming. Philip. (1885) 154; Rev. Pl. Vasc. Filip. (1886) 280.

Freycinetia cumingiana Gaudich. Bot. Voy. Bonite (1843) *t. 60 et t. 37, f. 12–14*, sine descr.; C. B. Robinson in Bull. Torr. Bot. Club **35** (1908) 64.

Luzon, Province of Camarines Sur, *Cuming 1455;* Mount Isarog, *For. Bur. 11361 Curran*, May, 1908.

I have examined the number collected by Cuming, cited above, in the Kew and Berlin herbaria, and find that Presl's species is distinct from the form previously determined by me as *F. luzonensis* Presl.[3] It is possible that more than one form is included by Presl in the original description of the species, but this can only be determined by an examination of the material in Presl's herbarium. The specimens I have seen of Cuming's number, seem to agree perfectly with the figure of *F. cumingiana* Gaudich., which, following Warburg, is here considered to be a synonym of *F. luzonensis*. Although the plate representing Gaudichaud's species was published some years earlier than Presl's species, still the description of the plate, but no description of the plant, was not published until 1866 in Charles d' Alleizette's explanation of the plates. **3**: 133. Dr. Robinson considered that the *Freycinetia luzonensis* of recent botanists, including Warburg, was different from *F. luzonensis* of Presl, but I am inclined to consider that Warburg correctly interpreted Presl's species, and also correctly reduced to it Gaudichaud's *F. cumingiana*. The material that has been considered as *F. luzonensis* Presl, in this office, and distributed as such, certainly does not represent Presl's species, and is below described as new.

5. **Freycinetia vidalii** Hemsl. in Kew Bull. (1896) 166; Warb. l. c. 36.

Freycinetia confusa Elm. Leafl. Philip. Bot. **1** (1907) 213; non Ridley, Mater. Fl. Malay Penin. **2** (1907) 233.

Luzon, Province of Nueva Viscaya, Bayombon, *Vidal 3964* in Herb. Kew (type): Province of Tayabas, Lucban, *Elmer 9007*, type of *F. confusa* Elm.

I have examined the type of this species in the Kew Herbarium, and Elmer's *Freycinetia confusa* is manifestly identical. The species belongs in the section *Oligostigma*, although Warburg placed it in the section *Pleiostigma*. The type is an immature specimen, and there is nothing in the original diagnosis from which the proper section can be determined.

6. **Freycinetia robinsonii** sp. nov. § *Oligostigma.*

Scandens, 2 ad 4 m alta; ramis 1.5 ad 2 cm diametro, ramulis 3 ad 5 mm crassis; foliis submembranaceis, anguste lanceolatis, circiter 20 cm longis, 1 ad 2 cm latis, basi plus minus angustatis vaginantibusque, apice sensim acuminatis, vulgo toto margine et subtus in costis spinuloso-serratis; inflorescentiis terminalibus, spadicibus femineis 4 vel 5, bracteis multis rubris 6 ad 7 cm longis oblongo-ovatis caudato-acuminatis, acuminibus spinuloso-serratis, exterioribus foliaceis, circumdatis; spadicibus fructiferis cylindraceis, oblongis, 3 ad 5 cm longis, 1 ad 1.5 cm crassis; fructibus circiter 5 mm longis, apice angulato-pyramidatis; stigmatibus 2 vel 3; pedunculis 3 cm longis, scabris.

Luzon, Province of Bataan, Lamao River, *Merrill 3791*, January, 1904; *Williams 338*, December, 1903; *For. Bur. 2194, 2827 Meyer; For. Bur. 752, 2466, 3037* (type) *Borden; Whitford 1311*, June, 1905 and *s. n.*, July, 1904; *Copeland*

[3] *Philip. Journ. Sci.* **1** (1906) Suppl. 25.

252, January, 1904: Province of Laguna, Los Baños, *Hallier s. n.*, December, 1903; *Elmer 8242*, April, 1906: Province of Zambales, Mount Abu, *Bur. Sci. 2006 Foxworthy*, December, 1906: Province of Benguet, Sablan, *Elmer 6196*, April, 1904.

A species allied to *Freycinctia luzonensis* Presl, and to *F. multiflora* Merr., differing from the former in its longer leaves, longer and differently shaped syncarps which are more numerous, and from the latter in its shorter, fewer syncarps and shorter leaves. It is the species previously determined by me as *F. luzonensis* Presl.[4]

7. **Freycinetia curranii** sp. nov. § *Oligostigma*.

Scandens; ramis teretibus, circiter 1.3 cm crassis; foliis numerosis, congestis, coriaceis, nitidis, pallidis, lineari-lanceolatis vel anguste lanceolatis, 40 ad 50 cm longis, 2 ad 3 cm latis, apice sensim longe acuminatis, basi vix angustatis, vaginantibus, marginibus apicem basimque versus spinuloso-dentatis, in media parte inermibus, costa subtus in parte superiore spinuloso-aculeatis. Spadicibus ternis, fructiferis oblongis, cylindraceis, circiter 4 cm longis, 1 ad 1.3 cm crassis; fructibus cylindraceis, angulatis, basi plus minus carnosis, partibus superioribus liberis, 3 mm longis, angulatis, truncatis, stigmatibus 2 vel 3; pendunculis scabridis, 2 cm longis.

Luzon, Province of Camarines, Mount Isarog, *For. Bur. 11359 Curran*, May, 1908, in forests at 1,000 m. alt.

A species allied to *F. auriculata* Merr., but with syncarps less than one-half as long as in that species, the auricles at the base of the leaves membranaceous, and attached to the leaf margin for their entire length, with no free ovate portion.

8. **Freycinetia multiflora** Merr. in Philip. Journ. Sci. 2 (1907) 259; Elmer Leafl. Philip. Bot. 1 (1907) 213.

Luzon, Province of Tayabas, Lucban, *Elmer 8039, 9009*, May, 1907: Province of Laguna, Mount Maquiling, *For. Bur. 7768 Curran & Merritt*, October, 1907: Province of Rizal, Bosoboso, *For. Bur. 2994 Ahern's collector*, April, 1905; *Bur. Sci. 2092 Ramos*, February, 1907. Mindoro, Mount Halcon, *Merrill 5647*, November, 1906 (type). Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 73, 1028*, January, 1906, May, 1907: Province of Misamis, Mount Malindang, *For. Bur. 4672 Mearns & Hutchinson*, May, 1906: District of Davao, Mount Apo, *Copeland 1206*, April, 1904.

Closely allied to the preceding, but apparently distinct. *F. luzonensis*, *F. robinsonii*, and *F. multiflora* form a group of allied species, and additional material may lead to a different disposition of some of the specimens cited above.

9. **Freycinetia auriculata** sp. nov. § *Oligostigma*.

Scandens, robusta, ramulis circiter 1 cm crassis; foliis coriaceis, nitidis, 40 ad 60 cm longis, 1 ad 1.5 cm latis, pallidis, apice sensim attenuato-acuminatis, basi haud angustatis, valde vaginantibus, auriculatis, auriculis 7 ad 10 mm longis, obtusis, coriaceis, marginibus aculeatis, costa subtus in partibus superioribus plus minus aculeatis; inflorescentiis terminalibus, bracteis delapsis; spadicibus ternis, fructiferis cylindraceis,

[4] *Philip. Journ. Sci.* 1 (1906) Suppl. 25.

9 ad 11 cm longis, 2 ad 2.5 crassis; fructibus plus minus carnosis, apice liberis, angustatis, 2 mm longis, valde sulcatis, truncatis; stigmatibus 2; pedunculis 5 ad 6 cm longis, minute scabris.

PALAWAN, near Puerto Princesa, *Bur. Sci. 876 Foxworthy*, May, 1906.

10. **Freycinetia palawanensis** Merr. ex Elm. Leafl. Philip. Bot. 1 (1907–08) 216, 362.

PALAWAN, Victoria Peak, *Bur. Sci. 706 Foxworthy*, March, 1906, alt. 900 m. LUZON, Province of Tayabas, Lucban, *Elmer 7810, 9386*, May, 1907.

11. **Freycinetia jagorii** Warb. in Pflanzenreich 3 (1900) 39, *f. 10, G.*

SAMAR, *Jagor 954*, in Herb. Berol. (type). MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, September–October, 1906, and March, April, and June, 1907.

The type, which I have examined in the Berlin Herbarium, is an immature specimen, the material collected by Mrs. Clemens being manifestly the same species.

12. **Freycinetia philippinensis** Hemsl. in Kew Bull. (1896) 165; Warb. l. c. 40.

PHILIPPINES, without locality, *Cuming 1898*, in Herb. Kew. LUZON, Province of Tayabas, *Gregory 117*, August, 1904.

13. **Freycinetia rigida** Elm. Leafl. Philip. Bot. 1 (1908) 362.

Freycinctia hemsleyi Elm. Leafl. Philip. Bot. 1 (1907) 214; non Warb. in Pflanzenreich 3 (1900) 36.

LUZON, Province of Tayabas, Lucban, *Elmer 7847*, May, 1907.

Manifestly allied to the preceding, but distinct. An immature specimen, *Elmer 6217*, from Sablan, Province of Benguet, Luzon may be referable here.

14. **Freycinetia scabripes** Warb. in Pflanzenreich 3 (1900) 41.

Freycinctia banahaensis Elm. Leafl. Philip. Bot. 1 (1907) 215.

LUZON, Province of Bataan, *Warburg s. n.*, in Herb. Berol. (type); Lamao River, *For. Bur. 4529 Maule*, May 30, 1906; *For. Bur. 2826 Meyer*, March, 1905: Province of Tayabas, Lucban, *Elmer 7902*, May, 1907, type of *F. banahaensis* Elm. BATAN (Batanes Islands), *Bur. Sci. 3806 Fenix*, June, 1907.

I have examined the type of the species in the Berlin Herbarium, and consider it to be well represented by the specimens from the Lamao River, cited above. The specimen from the Batanes Islands is certainly the same, and I am unable to distinguish Elmer's *F. banahaensis*, a cotype of which is before me.

15. **Freycinetia dilatata** Merr. ex Elm. Leafl. Philip. Bot. 1 (1907–08) 214, 362.

LUZON, Province of Rizal, near Bosoboso, *Bur. Sci. 99 Foxworthy*, January, 1906; Tanay, *Merrill 2301*, May, 1903: Province of Tayabas, Lucban, *Elmer 9008*, May, 1907.

Plate 437 of the third edition of Blanco's Flora de Filipinas, determined by Naves as *F. luzonensis* var. *heterophylla*, is probably referable here: it is not Presl's variety and certainly is not the same as *F. philippinensis* Hemsl.

16. **Freycinetia negrosensis** sp. nov. § *Pleiostigma.*

Scandens; foliis dense imbricatis, coriaceis, nitidis, 60 ad 70 cm longis, circiter 2 cm latis, apice longe sensim angustato-acuminatis, basi vix dilatatis ibique in margine membranaceis, toto margine denticulatis, costa

subtus minute denticulatis. Spadicibus fructiferis terminalibus, binis vel ternis, densis, oblongis, cylindraceis, 7 ad 10 cm longis, 1.5 cm diametro; fructibus circiter 5 mm longis, plus minus angulatis, apice truncatis; stigmatibus 5 vel 6.

Negros, Mount Silay, *Whitford 1541*, May, 1906, in forests on exposed ridges at an altitude of about 1,200 m.

This species is allied to the preceding, and in the preliminary work on the present paper it was considered to be the same as *F. dilatata*. On going over the material with Mr. Elmer, however, it was found that the present species differed constantly from the preceding in its leaves being densely imbricated but not dilated at the base, the membranaceous margins narrower and attached along one side, leaving no free portion at the apex, and by its very dense syncarps and shorter fruits. It has again been collected by Mr. Elmer in southern Negros.

17. **Freycinetia merrillii** Elm. Leafl. Philip. Bot. 1 (1907) 216.

Luzon, Province of Tayabas, Lucban, *Elmer 9161*, May, 1907, type.

18. **Freycinetia megacarpa** sp. nov. § *Pleiostigma*.

Scandens, ramis ramulisque plus minus triangularibus, 5 ad 10 mm crassis, rubro-brunneis; foliis oblongis vel oblongo-lanceolatis, 14 ad 17 cm longis, 3.5 ad 4 cm latis, submembranaceis, apice breviter acuminatis, basi angustatis, vix vaginantibus, margine apicem versus pauce obsecreque denticulatis, inferne integris; inflorescentiis terminalibus, ternis vel quaternis; pedunculis 2 ad 3.5 cm longis; syncarpiis globosis vel ovoideis, 3 ad 5 cm diametro; fructibus carnosis, ovoideis vel obovoideis, usque ad 1.5 cm longis, apice plus minus pyramidatis, angulatis, breviter rostratis; stigmatibus circiter 6.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, March, 1907.

A species manifestly allied to the preceding, but the leaves lacking the prominent basal auricles, and the margins of the leaves in the basal portions entire or subentire.

19. **Freycinetia monocephala** Elm. Leafl. Philip. Bot. 1 (1906–7) 78, 218.

Luzon, Province of Tayabas, Lucban, and Mount Banajao. *Elmer 7380, 9012*, May, 1907; *Whitford 971*, October, 1904.

A species well characterized by its usually solitary syncarps and very narrow grass-like leaves.

20. **Freycinetia sphaerocephala** Gaudich. Bot. Voy. Bonite (1843) *t. 52*; Warb. in Pflanzenreich 3 (1900) 35.

Freycinetia globosa Merr. in Philip. Journ. Sci. 2 (1907) 260; Elm. Leafl. Philip. Bot. 1 (1907) 217.

Freycinetia strobilacea Vid. Phan. Cuming. Philip. (1885) 154; Rev. Pl. Vasc. Filip. (1886) 280, non Blume.

Luzon, Province of Albay, *Cuming 839*. Mindoro, Mount Halcon, *Merrill 5791*, November, 1906.

Cuming's specimen is probably the type of the species, although Gaudichaud may have collected the same form in the Philippines. A fragment of *Cuming 839* is now in our herbarium, and from the material now available, I find that the differential characters by which *F. globosa* was separated are of no value. The figure of *F. strobilacea* given by Vidal in his Sinopsis Atlas *t. 95, f. B*, was copied from Blume's Rumphia, fide Vidal, l. c. XLII.

21. **Freycinetia rostrata** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 177.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 475*, April, 1906, and without numbers, July, September, October, 1906, April and June, 1907. Samar, Lanang, *Merrill 5235*, October, 1906.

22. **Freycinetia warburgii** Elm. Leafl. Philip. Bot. 1 (1907) 218.

Luzon, Province of Tayabas, Lucban, *Elmer 8229*, May, 1907.

A species with the general appearance of *F. luzonensis* Warb., and *F. robinsonii* Merr., but with less acuminate leaves and manifestly in the section *Pleiostigma*.

23. **Freycinetia ensifolia** Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 5; Philip. Journ. Sci. 1 (1906) Suppl. 25.

Luzon, Province of Bataan, Mount Mariveles, *Merrill 3242*, October, 1903; *Whitford 329*, May, 1904; *For. Bur. 2624 Meyer*, February, 1905; *Topping 468; Elmer 6840*, November, 1904; *For. Bur. 6285 Curran*, February, 1907: Province of Pampanga, Mount Abu, *Bur. Sci. 1944 Foxworthy*, December, 1906.

A local species, common on exposed forested ridges on Mount Mariveles, above 1,000 m altitude.

24. **Freycinetia williamsii** sp. nov. § *Pleiostigma*.

Differt a *F. ensifolia* foliis multo longioribus, sensim tenuiter acuminatis, usque ad 20 cm longis, 7 ad 10 mm latis: syncarpiis multo majoribus, binis vel ternis, rariter solitariis, globosis vel ellipsoideis, 2 ad 3 cm longis latisque.

Batan (Batanes Islands), Santo Domingo de Basco, *Bur. Sci. 3786 Fenix* (type), June, 1907. Luzon, Province of Benguet, *Bur. Sci. 3504 Mearns*, July, 1907; *Elmer 5857*, March, 1904; *Dr. Pond*, March, 1904; *Williams 1013*, October, 1904: Province of Laguna, Mount Banajao, *Bur. Sci. 6075 Robinson*, March, 1908: Mount Maquiling, *For. Bur. 7706 Curran & Merritt*, October, 1907: Province of Rizal, Bosoboso, *For. Bur. 2696 Ahern's collector*, January–March, 1905.

THE OAKS OF THE PHILIPPINES.

By Elmer D. Merrill.

(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

The first mention of Philippine oaks is in the first edition of Blanco's Flora de Filipinas, in 1837, where three species of *Quercus* are described, and one species of *Castanopsis*, the latter as a *Fagus* and without specific name. The three true oaks, Blanco identified with extra-Philippine species, one as *Quercus molucca* Rumph., of eastern Malaya, one with *Q. glabra* presumably of Thunberg, and one with *Q. cerris* Linn., an European species. In the second edition of the work, the name *Quercus molucca* is changed to *Q. concentrica*, *Q. glabra* is changed to *Q. ovalis*, and a short description of a fourth species, *Q. cooperta*, is added. The identification of these species has caused considerable confusion, and one of the objects of the present paper is to determine their status, so far as possible.

Nothing further appeared regarding Philippine *Quercus* until A. De Candolle's monograph of the family in 1864,[1] when *Quercus llanosii* A. DC., based on specimens supplied by Father Llanos, supposed to represent Blanco's *Quercus concentrica*, and *Q. philippinensis* A. DC., based on a specimen collected in Luzon by Cuming, were described. *Quercus ovalis* Blanco was admitted, with a short diagnosis taken from Blanco's description, while the new name *Q. blancoi* was proposed for Blanco's *Q. glabra*, the author overlooking the fact that in publishing *Quercus ovalis*, Blanco simply proposed a new name for his own *Q. glabra*. *Q. cooperta* Blanco is also included but with doubt as to whether or not it was a true *Quercus*, while a drawing sent by Llanos was identified as probably *Quercus pruinosa* Blume, although so far this species has not been found in the Philippines.

In 1875, Máximo Laguna y Villanueva published in Madrid, a pamphlet of eight pages,[2] with one plate, enumerating the species of *Quercus* previously recorded from the Philippines, and described and figured

[1] Prodr. 16[2] (1864) 1–123.

[2] Apuntes sobre un nuevo roble (Q. jordanae) de la flora de Filipinas. (1875) 1–8, cum lamina.

Quercus jordanae as a new species, the type material being from the Caraballo Mountains in Central Luzon.

In 1883, F.-Villar [3] credited nineteen species of *Quercus* to the Philippines, two of which were described as new. It is evident that nearly all of these were admitted on erroneous identifications. Many of them it will be quite impossible to identify, but some were cleared up by Vidal.[4]

In 1883, Vidal [5] figured no less than seven species of *Quercus* and two species of *Castanopsis*, two of the former being described as new, while in 1886 ten species of *Quercus* and one *Castanopsis* are enumerated by him [6] with specific names, and two species of *Quercus* and one *Castanopsis* without specific names. Two species of *Quercus* are described as new, while the descriptions of *Q. vidalii* F.-Vill., and *Q. blancoi* A. DC., are amplified.

Wenzig's paper on "Die Eichen Ost- und Südasiens" [7] adds nothing to our knowledge of Philippine oaks, a single species, *Quercus philippinensis* A. DC., being credited to the Philippines, *Q. llanosii*, *Q. ovalis* Blanco, and *Q. blancoi* A. DC., being erroneously reduced to it.

King's valuable paper "The Indo-Malayan Species of Quercus and Castanopsis" [8] does not include the Philippine species, but is the one most useful work in determining the Philippine species of this group.

Six species of *Quercus* are enumerated from the Philippines by Von Seemen,[9] and a single one was described by Hance.

Our Philippine oaks are difficult to determine properly, chiefly because of lack of complete material, and because many of the species were originally described from immature specimens. After an examination of Vidal's types at Kew, some of Blume's types at Leiden, and the types of DeCandolle's Philippine species at Geneva, I was impressed with the discrepancies in the identifications of the Philippine species, and on my return to Manila considered it advisable to examine critically the entire material available, and publish an enumeration of the species. Most of the specimens cited by Vidal I found at Kew, but some of the numbers do not appear to be extant, and while there I succeeded in matching most of Vidal's species with recently collected specimens, although if Vidal's specimens were now before me, I have no doubt but that the present paper would be more accurate, so far as the disposition of his species is concerned.

It is frequently difficult to accurately identify specimens unless they have mature fruits, and for this reason, it is to be expected that some of

[3] Nov. App. (1883) 207–209.
[4] Rev. Pl. Vasc. Filip. (1886) 260–265.
[5] Sinopsis Atlas (1883) XLI. t. 92.
[6] Rev. Pl. Vasc. Filip. (1886) 260–265.
[7] *Jahrb. Kgl. Bot. Gart. Berlin* 4 (1886) 214–240.
[8] *Ann. Bot. Gard. Calcutta* 2 (1889) 17–107, *pl. 15–16*.
[9] Perkins Frag. Fl. Philip. (1904) 41, 42.

the specimens referred to definite species below will later be found to be really different, when additional material is secured. I have below disposed the specimens in flower, and those with immature fruits, to the best of my ability, but am not always sure that they are always correctly referred. Although a great number of specimens have been cited, the following paper by no means accounts for all in our herbarium, for I have described no new species excepting those of which mature fruits were available. It is apparent that several forms remain to be described at a later date when more complete material is secured.

Most of the species of *Quercus* found in the Philippines are endemic, but four species, as here interpreted, being found outside of the Philippines, two in Celebes, *Quercus llanosii* and *Q. ovalis*, if the identification of the Celebes material is correct, and two, *Q. reflexa* King and *Q. bennettii* Miq., in Borneo, the latter extending to Bangka and Malacca.

Nearly all our species of the genus are found in the hill or mountain forests at medium and higher altitudes, but three species being known from comparatively low altitudes, *Q. caudatifolia*, occuring at least as low as 20 m above sea level in Mindanao, and *Q. bennettii* and *Q. soleriana*, being found as low as 100 m on Mount Mariveles, in Luzon. Some species, like *Quercus jordanae*, are very abundant in the mossy forests like those of Mount Data and Mount Tonglon, at altitudes as high as 2,250 m, but the great bulk of the species are found at altitudes of from 400 to 1,500 m.

KEY TO THE PHILIPPINE GENERA AND SPECIES OF FAGACEÆ.

Involucre inclosing the nuts, often splitting irregularly, armed externally with rather long spines, usually containing more than one nut..... 1. *Castanopsis*

Involucre inclosing the nut in few species only, mostly cup- or saucer-shaped, covered with imbricate scales, or zonulate, rarely tuberculate, never containing more than one nut..... 2. *Quercus*

1. CASTANOPSIS Spach.

1. **Castanopsis philippensis** (Blanco) Vidal Rev. Pl. Vasc. Filip. (1886) 265. (*philippinensis*).

Fagus philippensis Blanco Fl. Filip. ed. 2 (1845) 503, err. typ. *philipensis*.

Castanopsis sumatrana F.-Vill. Nov. App. (1883) 210, fide Vidal, non A. DC.

Castanopsis javanica Vidal Sinopsis Atlas (1883) *t. 92, f. I*, non A. DC.

Luzon, Province of Rizal, Bosoboso, *Bur. Sci. 2658 Ramos*, May, 1907; *For. Bur. 2148, 2872, 3100 Ahern's collector*, November, 1904, March, May, 1905. Mindoro, Calausan, *For. Bur. 8547 Merritt*, January, 1908.

The specimens cited above agree with *Vidal 611bis*, in Herb. Kew, collected at Angat, Province of Bulacan, Luzon, and also agree with Blanco's description. Endemic.

A second species, probably undescribed, occurs in the Philippines, enumerated by Vidal l. c., as *Castanopsis* sp., and previously erroneously identified by F.-Villar l. c., as *C. javanica* A. DC., and by Vidal, Sinopsis Atlas l. c., *f. H*, as *C. sumatrana*. I have no specimens of it.

2. QUERCUS Linn.

Involucres cup-shaped, saucer-shaped, or discoid, their bracts imbricate, free or united by their bases only, the apices always free..... § PASANIA
Leaves more or less pubescent or pubernlent beneath.
Leaves subcoriaceous, slightly pubescent beneath, at least along the midrib and lateral nerves, the reticulations lax, very distinct..... 1. *Q. clementis*
Leaves firmly coriaceous, densely and uniformly ferruginous-pubescent beneath, the reticulations obscure..... 2. *Q. jordanae*
Leaves entirely glabrous beneath, or at most minutely puberulent. .
Leaves mostly exceeding 12 cm in length..... 3. *Q. llanosii*
Leaves 4 to 6 cm long..... 4. *Q. luzoniensis*
Involucres cup-shaped, their bracts connate into entire or denticulate concentric lamellæ ..... § CYCLOBALANUS
Glans manifestly longer than broad.
Leaves more or less pubescent or puberulent beneath; glans never more than 12 mm in diameter..... 5. *Q. caudatifolia*
Leaves entirely glabrous beneath, glans exceeding 12 mm in diameter.
Glans at least 2 cm in diameter..... 6. *Q. merrittii*
Glans about 1.5 cm in diameter..... 7. *Q. ovalis*
Glans at least as broad as long, frequently broader than long.
Leaves 8 to 11 cm wide.
Involucres inclosing less than one-third the glans; leaf-margins sometimes somewhat repand above..... 8. *Q. woodii*
Involucres inclosing about three-fourths the glans; leaf-margins entire. 9. *Q. castellarnauiana*
Leaves 7 cm wide or less.
Leaves more than 6 cm long, strongly acuminate, entire.
Lamellæ of the involucre 5 to 8, usually denticulate.
Leaves densely cinereous-ferruginous-puberulent beneath. 10. *Q. acuminatissima*
Leaves glabrous beneath.
Leaves usually abruptly acuminate.
Leaves 7 to 15 cm long; reticulations on the lower surface fine but evident ..... 11. *Q. soleriana*
Leaves 12 to 25 cm long; reticulations on the lower surface obsolete ..... 9. *Q. castellarnauiana*
Leaves gradually and slenderly caudate-acuminate, 6 to 8 cm long ..... 12. *Q. philippinensis*
Lamellæ of the involucre 3 or 4, obscurely denticulate; leaves abruptly short-acuminate, the acumen blunt..... 13. *Q. bennettii*
Leaves 5 cm long or less, acute, obtuse, or very obscurely acuminate, the margins sometimes slightly sinuate above..... 14. *Q. merrillii*
Involucres ovoid, externally tubercular, closed and inclosing the whole glans but not adnate to it except at the base..... § CHLAMYDOBALANUS
Leaves with about 15 pairs of lateral nerves..... 15. *Q. cooperta*
Leaves with 10 to 12 pairs of lateral nerves..... 16. *Q. reflexa*
Involucres large, thick, woody, turbinate, the upper portion tubercled, nearly enveloping the glans and adherent to it on the base and sides; glans bony. § LITHOCARPUS
Leaves somewhat pubescent beneath, the branchlets densely ferruginous-villous; involucre 3 cm in diameter..... 17. *Q. curranii*

§ Pasania.

1. **Quercus clementis** sp. nov.

Arbor 10 ad 13 m alta, inflorescentiis, subtus foliis, ramulisque plus minus ferrugineo-pubescentibus; foliis oblongis vel elliptico-oblongis, rigide chartaceis vel subcoriaceis, 10 ad 18 cm longis, basi acutis, apice breviter obtuseque acuminatis, integris, nitidis, subtus sparse pubescentibus, reticulis laxis, distinctis; cupulis 2 ad 2.5 cm diametro, utrinque dense ferrugineo-pubescentibus; glandibus subcylindraceis, apice subtruncatis, 2 cm longis.

A tree 10 to 13 m high, the branchlets and inflorescence densely ferruginous-pubescent. Branches slender, reddish-brown, ultimately glabrous. Leaves alternate, oblong or elliptical-oblong, 10 to 18 cm long, 4 to 7 cm wide, firmly chartaceous or subcoriaceous, the base acute, the apex rather abruptly and shortly acuminate, the acumen blunt, margins entire, slightly recurved, shining on both surfaces, the upper surface glabrous, or pubescent on the midrib and lateral nerves, the lower surface more or less pubescent on the midrib and nerves, and with scattered hairs on the surface, in age nearly glabrous; lateral nerves 10 to 12 on each side of the midrib, strongly impressed on the upper surface, very prominent beneath, anastomosing and forming a somewhat arched submarginal nerve, the reticulations rather lax, very distinct; petioles stout, more or less pubescent, 5 mm long. Male inflorescence: spikes 8 to 13 cm long, fascicled in the upper axils or in depauperate panicles, densely ferruginous-pubescent; flowers sessile, solitary, the perianth 2 mm long, densely pubescent, 6-lobed; stamens 10, the longer filaments 3 mm. Female inflorescence: spikes 12 to 20 cm long, in terminal panicles, when young densely pubescent, in age subglabrous; flowers solitary, numerous, pubescent. Fruits maturing the second year, the involucres 1 cm high or less, 2 to 2.5 cm in diameter, densely ferruginous-pubescent on both surfaces, the scales on the outer surface very numerous, appressed, imbricate, acuminate, about 2 mm long. Glans 2 cm long and 2 cm in diameter, deciduous-puberulent, subcylindrical, the sides parallel, the apex very abruptly rounded-subtruncate, apiculate.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 906*, February, 1907, and four sheets without numbers from the same locality, April, June, and September, 1907. A closely allied form is represented by *Clemens 1138*, from the same locality, but the specimen has immature fruits and its leaves have about 15 pairs of lateral nerves.

The species above described seems to be allied to *Quercus lamponga* Miq., of the Malayan region, but is apparently sufficiently distinct from that species, the scales of the involucre not arranged in lamellæ. It is well characterized by its subcylindrical glans that is as long as broad, and its rather laxly and strongly reticulate leaves. According to the collector the bark of this tree peels off in thin papery flakes similar to that of many species of *Betula*.

2. **Quercus jordanae** Laguna Apuntes Sobre Nuev. Roble de Filip. (1875) 7, *cum lamina;* F.-Vill. Nov. App. (1883) 208; Vid. Rev. Pl. Vasc. Filip. (1886) 264; Ceron Cat. Pl. Herb. (1892) 165.

Q. vidalii F.-Vill. Nov. App. (1883) 209; Vidal Sinopsis Atlas XLI (1883) *t. 92. f. B.;* Ceron Cat. Pl. Herb. (1892) 164.

Q. caraballoana F.-Vill. Nov. App. (1883) 209; Vidal l. c. 265; Ceron l. c. 165.

Q. havilandii Von Seem. in Perk. Frag. Fl. Philip. (1904) 42, non Stapf.

Q. sundaica Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 41, non Blume.

Luzon, District of Lepanto, Mount Data, *Merrill 4550*, November, 1905; *Loher 4873:* Province of Benguet, Pauai, *Bur. Sci. 4407, 4480 Mearns*, August, 1907; Mount Tonglon (Santo Tomas), *Williams 1321, 1365*, October, 1904; *For. Bur. 5009 Curran*, August, 1906; Baguio, *Lardizabal 7*, 1901: Province of Bataan, Mount Mariveles, *For. Bur. 1253 Borden*, July, 1904; *Whitford 1186*, March, 1905: Province of Tayabas, Mount Banajao, *For. Bur. 7912 Curran & Merritt*, November, 1907: *Elmer 7903*, May, 1907.

Quercus jordanae Laguna, as here interpreted, is a rather variable species, but after examining the above series of specimens I have concluded that all are referable to one species. *Q. jordanae* was placed by its author in the section *Cyclobalanus*, but all the specimens cited above are manifestly of the section *Pasania*. The species as figured by Laguna has relatively broader leaves than has *Quercus vidalii* as figured by Vidal, but the indumentum seems to be nearly the same in both, as well as the shape of the base and apex of the leaves, and the venation. I have seen the type number of *Quercus vidalii* in Herb. Kew (*Vidal 617 bis*), and it is well matched by the specimens from Mount Mariveles, cited above. His specimen was from the same region as the type of *Quercus jordanae*, the Caraballo Mountains, in central Luzon. The specimens from Lepanto and Benguet differ from those of Mount Mariveles and Mount Banajao in having somewhat more coriaceous and slightly more pubescent leaves, and rather more pubescent involucres, the scales being also more prominent, but good differential specific characters appear to be lacking. *Vidal 1814*, in Herb. Kew, which was mentioned by Stapf in the original description of *Quercus havilandii*[10] as possibly referable to the Bornean species, is almost certainly referable to the species here considered as *Q. jordanae*, but the specimen is without flowers and fruit, so that its absolute identification will always be more or less doubtful. I do not consider it to be the same as *Q. havilandii*. *Quercus caraballoana* F.-Vill., to which Vidal refers his No. 618bis, is surely the same as *Q. jordanae* (*Q. vidalii*), although the specimen does not appear to be extant, as I could not find it in the Kew herbarium. F.-Villar's description however applies very closely to the specimens above cited, while Vidal[11] states that it appeared to him to be very close to Laguna's species, giving only some trivial characters by which it could be distinguished. *Quercus sundaica* Bl., was admitted by me[12] on the strength of identifications made by O. Von Seemen, but Blume's species is quite different, its leaves having about 15 pairs of lateral nerves, while *Q. jordanae* has but 9 or 10 pairs. A specimen in the U. S. National Herbarium, *Lardizabal 7*, was identified at Berlin as *Quercus pruinosa* Blume, but this is a manifest error, as *Q. pruinosa* has quite different fruits, and differs from *Q. jordanae* in many other characters. The specimen determined by Von Seemen as *Quercus havilandii*,[13] *Loher 4873*, is not Stapf's species, but is the same as the other specimens from Lepanto and Benguet here referred to *Q. jordanae*.

[10] Trans. Linn. Soc. Bot. II 4 (1894) 231, *pl. 18, f.* 1.

[11] Rev. Pl. Vasc. Filip. (1886) 265.

[12] *This Journal* 1 (1906) *Suppl.* 41.

[13] Perk. Frag. Fl. Philip. (1904) 42.

3. **Quercus llanosii** A. DC. Prodr. 16 ^{2} (1864) 97, excl. syn. Blanco.

Q. companoana Vidal Sinopsis Atlas (1883) XLI, *t. 92, f. D;* Rev. Pl. Vasc. Filip. (1886) 260; Ceron Cat. Pl. Herb. (1892) 164; Koord. Meded. 's Lands Plantent. 19 (1898) 615 ?

Q. sundaica F.-Vill. Nov. App. (1883) 207, excl. syn. Naves, fide Vidal; non Blume.

Luzon, without locality, *Llanos* in Herb. DeCandolle (type): Province of Cagayan, San Vicente, *For. Bur. 7086 Klemme*, May, 1907: Province of Rizal, Bosoboso, *Merrill 3680*, June, 1903; *Bur. Sci. 2100 Ramos*, February, 1907; Tanay, *Merrill 2344*, May, 1903: Province of Bataan, Lamao River, *For. Bur. 7368 Curran*, July, 1907. Local names *Maculab, Manloab, Bayucan, Catiban, Pagnan.*

I have examined the type of this species in the DeCandolle Herbarium, and also the type number of *Quercus companoana* Vidal at Kew, and although the type of *Quercus llanosii* is a flowering specimen with leaves 20 cm in length, and the type of *Q. companoana* is a specimen with immature fruits and with leaves 8 to 13 cm in length, I am disposed to consider the two species identical, and accordingly here reduce Vidal's species. The account of the fruit and Blanco's synonyms must be excluded from DeCandolle's description of the species, as *Quercus concentrica* Blanco appears to be referable to *Q. solcriana.* This may be the species determined by Blanco as *Quercus cerris*, as suggested by Vidal. Koorders has reported this species from Celebes, under *Q. companoana* Vidal.

4. **Quercus luzoniensis** sp. nov.

Arbuscula vel arbor parva subglabra; ramis teretibus, lenticellatis, ramulis glabris, nigricantibus; foliis alternis, coriaceis, integris, 4 ad 6 cm longis, oblongo-lanceolatis vel elliptico-lanceolatis, breviter acuminatis, basi acutis, supra nitidis, subtus glabris vel minutissime griseo-puberulis; cupulis circiter 1 cm diametro, utrinque cinereo-pubescentibus, squamulis imbricatis, acuminatis, adpressis, circiter 1.5 mm longis; glandibus conico-ovoideis, glabris, nitidis, apiculatis, circiter 1 cm altis crassisque.

A shrub or small tree about 6 m high, nearly glabrous. Branches terete, lenticellate, brownish, the branchlets somewhat angled, slender, glabrous, blackish when dry. Leaves alternate, oblong-lanceolate to elliptical-lanceolate, 4 to 6 cm long, 1.5 to 2.5 cm wide, the apex rather gradually short-acuminate, the base acute or slightly decurrent-acuminate, the margins entire, recurved, coriaceous, the upper surface glabrous, shining, the lower surface slightly paler, dull, glabrous or very minutely grayish-puberulent; nerves about 7 on each side of the midrib, obsolete or nearly so above, distinct beneath, the reticulations obsolete or nearly so; petioles about 5 mm long. Inflorescence unknown. Fruits in short spikes, terminal or in the upper axils; involucre about 7 mm high, abruptly narrowed below into a stout stalk, about 1 cm in diameter, rather densely gray-pubescent on both surfaces, the scales lanceolate, acuminate, alternate, imbricate, not arranged in concentric lines; glans ovoid-conical, glabrous, shining, about 1 cm high and the same in diameter, apiculate.

Luzon, Province of Benguet, Mount Tonglon, *For. Bur. 5040 Curran*, August, 1906 (type); Pauai, *Bur. Sci. 4411 Mearns*, July, 1907, sterile: Province of Zambales, Mount Tapulao, *For. Bur. 8081 Curran & Merritt*, December, 1907, sterile.

A species well characterized by its small coriaceous leaves and small fruits, the involucres being rather densely cinereous-pubescent. In leaf characters somewhat similar to *Quercus merrillii* Von Seem., but the fruits are entirely different.

§ CYCLOBALANUS.

5. **Quercus caudatifolia** sp. nov.

Arbor 17 ad 25 m alta; foliis oblongo-lanceolatis, 8 ad 14 cm longis, basi acutis, apice sensim caudato-acuminatis, acuminibus obtusis, supra glabris, subtus pallidioribus, junioribus plus minus cinereo-ferrugineo-puberulis, nervis utrinque circiter 10, subtus distinctis, reticulis subobsoletis; glandibus oblongo-conico-ovoideis, puberulis, 1.5 ad 2 cm longis, 8 ad 12 mm diametro; cupulis plus minus cinereo- vel ferrugineo-puberulis, circiter 7 mm altis.

A tree 17 to 25 m high. Branches terete, slender, ultimately glabrous, sparingly lenticellate, dark-reddish-brown to nearly black, the branchlets rather densely ferruginous-pubescent. Leaves alternate, oblong-lanceolate, subcoriaceous, 8 to 14 cm long, 2.5 to 4 cm wide, the base acute, the apex gradually narrowed to the rather slender, caudate, blunt acumen, the margins entire, the upper surface shining, glabrous, or when young very slightly pubescent, the lower surface paler, when young more or less ferruginous-cinereous-puberulent, especially along the midrib and nerves, apparently glabrous in age or nearly so; nerves about 10 on each side of the midrib, distinct beneath, obscurely anastomosing, the reticulations indistinct, nearly obsolete; petioles 5 to 10 mm long, usually pubescent. Female flowers spicately disposed, the spikes fascicled in the upper axils or arranged in terminal 5 to 7 cm long, panicles, ferruginous-pubescent. Glans oblong-conical-ovoid, 1.5 to 2 cm long, more or less puberulent, apiculate, 8 mm in diameter in the type, in other specimens 9 to 12 mm in diameter below. Cup about 7 mm high, including the thickened stipe, 10 to 12 mm in diameter, inclosing only the base of the glans, more or less ferruginous- or cinereous-pubescent outside, nearly glabrous within, the laminæ about 7, concentric, denticulate, the teeth very short, acute.

Type specimen from Lamao River, Mount Mariveles, Province of Bataan, Luzon, *For. Bur. 806 Borden*, May, 1904, at an altitude of about 700 m. I am disposed to refer here also the following specimens: *Elmer 6897*, November, 1904; *Whitford 276*, May, 1904, from the same locality: Province of Ilocos Sur, La Paz, *For. Bur. 5668 Klemme*, October, 1906: Province of Zambales, Botolan, *Merrill 2979*, June, 1903: Province of Rizal, Bosoboso, *Merrill 2702*, June, 1903: Province of Pangasinan, *For. Bur. 8277 Curran & Merrill*, December, 1907: Province of Camarines, *For. Bur. 10644 Curran*, June, 1908.

The species as here described is the Mariveles form, and some of the other specimens referred to it differ in some minor characters, in some specimens (*Curran 10644*), the leaves being quite glabrous. It is well characterized by its small fruits, which are considerably longer than thick. The species figured by Vidal in his Sinopsis, Atlas, *t. 92, f. A.*, as doubtfully representing *Quercus celebica* Miq., is probably referable here. It is certainly not Miquel's species. Local names: T., *Catabang, Bayucan*; Il., *Diraan, Dalutan*.

6. **Quercus merrittii** sp. nov.

Arbor circiter 18 m alta, glabra; foliis elliptico-lanceolatis, papyraceis, utrinque acuminatis, circiter 15 cm longis, integris, nitidis, nervis utrinque 9, subtus prominentibus, reticulis minutis, densis; glandibus conico-ovoideis, minute cinereo-puberulis, apiculatis, basi convexis, circiter 3 cm longis, 2 ad 2.2 cm diametro; cupulis 1.5 cm altis.

A tree about 18 m high, glabrous. Branchlets slender, terete or slightly angled, sparingly lenticellate, gray or reddish-brown. Leaves alternate, papyraceous, 13 to 15 cm long, 3.5 to 5 cm broad, the base somewhat decurrent-acuminate, the apex rather strongly caudate-acuminate, the acumen about 2 cm long, blunt, the margins entire, both surfaces rather pale when dry, somewhat shining; nerves 9 on each side of the midrib, prominent beneath, ascending, somewhat curved and very obscurely anastomosing, the reticulations very fine, dense, not prominent; petioles about 1 cm long. Flowers unknown. Glans conical-ovoid, minutely and deciduously cinereous-puberulent outside, the apex apiculate, the base convex, about 3 cm long, 2 to 2.2 cm in diameter; cup inclosing the basal fourth of the glans, including the stout stipe about 1.5 cm high, glabrous, or the outside minutely puberulent, the laminæ indistinct, 6 or 7, denticulate, the teeth very short.

Luzon, Province of Tayabas, Mount Banajao, *For. Bur. 8047 Curran & Merritt*, November, 1907, altitude 700 m.

This species is well characterized by its large fruits, its acorns being considerably larger than those of any other species known from the Philippines.

7. **Quercus ovalis** Blanco Fl. Filip. ed. 2 (1845) 502; A. DC. Prodr. 16 [2] (1864) 97; F.-Vill. Nov. App. (1883) 208, *cum descript.!*; Vidal Rev. Pl. Vasc. Filip. (1886) 262; Ceron Cat. Pl. Herb. (1892) 164.

Q. glabra Blanco Fl. Filip. (1837) 727, non Thunb.

Q. blancoi A. DC. Prodr. 16 [2] (1864) 97; Vidal Cat. Pl. Prov. Manila (1880) 42; Sinopsis Atlas (1883) XLI, *t. 92, f. C*; Rev. Pl. Vasc. Filip. (1886) 262, *cum descript.!*; Ceron Cat. Pl. Herb. (1892) 164; Koord. Meded. 's Lands Plantent. 19 (1898) 615.

Q. induta F.-Vill. Nov. App. (1883) 207, fide Vidal, non Blume.

Q. teysmanni F.-Vill. l. c., fide Vidal, non Blume.

Luzon, Province of Zambales, *For. Bur. 5817 Curran*, January, 1907: Province of Pampanga, Mount Abu, *Bur. Sci. 1909 Foxworthy*, January, 1907: Province of Bulacan, Angat, *For. Bur. 3235 Russell*, June, 1905: Province of Rizal, Bosoboso, *For. Bur. 10017 Curran*, February, 1908: Province of Batangas, Mount Malaraya, *For. Bur. 7847 Curran & Merritt*, November, 1907.

A very characteristic species, entirely glabrous or nearly so, with shining coriaceous leaves. Blanco's specific name *oralis* is the earliest valid one available, and is here retained. *Quercus blancoi* A. DC., was based on *Q. glabra* Blanco, non Thunb., but *Q. oralis* of the second edition of the Flora de Filipinas is manifestly *Q. glabra* of the first edition, Blanco having recognized his own error in referring Philippine material to Thunberg's species, simply proposed the new name *oralis*, but did not indicate this. Vidal [14] has attempted to hold *Quer-*

[14] Rev. Pl. Vasc. Filip. (1886) 262.

cus blancoi and *Q. ovalis* distinct, but this is inadmissable, as *Q. ovalis* and *Q. blancoi* are both only new names of the same species, *Q. glabra* Blanco, non Thunb., and are hence synonyms. I could not find the specimen in Herb. Kew, referred by Vidal to *Q. ovalis* (*Vidal 616bis*), but the specimens referred by him to *Q. blancoi* are identical with those cited above as representing the species. The specimen collected by Russell is a topotype, and was received under the same native name that Blanco cites, and agrees perfectly with his description, so I do not consider that there is the least doubt as to the identity of the species. Local names: T., *Uayan, Malabingao.*

8. **Quercus woodii** Hance in Journ. Bot. 12 (1874) 240; F.-Vill. Nov. App. (1883) 208.

Luzon, without locality, *Wood*, in Herb. Mus. Brit. (type): Province of Benguet, Bagnio, *Williams 949, 980*, June, September, 1904; *Elmer 5900*, March, 1904.

The type of this species, which I have examined in the Herbarium of the British Museum, is very fragmentary, consisting of mature fruits and mere fragments of leaves, showing only the basal portions of two or three leaves. It is closely matched by Williams' specimens cited above. It is closely allied to *Quercus soleriana* Vidal, but has relatively much broader leaves, which are sometimes slightly repand above. Elmer's specimen was determined by Von Seemen as *Quercus pallida* Blume, but is quite unlike Blume's species, the type of which I have examined in Herb. Leiden. The leaves of *Quercus woodii* have but 9 or 10 pairs of lateral nerves, while those of *Q. pallida* Blume have about 15 pairs. Moreover the fruits are quite different, Blume's species being characterized by its very broad and flattened glans. *Q. pallida* is well figured by King in Ann. Bot. Gard. Calcutta 2 (1889) *pl. 53A*, and I have seen nothing closely approaching it from the Philippines.

9. **Quercus castellarnauiana** Vid. Rev. Pl. Vasc. Filip. (1886) 264; Ceron Cat. Pl. Herb. (1892) 165.

The type of this species was from the Island of Marinduque, *Vidal 1806*, locally known as *Puso-puso*. I am not at all sure that it belongs in this section, and it may be a species of the section *Pasania*, and allied to *Q. llanosii* A. DC.

10. **Quercus acuminatissima** sp. nov.

Quercus colchica Von Seem. in Perk. Frag. Fl. Philip. (1904) 41, non Miq.
Quercus philippinensis Merr. in For. Bur. Bull. 1 (1903) 16, non A. DC.

Arbor mediocriter, inflorescentiis, subtus foliis, ramulisque plus minus dense cinereo-ferrugineo-puberulis vel pubescentibus; foliis late oblongo-lanceolatis, 9 ad 17 cm longis, subcoriaceis, integris, basi acutis vel acuminatis, apice valde tenuiter acuminatis, supra brunneis, nitidis, glabris, subtus pallidioribus; glandibus conico-ovoideis, acuminatis, 1.8 ad 2.2 cm diametro, 1.5 ad 2 cm altis; cupulis extus dense ferrugineo- vel cinereo-pubescentibus, laminibus 8 ad 10, denticulatis.

A medium-sized tree, the branchlets, inflorescence, and lower surface of the leaves rather densely ferruginous- or cinereous-puberulent or pubescent. Branches terete, grayish- or reddish-brown, somewhat lenticellate, rugose, glabrous, the branchlets usually pubescent. Leaves alternate, broadly oblong-lanceolate, subcoriaceous, 9 to 17 cm long, 3 to 4.5 cm wide, entire, the base acute or somewhat acuminate, the apex strongly and slenderly acuminate, the acumen frequently 2 cm long, narrowed upwards

to the blunt or acute point, the upper surface brown, shining, glabrous, the lower surface pale and densely ferruginous-cinereous-puberulent; nerves about 9 on each side of the midrib, distinct beneath, the reticulations obsolete; petioles glabrous or pubescent, about 1 cm long. Male inflorescence densely ferruginous-pubescent, in terminal panicles 7 to 15 cm long. Female inflorescence of solitary, axillary, pubescent spikes 7 to 11 cm long, the flowers solitary. Glans conical-ovoid, glabrous, shining, the base truncate, the apex acuminate, apiculate, 1.8 to 2.2 cm in diameter, 1.5 to 2 cm high; cup inclosing only the basal portion of the glans, saucer-shaped, densely ferruginous- or cinereous-puberulent outside, the laminæ 8 to 10, concentric, denticulate, the scales of the lower laminæ quite united, those of the upper less so.

MINDANAO, Province of Surigao, Placer, *Ahern 432*, February–May, 1901 (type) N. v., *Uyayan*. I am disposed to refer here also the following specimens, all from Mindanao: Maria Cristina Falls, *Mrs. Clemens 709*, October, 1906: Lake Lanao, Camp Keithley, *Mrs. Clemens 1176*, September, 1907: District of Zamboanga, Port Banga, *For. Bur. 9066, 9143, 9417 Whitford & Hutchinson*, November, 1907, to February, 1908.

This species was previously identified erroneously by me as *Q. philippinensis* A. DC., to which it is not at all closely allied, and later the same specimen was referred by Von Seemen to *Quercus celebica* Miq. It does not, however, appear to be very closely allied to Miquel's species, which was placed by DeCandolle in the section *Cyclobalanus*, and by King in the section *Pasania*. I am of the opinion that the present species is a *Cyclobalanus*, although the bracts of the upper laminæ are nearly free. It differs decidedly from *Quercus celebica* in being more pubescent, with larger fruits and very much more acuminate leaves. This species grows at lower altitudes than any other species known from the Philippines, occurring in the District of Zamboanga in dipterocarp forests at an altitude of from 20 to 30 m above the sea.

11. **Quercus soleriana** Vidal Rev. Pl. Vasc. Filip. (1886) 261; Ceron Cat. Pl. Herb. (1892) 164.

Quercus concentrica Blanco Fl. Filip. ed. 2 (1845) 502, non Lour.

Quercus molucca Blanco Fl. Filip. (1837) 726, non Rumph.

Quercus reinwardtii F.-Vill. Nov. App. (1883) 207, fide Vidal, non Korth.

Quercus costata var. *convexa* Naves Fl. Filip. ed. 3, *t. 441*, non Blume.

Quercus clementiana Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 41, non King.

Quercus llanosii Merr. in Philip. Journ. Sci. 2 (1907) 270, non A. DC.

LUZON, Province of Benguet, Twin Peaks, *Elmer 6443*, June, 1904: Province of Zambales, *For. Bur. 6811 Curran*, May, 1907: Province of Bulacan, Angat, *For. Bur. 11154 Aguilar*, April, 1908: Province of Rizal, Bosoboso, *For. Bur. 1148, 3258 Ahern's collector*, June, 1904, August, 1905; *Bur. Sci. 4659 Ramos*, August, 1907: Province of Batangas, *For. Bur. 7664 Curran & Merritt*, October, 1907: Province of Laguna, Santa Maria Mavitac, *For. Bur. 10101 Curran*, February, 1908: Province of Bataan, Mount Mariveles, *Elmer 6898*, November, 1904; *For. Bur. 2997 Meyer*, May, 1905; *Whitford 1178, 1180*, March, 1905; *For. Bur. 5458 Curran*, November, 1906; *Bur. Sci. 1598 Foxworthy*, October, 1906: Province of Tayabas, Unisan, *For. Bur. 1824, 1825 Klemme*, September, 1904. MINDORO, Mount Halcon, *Merrill 5695*, November, 1906; Mount Malasumbu, *For. Bur. 8586*,

8749 Merritt, January, 1908; Mount Inanan, *For. Bur. 8721 Merritt*, January, 1908. MINDANAO, District of Davao, Todaya and Mount Apo, *Williams 2608, 3035*, April, July, 1905; *Copeland 1145, 1271*, April, 1904.

By far the most common and widely distributed species of the genus in the Philippines, and rather variable. Vidal's type is minutely matched by *Elmer 6443*, and by the specimens from Rizal Province cited above. *Quercus concentrica* Blanco non Lour., and *Q. molucca* Blanco non Rumph., are referred here, as Blanco's descriptions apply closely to the present species. *Quercus clementiana* was admitted by me on the strength of identifications made by Von Seemen, but an examination of authentic material of King's species, shows that it is distinct from *Q. soleriana*. The mature glans is about 2 cm long, and from 1.8 to 2.4 cm in diameter. Local names, T., *Hayopay, Alayan*, ex Blanco; *Cacaná* ex Vidal; *Basacan, Catabang;* Bogobo, *Ulaian;* Moro, *Ulan*.

12. **Quercus philippinensis** A. DC. Prodr. 16 [2] (1864) 97; F.-Vill. Nov. App. (1883) 208; Vidal Phan. Cuming. Philip. (1886) 147; Rev. Pl. Vasc. Filip. (1886) 265; Ceron Cat. Pl. Herb. (1892) 165; Wenzig in Jahrb. Bot. Gart. Berlin 4 (1886) 231.

LUZON, Province of Tayabas, Mount Banajao, *Cuming 809*, type; *Elmer 8185*, May, 1907; *For. Bur. 7910, 7911 Curran & Merritt*, November, 1907; Mount Malaraya, *For. Bur. 7848 Curran & Merritt*, November, 1907; Province of Zambales, Mount Tapulao, *For. Bur. 8100 Curran & Merritt*, December, 1907.

This species is manifestly allied to *Quercus soleriana* Vidal, but is well characterized by its very prominently caudate-acuminate leaves. It appears to be rather local. King states that he can see no reason why this species should not be reduced to *Quercus lineata* Blume, of the section *Cyclobalanopsis*, but its leaves are entire, and recently collected material from the type locality shows it to have erect male spikes, and therefore to be a true *Cyclobalanus*. Wenzig l. c. states under *Q. philippinensis:* "*Q. llanosii* DC. N. 235, *Q. oralis* Blanco fl. de filip. (ed. 2) p. 502, DC. N. 236, *Q. Blancoi* A. DC. N. 237 * * * sunt nonnisi formae *Q. philippinensis* DC.," but *Q. llanosii* is a species very distinct from *Q. philippinensis*, while *Q. blancoi* is an exact synonym of *Q. oralis*, which is a species entirely different from both *Q. llanosii* and *Q. philippinensis*, as shown above.

13. **Quercus bennettii** Miq. Fl. Ind. Bat. 1 [1] (1856) 857; DC. Prodr. 16 [2] (1864) 94; King in Ann. Bot. Gard. Calcutta 2 (1889) 64, *pl. 58A;* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 41.

Q. llanosii F.-Vill. Nov. App. (1883) 208; Vidal Sinopsis Atlas (1883) XLI, *t. 92, f. F.* ?, non A. DC.

Quercus wenzigiana Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 41, non King.

LUZON, Province of Bataan, Lamao River, Mount Mariveles, *Williams 705*, March, 1904; *Whitford 295, 365*, May, June, 1904; *For. Bur. 54 Barnes*, October, 1903; *For. Bur. 632, 685, 759, 781 Borden*, April, May, 1904; *For. Bur. 7224 Curran*, June, 1907; *Bur. Sci. 1572 Foxworthy*, October, 1906; *Leiberg 6052*, July, 1904; Province of Zambales, Masinloc, *Merrill 2941*, May, 1903; Province of Rizal, Antipolo, *Merrill 1709*, March, 1903; Province of Tayabas, *For. Bur. 1826 Klemme*, September, 1904.

Some of the specimens from the Province of Bataan were identified by Von Seemen as *Quercus bennettii* Miq., and others as *Q. wenzigiana* King, but they are manifestly all one species, and appear to me to be closer to *Q. bennettii* Miq., than to *Q. wenzigiana*. They are certainly very close to Maingay's Malacca specimen in Herb. Kew, referred by King to Miquel's species. Local names, T., *Bayucan, Basacan, Catibang, Palonapoy*.

Malacca, Borneo, and Bangka.

14. **Quercus merrillii** Seem. in Fedde Repert. 5 (1908) 21.

Palawan, Mount Pulgar, *For. Bur. 3857, 3858 Curran*, February, March, 1906; *Bur. Sci. 566 Foxworthy*, March, 1906.

A very distinct species, known only from Mount Pulgar.

§ Chlamydobalanus.

15. **Quercus cooperta** Blanco Fl. Filip. ed. 2 (1845) 503.

Castanopsis costata F.-Vill. Nov. App. (1883) 209, non A. DC.

Castanea cooperta Oerst. Vidensk. Selsk. Skr. V 9 (1873) 379.

Quercus fernandezii Vidal Sinopsis Atlas (1883) XLI, *t. 92, f. E.*; Rev. Pl. Vasc. Filip. (1886) 260.

The only specimen of this species that I have seen is *Vidal 617*, from Angat, Province of Bulacan, Luzon, in Herb. Kew, a topotype of Blanco's species. Although Blanco's description is very short, I can see no particular reason for displacing his specific name, which is here accepted. Vidal placed the species in the section *Lithocarpus*, but it appears properly to belong in the section *Chlamydobalanus*.

16. **Quercus reflexa** King in Ann. Bot. Gard. Calcutta 2 (1889) 78, *t. 72*.

Mindanao, District of Davao, Todaya, *Copeland 1289*, April, 1904.

This very characteristic specimen agrees closely with King's description and figure of *Quercus reflexa*. It is well distinguished by its acorns being entirely inclosed by the cups, the latter being covered with short reflexed tubercles.

Borneo.

§ Lithocarpus.

17. **Quercus curranii** sp. nov.

Arbor circiter 20 m alta, ramulis densissime ferrugineo-tomentosis; foliis oblongis vel oblongo-ellipticis, subcoriaceis, 10 ad 12 cm longis, basi acutis, apice breviter obscureque acuminatis, integris, supra nitidis, subtus pallidioribus, plus minus ferrugineo- vel cinereo-pubescentibus; cupulis turbinatis, ferrugineo-pubescentibus, supra tuberculatis, vix zonulatis, 3 cm longis crassisque.

A tree about 20 m high. Branches terete, brownish, slightly pubescent, the branchlets very densely ferruginous-tomentose. Leaves oblong or oblong-lanceolate, subcoriaceous, entire, 10 to 12 cm long, 3 to 5 cm wide, the base acute, the apex shortly and obscurely acuminate, the upper surface brownish, shining, in age glabrous, when young somewhat pubescent, especially along the midrib, the lower surface pale, somewhat cinereous-pubescent, the midrib and lateral nerves ferruginous-pubescent; nerves 9 to 11 on each side of the midrib, prominent beneath, the reticulations obscure; petioles ferruginous-tomentose, about 1 cm long. Flowers unknown. Involucre turbinate, 3 cm high and 3 cm in diameter, narrowed from the upper third to the base, and with a stout 1 cm long stalk, rather densely ferruginous-pubescent, the lower two-thirds smooth, or with very few scattered spines above, the portion covering the top of the glans with numerous stout tubercles, which become more numerous and

more densely disposed towards the apex, the upper third extending over the top of the glans and nearly inclosing it, leaving a circular ostiole 1 cm in diameter or less. Glans very hard, bony, the base and sides continuous, hemispherical, the top slightly convex, the apex depressed and apiculate, about 2 cm high and nearly 3 cm in diameter.

Luzon, Province of Laguna, Mount Banajao, *For. Bur. 7917, 7918 Curran & Merritt*, November, 1907, in forests at an altitude of from 800 to 900 m.

A very characteristic species, and the only one of the section known from the Philippines, allied to *Quercus rotundata* Bl., of Java, and to *Q. pulchra* King, of Borneo, but very distinct from both. It is the species of which Vidal figured the fruits as *Quercus* sp., Sinopsis Atlas (1883) XLI, *t. 92, f. G.*, and which also came Mount Banajao, at an altitude of about 1000 m.

DOUBTFUL AND EXCLUDED SPECIES.

Quercus cerris Blanco Fl. Filip. (1837) 727; ed. 2 (1845) 503, non Linn.

It is quite impossible to determine what species Blanco had in mind, from his very short and imperfect description. It is possible that it is the same as *Quercus llanosii* A. DC.; it is, of course, not at all the European species.

The following note from Blanco's discussion of this imperfectly described species, throws much light on his methods of botanizing: "It is truly lamentable that for the lovers of the study of nature, neither prayers, supplications nor money suffice to bring to knowledge the precious things of the Philippine forests."

Quercus nitida Von Seem. in Perk. Frag. Fl. Philip. (1904) 42, non Blume.

The specimen, *Merrill 1115*, at least the one before me, is a mixture, the fruits, picked up from the ground, being very similar to those of *Q. reflexa* King, but the leaves are manifestly those of *Parinarium* (*Rosaceæ*) well characterized by the glands at the base of the lamina. *Quercus nitida* Blume is a doubtful species, and the above specimen, so far as it is a *Quercus*, does not seem to be at all allied to it.

Quercus castellarnauiana Merr. in For. Bur. Bull. 1 (1903) 16; Von Seem. in Perk. Frag. Fl. Philip. (1904) 41, non Vidal.

This is an undeterminable form, as noted by Von Seemen, with flowers only. It is not Vidal's species.

The only clue we have to the numerous species credited to the Philippines in the Novissima Appendix by F.-Villar, is Vidal's notes.[15] Those accounted for by Vidal have been treated above according to the disposition Vidal made of them. It seems probable that of the nineteen species admitted by F.-Villar, none of those originally described from extra-Philippine material were correctly identified. Eight species were unaccounted for by Vidal, and it does not seem to be worth while to enter into any further consideration of them, as there are no specimens extant, and their identification would be only a matter of guesswork.

[15] Rev. Pl. Vasc. Filip. (1886) 260–265.

THE GENUS RADERMACHERA HASSK IN THE PHILIPPINES.

By Elmer D. Merrill.

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The Philippine history of this genus begins with the publication of Blanco's "Flora de Filipinas" in 1837, in which two species are inadequately described, *Millingtonia pinnata* Blanco and *Millingtonia quadripinnata* Blanco. The descriptions of both are imperfect, and both species have been variously interpreted by later authors. The descriptions are repeated in the second and third editions of Blanco's work, without change of name. In 1861, Bureau described *Radermachera banaibana* in Adansonia **2**:194, based on a specimen in the Paris herbarium collected at Calauan, Province of Laguna, Luzon, by Callery. This species is manifestly the same as the one described by Blanco as *Millingtonia pinnata* and was so considered by Seemann in his Revision of the Natural Order Bignoniaceae,[1] where Blanco's *Millingtonia pinnata* is transferred to *Radermachera* as *R. pinnata* (Blanco) Seem., Bureau's *Radermachera banaibana* being reduced as a synonym. At the same time Seemann also transferred Blanco's *Millingtonia quadripinnata* to *Radermachera*, as *R. quadripinna*, and referred to it a specimen collected in the Philippines by Cuming (no. 996). In 1883, F.-Villar [2] transferred Blanco's two species of *Millingtonia* to *Stereospermum*, as *S. pinnatum* and *S. quadripinnatum*, while Naves figured a plant that he identified with *Millingtonia quadripinnata* Blanco in the third edition of Blanco's Flora de Filipinas, *t. 252*. In this same year Vidal [3] also figured a plant that he identified as *Stereospermum quadripinnatum* F.-Vill., which although poorly and imperfectly drawn, is, I am confident, identical with the plant determined by F.-Villar as *Stereospermum quadripinnatum*, and which, whether or not it is Blanco's *Millingtonia quadripinnata*, is certainly the plant he described as *M. pinnata*.

In 1884, Rolfe [4] considered the Philippine species of *Stereospermum*,

[1] Journ. Bot. **8** (1870) 147.

[2] Nov. App. 151.

[3] Sinopsis Atlas *t. 73, f. A*.

[4] Journ. Linn. Soc. Bot. **21** (1884) 313–315.

recognizing four species, *S. quadripinnatum* (Blanco) F.-Vill., the form so identified by F.-Villar and Vidal, *S. pinnatum* (Blanco) F.-Vill., to which is referred a specimen collected by Cuming (no. 1517), which is certainly not the same as the plant Blanco described, *S. banaibanai* (Bureau) Rolfe, and *S. seemannii* Rolfe, the latter described as new, based on *Cuming 996*, a very fragmentary specimen, which had been referred by Seemann to *Radermachera quadripinna*. Vidal [5] follows Rolfe in his consideration of the Philippine species of the genus. In 1905, the present author described *Radermachera elmeri*, and in the following year, *R. biternata*, this being a history of the Philippine forms up to the present time.

The difficulty has been to determine just what the plants were that Blanco described, and from an examination of his descriptions, both of which are imperfect, the conclusion has been reached that both of Blanco's descriptions apply to only one species, for which the earlier name *pinnata* is here adopted, although none of the specimens so identified have pinnate leaves, and no specimens seen from the Philippines have 4-pinnate leaves. The local name, *Banaibanai*, is almost invariably applied to the form below considered to represent *Radermachera pinnata* (Blanco) Seem., and is one of the names cited by Blanco. The other native name cited by Blanco, *Botong manoc*, meaning "chicken bone," is of little value in establishing the identity of the species, as it is applied indiscriminately by the natives to a number of totally different trees. The only native name cited by Blanco under *Millingtonia quadripinnata*, is *Baticulin*, but this name is almost invariably applied to various arborescent *Lauraceae* at the present time.

Nine species of *Radermachera* are recognized in the following paper, considerably more than is known from all other regions combined. In my treatment of the older species, based on Blanco's two Millingtonias, I am at considerable variance with Seemann, and entirely at variance with Rolfe, in my conception as to what Blanco really intended to describe, but my conclusions have been based on considerable field knowledge, extending over a period of six years, as well as a very extensive series of specimens from all parts of the Philippines, and especially rich in individual collections from the provinces about Manila, from which Blanco received most of the material on which his Flora de Filipinas was based.

[5] Phan. Cuming. Philip. (1885) 132; Rev. Pl. Vasc. Filip. (1886) 203.

KEY TO THE SPECIES.

Calyx strongly longitudinally ribbed; leaves pinnate ..... 1. *R. coriacea*
Calyx smooth, not ribbed; leaves various.
  Leaves simply pinnate ..... 2. *R. elliptica*
  Leaves bi-ternate ..... 3. *R. biternata*
  Leaves bi- or tripinnate.
    Corolla 4 to 6.5 cm long.
      Corolla campanulate, usually broadly so.
        Flowers about 6 cm long ..... 4. *R. elmeri*
        Flowers 4 to 4.5 cm long.
          Leaflets obtuse, or shortly and obtusely acuminate ..... 5. *R. fenicis*
          Leaflets slenderly long-acuminate ..... 6. *R. acuminata*
      Corolla tubular, 5.5 cm long, the limb spreading ..... 7. *R. palawanensis*
    Corolla 3 cm long or less.
      Rachises of the panicles and leaves not lenticellate; flowers 2.5 to 3 cm long.
        Panicles pubescent ..... 8. *R. pinnata*
        Panicles glabrous ..... 8. *R. pinnata glabra*
      Rachises of the panicles and leaves usually strongly lenticellate; corolla less than 2 cm long ..... 9. *R. mindorensis*

1. **Radermachera coriacea** sp. nov.

Arbor glabra; foliis pinnatis, 20 ad 30 cm longis; foliolis 5, coriaceis, supra nitidis, oblongis vel elliptico-oblongis, 7 ad 14 cm longis, basi acutis, apice obtusis vel obscure obtuseque acuminatis, marginibus recurvatis; floribus 4 cm longis; calycibus 1.8 cm longis, fissis, valde longitudinaliter costatis, angustatis; fructibus 16 cm longis.

A tree, glabrous throughout. Branches terete, brown, densely lenticellate. Leaves pinnate, 20 to 30 cm long: leaflets 5, oblong or elliptical-oblong, 7 to 14 cm long, 3 to 4 cm wide, firmly coriaceous, the upper surface very shiny, the lower slightly paler and somewhat shining, densely punctate-glandular, the base acute, the apex obtuse or shortly and obscurely blunt-acuminate, the margins rather strongly recurved; nerves about 13 on each side of the midrib, anastomosing, slightly more distinct than are the rather lax reticulations; petiolules of the lateral leaflets about 1 cm long, that of the terminal leaflet 2.5 cm long. Panicles at least 15 cm long. Calyx 1.8 cm long, narrow, strongly longitudinally costate with 5 or 6 ridges, cleft down one side nearly to the middle, 3-toothed at the apex. Corolla 4 cm long, the tube rather narrow, slightly enlarged above, the lobes about 1 cm long, obtuse. Fruit 16 cm long, the valves 5 to 7 mm wide, shining, coriaceous, glabrous, blunt or acuminate at the apex; seeds unknown.

Luzon, Province of Tayabas (Principe), Baler, *Merrill 1099*, September, 1902, N. v., *Bibit parang*.

A very characteristic species, not only in its simply pinnate leaves and very coriaceous leaflets, but also in its cleft and strongly ridged calyx. It is the only known Philippine species possessing the latter character.

2. **Radermachera elliptica** sp. nov.

Arbor glabra; foliis pinnatis, circiter 35 cm longis; foliolis 5, ellipticis vel obovato-ellipticis, usque ad 15 cm longis, basi acutis vel acuminatis, apice late rotundatis vel breviter obtuseque acuminatis, nervis utrinque 9; paniculis axillaribus, circiter 15 cm longis, densis; floribus 5 cm longis, calycibus 2 cm longis, obliquis, junioribus clausis; fructibus 20 ad 25 cm longis.

A tree, glabrous throughout. Branches terete, brown, strongly lenticellate. Leaves simply pinnate, about 35 cm long: leaflets 5, elliptical or obovate-elliptical, 12 to 15 cm long, 7 to 9 cm wide, coriaceous, shining, the base acute or somewhat acuminate, the apex broad, rounded, or very shortly and broadly obtusely acuminate; nerves about 9 on each side of the midrib, distinct, anastomosing, the reticulations lax; petiolules about 1.5 cm long, that of the terminal leaflet short, but the rachis produced about 5 cm beyond the upper pair of leaflets. Panicles axillary, about 15 cm long, peduncled, densely flowered, more or less resinous and shining. Flowers white. Calyx about 2 cm long, closed in bud, obliquely split in anthesis, not toothed, submembranaceous, smooth, not at all ridged. Corolla 5 cm long, the tube somewhat abruptly enlarged where it emerges from the calyx, about 1.5 cm in diameter above, the lobes broadly ovate, rounded, 1 cm long, somewhat hairy inside at the insertion of the anthers; filaments glabrous. Capsules 20 to 25 cm long, nearly cylindrical, slightly compressed, glabrous, shining, 7 to 8 mm in diameter, the apex somewhat acuminate; seeds numerous, including the wings 1.3 cm long.

Luzon, Province of Bulacan, Angat, *For. Bur. 11141 Aguilar*, April, 1908.

Well characterized by its pinnate leaves, elliptical coriaceous leaflets, and large flowers. Not closely allied to any other known Philippine species.

3. **Radermachera biternata** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 238.

Culion, *Merrill 568*, December, 1902. Busuanga, *For. Bur. 3491 Curran*, December, 1905.

The only known species of the genus with biternate leaves.

4. **Radermachera elmeri** Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 48.

Luzon, Province of Benguet, Sablan, *Elmer 6179* (type), April, 1904: Province of Cagayan, *Bolster 134*, July 15, 1905. Palawan, Balsajan River, *Bur. Sci. 584 Foxworthy*, March, 1906; Cabudlungan, *For. Bur. 5190 Curran*, August, 1906. N. v., *Aglap*, in Palawan.

This species is well characterized by its very large flowers, those in the type being 6 cm long, and, according to the collector, pink in color, while those of Bolster's specimen are 6.5 cm long and said by him to be white and more or less yellow inside. The Palawan specimens differ from the type in having somewhat smaller flowers (5.5 cm), which are said by Foxworthy to be white and fragrant. I can not, however, find any valid characters in the material at hand to warrant the separation of any of the above as distinct species, although additional material may show such a course to be desirable.

5. **Radermachera fenicis** sp. nov.

Arbor parva, usque ad 5 m alta, glaberrima; foliis 15 ad 20 cm longis, bipinnatis, 3-jugatis; foliolis oblongo-ellipticis vel anguste obovato-ellipticis, 4 ad 5 cm longis, subtus minutissime punctatis, apice acutis, obtusis, vel breviter obtuseque acuminatis, basi cuneatis; paniculis terminalibus folia aequantibus, angustis; floribus albis, 4 cm longis; fructibus circiter 11 cm longis.

A small tree 3 to 5 m high, glabrous throughout. Branches terete, grayish-brown, lenticellate. Leaves opposite, about 20 cm long, the lowest pinnæ 3-foliolate, the others of single leaflets: leaflets oblong-elliptical to obovate-elliptical, 4 to 5 cm long, 1.5 to 3 cm wide, rather thin, shining, the apex obtuse, acute, or somewhat acuminate, the base cuneate, the lower surface minutely punctate; lateral primary nerves about 7 on each side of the midrib, anastomosing, scarcely more distinct than are the secondary nerves and reticulations; petiolules 5 mm long or less, that of the terminal leaflet 1 to 1.5 cm long. Panicles terminal, narrow, about as long as the leaves, the bracteoles linear-setaceous, about 4 mm long. Flowers white. Calyx somewhat campanulate, epunctate, 1 cm long, 2-lobed, one lobe with two, the other with three small teeth. Corolla about 4 cm long, the first 5 mm slender, tubular, then abruptly enlarged and campanulate, 3 cm wide above, the lobes broad, rounded. Stamens glabrous. Capsules somewhat compressed, about 11 cm long, 6 mm thick, glabrous; seeds many, 3 mm wide, and, including the wings, 1 cm long, apiculate.

BATAN (Batanes Islands), Santo Domingo de Basco, *Bur. Sci. 3583 Fenix*, May, 1907. N. v., *Balaybayan*.

A species well characterized by its small leaves, comparatively short capsules, and its blunt, acute, or only shortly acuminate leaflets. I am disposed to refer here an imperfect specimen from Mindoro, *For. Bur. 9750 Merritt*, but when more and better material is secured, the Mindoro plant may be found to present characters sufficient to warrant its description as a distinct species. It has much more acuminate leaves than has the Batan plant.

6. **Radermachera acuminata** sp. nov.

Stereospermum quadripinnatum Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 313; *nec Millingtonia quadripinnata* Blanco, *nec Radermachera quadripinna* Seem.

Arbor glabra; foliis bipinnatis, circiter 40 cm longis: foliolis oblongo-lanceolatis vel lanceolatis, coriaceis, basi acutis, apice valde acuminatis, usque ad 13 cm longis; paniculis terminalibus circiter 25 cm longis; floribus circiter 4 cm longis, campanulatis.

A tree, glabrous throughout, or the inflorescence obscurely puberulent. Leaves bipinnate, about 40 cm long, the lowermost pinnæ with 5 leaflets, the next with 3 leaflets, and the upper ones simple: leaflets oblong-lanceolate or lanceolate, 8 to 13 cm long, 2.5 to 4.5 cm wide, the base acute, the apex slenderly long-acuminate, coriaceous, slightly shining; lateral nerves about 12 on each side of the midrib, not prominent, anastomosing, the reticulations fine, indistinct; petiolules 8 to 12 mm long,

that of the terminal leaflet 2.5 cm long. Panicles terminal, about 25 cm long, the primary branches about 5 cm long, many-flowered. Flowers crowded at the ends of the panicle-branches. Calyx closed in bud, in anthesis campanulate, about 1 cm long, 2-lobed. Corolla 4 cm long, the portion within the calyx slender, tubular, then abruptly enlarged and campanulate, about 2 cm wide, the lobes rounded, broad. Capsules unknown.

GUIMARAS, *For. Bur. 277 Gammill*, January, 1904.

I do not hesitate to refer here *Cuming 1003*, which Rolfe considered to represent Blanco's *Millingtonia quadripinnata*, but which is certainly not Blanco's species. I am disposed to refer here also an immature specimen from Masbate, *Whitford 1696*, and also a very fragmentary specimen from Mount Abu, Pampanga Province, Luzon, *Foxworthy 1949*. The exact locality of Cuming's specimen cited above is unknown, Rolfe stating it as Province of Albay, Luzon, but Cuming's list at Kew giving this number as from the Province of Pangasinan.

7. **Radermachera palawanensis** sp. nov.

Arbuscula subglabra; ramulis, rhachidibus, paniculisque sparse pubescentibus; foliis circiter 20 cm longis, bipinnatis; foliolis oblongo-ellipticis vel lanceolato-ellipticis, coriaceis, nitidis, 3.5 ad 8 cm longis, basi acutis, apice acuminatis, margine revolutis; paniculis folia aequantibus, laxis, paucifloris; floribus albis, 5 ad 5.5 cm longis; corollae tubo cylindraceo.

A shrub, nearly glabrous, or the branches, rachises of the leaves, and panicles slightly pubescent. Leaves about 20 cm long, bipinnate, the lowest pair of pinnæ with 5 leaflets, the next with 3 leaflets, the upper ones simple: leaflets oblong-elliptical or lanceolate-elliptical, 3.5 to 8 cm long, 1 to 2.5 cm wide, coriaceous, glabrous, shining on both surfaces, the margins rather strongly recurved, the base acute, the apex more or less acuminate, sometimes apiculate, and rarely with one or two irregular teeth at the apex; lateral nerves about 8 on each side of the midrib, not very distinct, anastomosing; petiolules of the lateral leaflets 3 to 8 mm long, that of the terminal one longer. Panicles as long as the leaves, lax, few-flowered. Flowers white. Calyx subcylindrical, narrowed below, obscurely lobed, about 1 cm long. Corolla 5 to 5.5 cm long, the portion within the calyx very slender, tubular, then abruptly enlarged, forming a broader tubular portion 2 to 2.5 cm long, the limb spreading, about 3 cm in diameter, the lobes broad, rounded. Capsules very slender, about 20 cm long, the valves at least 3 mm wide; seeds unknown.

PALAWAN, Victoria Peak, *Bur. Sci. 699 Foxworthy*, March 23, 1906, on rocky slopes along a river at 1,000 m altitude.

8. **Radermachera pinnata** (Blanco) Seem. in Journ. Bot. 8 (1870) 147.

Millingtonia pinnata Blanco Fl. Filip. (1837) 501; ed. 2 (1845) 351; ed. 3, 2: 285; Miq. Fl. Ind. Bat. 2 (1856) 753.

Millingtonia quadripinnata Blanco l. cc. 499, 351, 286; Miq. l. c.

Radermachera banaibana Bur. in Adansonia 2 (1861) 194; Seem. in Journ. Bot. 8 (1870) 147; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 124.

Stereospermum banaibanai Rolfe in Journ. Linn. Soc. Bot. **21** (1884) 314; Vidal Rev. Pl. Vasc. Filip. (1886) 203; Phan. Cuming. Philip. (1885) 132.

Stereospermum seemannii Rolfe in Journ. Linn. Soc. Bot. **21** (1884) 314; Vidal l. cc. 132, 203.

Stereospermum quadripinnatum F.-Vill. Nov. App. (1883) 151; Vidal Sinopsis Atlas (1883) *t. 73, f. A* (inaccurate).

Radermachera quadripinna Seem. in Journ. Bot. **8** (1870) 147.

Stereospermum pinnatum F.-Vill. Nov. App. (1883) 151.

Luzon, without locality, *Cuming 1182, 996:* Province of Benguet, Sablan, *Elmer 6157,* April, 1904: Province of Zambales, *For. Bur. 5800 Curran,* January, 1907; *For. Bur. 6084 Aguilar,* January, 1907; Botolan, *Merrill 2925:* Province of Pangasinan, Salasa, *For. Bur. 9628 Zschokke,* December, 1907: Province of Rizal, Montalban, *Loher 4323,* March, 1891; Antipolo, *Merrill 1729,* March, 1903: Province of Bataan, Mount Mariveles, *Whitford 24,* April, 1904; *For. Bur. 725, 1540, 1541, 1550, 1542, 1566 Borden; For. Bur. 342, 185, 548 Barnes; For. Bur. 2424 Meyer,* January, 1905; *Williams 588,* February, 1904: Province of Camarines Sur, *Ahern 61,* February, 1902. Mindoro, *For. Bur. 9717 Merritt,* February, 1908.

Var. **glabra** var. nov.

Differt a typo omnibus partibus glabratis.

Luzon, Province of Rizal, Bosoboso, *For. Bur. 2671 Ahern's collector,* January, 1905 (type); Antipolo, *For. Bur. 469 Ahern's collector; Dec. Philip. For. Fl. 174; Loher 4322,* March, 1903: Province of Bataan, Mount Mariveles, *For. Bur. 2469 Borden,* January, 1905; *Bur. Sci. 5177 Foxworthy,* April, 1908: Province of Cagayan, *For. Bur. 6660, 11303 Klemme,* April, 1907, 1908: Province of Isabela, Casiguran, *Bur. Sci. 3121 Mearns,* June, 1907. Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 274,* February, 1906.

This is the most common and widely distributed species of the genus in the Philippines, being somewhat variable, and its synonomy is rather complicated, due primarily to Blanco's imperfect descriptions, and to various later interpretations of these. The leaves are bi- and tripinnate, frequently on the same specimen, and the flowers vary in size from 2.5 to 3 cm in length, but on all the specimens cited above, both under the species and the variety, the flowers are uniformly described by the collectors, as far as the field notes show, as pink or pale purple and marked with yellow inside.

I have adopted the first valid specific name available, taken from *Millingtonia pinnata* Blanco, although so far as I have observed, and in the large series of specimens examined, the leaves are never simply pinnate. It is universally known to the natives as *Banaibanai,* a name normally applied to no other species, other than the following one, and with the exception of the discrepancy as to leaves, Blanco's description applies very closely. The species is very abundant in the regions from which Blanco received most of his material. The disposition of Blanco's *Millingtonia quadripinnata* necessitated careful consideration, but I have here reduced it to *Radermachera pinnata* (Blanco) Seem., although in this I am at variance with both Seemann and Rolfe, who have previously worked over the Philippine species of this genus. Knowing thoroughly the flora of the region about Manila, and the contiguous provinces, it does not seem probable that this species, if distinct from *R. pinnata,* as considered by Blanco, should have escaped our notice, but up to the present time there is nothing in our herbarium to which Blanco's description applies so well as to the material here considered to represent *Radermachera pinnata.* It seems rather curious that Blanco should have described it under two different names, neither of which apply well to the species, for none of the above specimens have simply pinnate leaves, and

none have quadripinnate ones, all having bi- or tripinnate leaves or both. Blanco's work shows internal evidence that the various species were described from time to time, in a period extending over many years, sometimes from fresh material, at other times from dried specimens brought or sent to him by various persons. It seems very evident, moreover, that he had no herbarium, so that the probability of repetitions was thereby increased.

As to *Stercospermum seemannii* Rolfe, after an examination of several specimens of each of the numbers secured by Cuming, including the type of *S. seemannii*, I can see no reason for separating it from *Radermachera pinnata*. The type, *Cuming 996*, and such duplicates of the type number as I have seen, one of which is before me, are very fragmentary, with detached leaflets and badly insect-eaten flowers, and appear to be in all respects the same as Blanco's species.

9. **Radermachera mindorensis** sp. nov.

Stercospermum pinnatum Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 314; Vidal Rev. Pl. Vasc. Filip. (1886) 203, not *Millingtonia pinnata* Blanco.

Stereospermum quadripinnatum Naves in Fl. Filip. ed. 3, *t. 252?*

Arbor glabra, usque ad 20 m alta; foliis tripinnatis, rariter bipinnatis, 40 ad 50 cm longis; foliolis lanceolatis vel oblongo-lanceolatis, basi acutis, apice caudato-acuminatis, chartaceis, 8 ad 11 cm longis; paniculis terminalibus, diffusis, folia aequantibus vel longioribus; floribus circiter 1.5 cm longis.

A tree glabrous throughout, about 20 m high. Branches terete, brown or gray, lenticellate. Leaves tripinnate, rarely bipinnate, 40 to 50 cm long, the rachis lenticellate; leaflets lanceolate or oblong-lanceolate, chartaceous, somewhat shining, 8 to 11 cm long, 2 to 3.5 cm wide, the base acute or somewhat acuminate, the apex slenderly caudate-acuminate, the acumen about 2 cm long, acute; nerves about 12 on each side of the midrib, anastomosing, slightly more distinct than are the secondary ones and reticulations; petiolules of the lateral leaflets about 5 mm long, those of the terminal leaflets 1 to 2 cm long. Panicles terminal, glabrous, diffuse, equaling or longer than the leaves, the rachis frequently lenticellate. Flowers light-purple. Calyx somewhat campanulate, 4 to 5 mm long, closed in bud, in anthesis shortly and irregularly 3- to 5-toothed. Corolla 1.5 to 1.8 cm long, the portion within the calyx slender, tubular, then abruptly enlarged and tubular-campanulate, somewhat pubescent on the outside, irregularly lobed. Capsules 15 cm long, 4 to 5 mm in diameter, somewhat compressed; seeds, including the wings, about 13 mm long.

Mindoro, Calapan, *Merrill 893* (type), April, 1903; Pola, *Merrill 2240, 2473*, May, June, 1903; Bongabong River, *Whitford 1387*, January, 1906; Baco River, *McGregor 257*, April, 1905, with larger flowers than the type; Bongabong, *Hickman s. n.*

Allied to the preceding species, but with much more diffuse panicles, and much smaller flowers. I am disposed to refer here *Cuming 1517*, which was from the Island of Mindoro, according to Cuming's list at Kew, not from Batangas Province, Luzon, according to the labels on some of the specimens. It was referred by Rolfe to *Stercospermum pinnatum* F.-Vill., but the sheet at Kew, which I have examined, has at least bipinnate leaves, and not pinnate ones as stated by Rolfe, and is certainly not the same as *Millingtonia pinnata* Blanco.

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THE PHILIPPINE SPECIES OF GARCINIA

PHILIPPINE ERICACEÆ

ON A COLLECTION OF PLANTS FROM THE BATANES AND BABUYANES ISLANDS

By Elmer D. Merrill

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

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[2] The first four bulletins in the ornithological series were published by the Ethnological Survey under the title "Bulletins of the Philippine Museum." Later ornithological publications of the Government appeared as publications of the Bureau of Government Laboratories.

(Concluded on third page of cover.)

THE PHILIPPINE SPECIES OF GARCINIA.

By Elmer D. Merrill.

(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

This difficult genus is rather largely represented in the Philippines, and its local study has been considerably complicated by difficulties encountered in the proper identification of the several species described by Blanco, as well as a number of manifestly erroneous identifications of Philippine plants made by later authors. The species are often obscure, and frequently difficult to classify even when complete material is available, while the difficulties encountered become proportionally greater when attempts are made to classify incomplete specimens. Frequently two species will closely simulate each other in all superficial and gross characters, but examination of the flowers will show them to belong to quite different sections of the genus.

Seventeen species are recognized in the following paper, which can hardly be considered as more than preliminary, but I am not at all sure that all those admitted will stand the test of time, especially those in the group with *Garcinia venulosa* (Blanco) Choisy. A full series of specimens, showing both staminate and pistillate flowers and mature fruits of each species, is greatly needed in this group.

Of the species previously credited to the Philippines, nothing has been done with the list given by F.-Villar in the Novissima Appendix to the third edition of Blanco's Flora de Filipinas, as no descriptions are given and no specimens are extant, so that any reductions of these species would be mostly a matter of surmise only. Vidal enumerates a number of species in his Revision de Plantas Vasculares Filipinas, some of which are manifestly admitted on erroneous identifications. I have examined most of the specimens cited by him, in the Kew Herbarium, and some of the species are disposed of below. Others I could not match with any recently collected material and these will have to be considered at a later date. *Garcinia morella*, to which three specimens are referred, is probably an erroneous identification, while *G. andersonii* certainly is, and one or both are probably undescribed; the specimen referred to the latter is remarkable in having leaves 1½ to 2 feet in length, and has only been found on the island of Alabat off the east coast of southern Luzon.

Twelve of the seventeen species below enumerated from the Philippines, are endemic in the Archipelago, while one, *Garcinia mangostana* Linn., is undoubtedly an importation from western Malaya. Five species are described as new and four are credited to the Philippines for the first time.

KEY TO THE SPECIES.

Flowers 5-merous (XANTHOCHYMUS).
- Inflorescence terminal, cymose ..... 1. *G. vidalii*
- Inflorescence axillary, fasciculate.
  - Leaves broad and rounded at the apex; flowers subsessile .... 2. *G. subelliptica*
  - Leaves more or less acuminate at the apex.
    - Rudimentary ovary in the male flowers none; staminal phalanges free; flowers long-pedicelled ..... 3. *G. dulcis*
    - Rudimentary ovary present in the male flowers, the staminal phalanges connate with it; flowers sessile or very shortly pedicellate. 4. *G. moselleyana*

Flowers 4-merous (EUGARCINIA).
- Stamens of the male flowers many, occupying both sides of four pedicelled phalanges; anthers sessile, 2-celled, dehiscing longitudinally.
  - Flowers in short axillary cymes ..... 5. *G. luzoniensis*
  - Flowers in axillary fascicles.
    - Leaves short-rostrate; nerves very numerous, slender, spreading, distinct. 6. *G. eugeniacfolia*
    - Leaves acuminate, not rostrate; nerves obscure, distant, ascending. 7. *G. dives*
- Stamens of the male flower in a 4-lobed mass surrounding the rudimentary ovary.
  - Rudimentary ovary sessile; flowers large; fruit dark-purple, edible. The mangosteen ..... 8. *G. mangostana*
  - Rudimentary ovary more or less pedunculed; flowers medium; fruit green or yellowish ..... 9. *G. benthami*
- Stamens of the male flower many, in a single unlobed mass; anthers 2-celled, dehiscing longitudinally.
  - Rudimentary ovary wanting in the male flower ..... 10. *G. cumingiana*
  - Rudimentary ovary present.
    - Some flowers with petaloid staminodes ..... 11. *G. calleryi*
    - Flowers without staminodes ..... 12. *G. venulosa*
- Stamens 4 to 14; anthers dehiscing longitudinally; rudimentary ovary none.
  - Lateral nerves about 40 on each side of the midrib, dense; stamens 4. 13. *G. tetrandra*
  - Lateral nerves 10 to 20 on each side of the midrib, rarely more, distant.
    - Lateral nerves about 12; stamens 4 ..... 14. *G. rubra*
    - Lateral nerves about 20; stamens 8 to 14 ..... 15. *G. binucao*
- Stamens many, united into a globose mass; dehiscence of the anther-cells circumscissile; rudimentary ovary none.
  - Anther-cells peltate ..... 16. *G. mindanaensis*
  - Anther-cells not peltate ..... 17. *G. lateriflora*

1. **Garcinia vidalii** sp. nov. § *Xanthochymus.*

Garcinia ovalifolia Vidal Sinopsis Atlas (1883) *t. 11, f. A*, non Hook. f. & Th.
Garcinia sp. Vidal Rev. Pl. Vasc. Filip. (1886) 53.

Arbor circiter 12 m alta; foliis coriaceis, obovatis vel elliptico-obovatis, apice late rotundatis vel leviter retusis, basi acutis vel leviter acuminatis, usque ad 25 cm longis, nervis utrinque circiter 40; inflorescentiis terminalibus, paucifloris; floribus 5-meris, sessilibus; fructibus globosis, carnosis, circiter 12-locellatis, 5 ad 6 cm diametro.

A tree about 12 m high. Branches and branchlets stout, somewhat angular, brownish or yellowish, rugose when dry. Leaves opposite, obovate or elliptical-obovate, 15 to 25 cm long, 6 to 14 cm wide, coriaceous, slightly shining above, somewhat paler beneath, the apex broadly rounded, often slightly retuse, rarely acute or even slightly acuminate, somewhat narrowed below to the acute or slightly acuminate base, the margins slightly recurved; lateral nerves about 40 on each side of the midrib, rather distinct, parallel, anastomosing near the margin, the reticulations obscure; petioles stout, 2 to 2.5 cm long, the upper surface inflated and stem-clasping. Inflorescence terminal, few-flowered, the ultimate branches each with three flowers. Flowers 5-merous, the staminate ones with stout, 4-angled, about 5 mm long pedicels, each subtended by two coriaceous ovate or orbicular bracteoles, the buds globose. Sepals 4. Petals 5, in bud orbicular. Stamens numerous, united into five masses, the rudimentary ovary with a disciform stigma. Fruit fleshy, greenish, smooth when fresh, subglobose, 5 to 6 cm in diameter, edible, about 12-celled, the sepals persistent, orbicular or reniform, accrescent, the inner pair about 15 mm wide, and 12 mm long, the outer pair similar but much smaller.

Luzon, Province of Rizal, Bosoboso, *For. Bur. 3093 Ahern's collector*, May, 1905, with immature flowers; *Bur. Sci. 2139 Ramos*, February, 1907, sterile: Province of Pangasinan, Eguia, *For. Bur. 8289 Curran & Merritt*, December, 1907, with mature fruit.

A characteristic species, readily recognizable by its rather large, numerously veined leaves which are broadly rounded at the apex and frequently retuse. It is certainly the species figured by Vidal as *G. ovalifolia*, which he later recognized as distinct from Hooker's species. A tree with a trunk diameter of about 40 cm, the bark with thick yellow latex. T., *Peris;* Pang., *Bunug*.

2. **Garcinia subelliptica** sp. nov. § *Xanthochymus*.

Arbor 10 ad 15 m alta, ramulis crassis, angulatis, flavo-viridibus vel flavo-brunneis; foliis ellipticis vel suborbicularibus, crasse coriaceis, nitidis, 8 ad 12 cm longis, 5 ad 10 cm latis, basi apiceque late rotundatis, marginibus reflexis, nervis obscuris vel subobsoletis; floribus masculinis 5-meris, fasciculatis, axillaribus, sessilibus vel breviter pedicellatis; fructibus depresso-globosis, in sicco valde rugosis, usque ad 4.5 cm diametro.

A tree 10 to 15 m high. Branchlets stout, strongly angled, yellowish-green or yellowish-brown. Leaves elliptical to suborbicular, 8 to 12 cm long, 5 to 10 cm wide, firmly coriaceous, shining, pale-yellowish when dry, the base and apex broad, rounded, the margins reflexed; lateral nerves about 10 on each side of the midrib, obscure or sometimes nearly

obsolete; petioles very stout, about 5 mm long. Male flowers in axillary, 4- to 6-flowered fascicles, sessile or shortly pedicellate, 5-merous, greenish-white. Outer two sepals suborbicular, rounded, about 2 mm in diameter, the inner three subreniform, about 3 mm long and 4 mm wide. Petals 5, elliptical to orbicular-elliptical, rounded, about 8 mm long, 6 to 7 mm wide. Filaments connate into five erect, pedicellate bodies, the pedicels flattened, 4 to 5 mm long, 1 mm wide, each bearing at the top from 3 to 6 anthers, the free filaments about 1 mm long. Rudimentary ovary none, the torus spongy. Fruit depressed-globose, when dry strongly wrinkled, 4.5 cm in diameter.

Luzon, Province of Tayabas, Mauban, *For. Bur. 10184 Curran*. March, 1908; Infanta, Tinauan River, *Whitford 757*, September, 1904: Province of Camarines, Daet, *For. Bur. 10731 Curran*, July, 1908.

A very characteristic species, readily recognizable by its elliptical or suborbicular, firmly coriaceous leaves which are broad and rounded at both ends, nearly obsolete nerves, short stout petioles, sessile fasciculate flowers and subglobose fruit. A tree, the trunk 35 cm in diameter, with yellow latex, growing in thickets along the seashore. T., *Gatasan, Dancalan*.

3. **Garcinia dulcis** (Roxb.) Kurz For. Fl. Brit. Burma 1 (1877) 92; Pierre Fl. Forest. Cochinch. Enum. IV; Vesque in DC. Monog. Phan. 8 (1893) 312; King in Journ. As. Soc. Beng. 59 [2] (1890) 169.

Xanthochymus dulcis Roxb. Pl. Coromandel 3 (1819) *t. 270;* Wight Icon. *t. 192*.

Garcinia ovalifolia Vidal Rev. Pl. Vasc. Filip. (1886) 53, non Hook. f.

Luzon, Province of Ilocos Sur, *For. Bur. 7103 Klemme:* Province of Zambales, Subic, *Merrill 2074:* Province of Bataan, *For. Bur. 6521 Curran:* Province of Rizal, Tanay, *Bur. Sci. 3326 Ramos*, Bosoboso, *For. Bur. 442, 3295 Ahern's collector:* Province of Camarines Sur, Pasacao, *Ahern 195*. Masbate, *For. Bur. 997 Clark*. Negros, *For. Bur. 5578 Everett; For. Bur. 5224 Danao*. Palawan, *Bur. Sci. 618 Foxworthy; For. Bur. 7428 Manalo; For. Bur. 3792 Curran*. Mindanao, District of Zamboanga, *For. Bur. 9457, 9467, 9471 Whitford & Hutchinson*.

A species widely distributed in the Philippines, and apparently common. The type was from the Moluccas, introduced into the Calcutta Botanical Gardens, and described by Roxburgh from living specimens. The Philippine material agrees closely with the various descriptions and figures of the species, and exactly matches numerous specimens in our herbarium from the Buitenzorg Gardens, so that I have no hesitation in recording the species from the Philippines. It extends from Perak to the Malay Archipelago. T., *Gatasan, Baniti;* Il., *Buncy*. Some specimens bear also the names *Tatlang anac* and *Bilucao*, which however properly belong to other species.

4. **Garcinia moselleyana** Pierre Fl. Forest. Cochinch. Enum. X; Vesque in DC. Monog. Phan. 8 (1893) 326.

The type of this species was collected by Mr. Moseley of the Challenger Expedition, on the small islet Malamani close to the north coast of Basilan, and opposite Isabela de Basilan. I have seen the type in Herb. Kew, but it is rather fragmentary, and seems to be closely matched by *DeVore & Hoover 84*, from the Island of Basilan. *Elmer 7187*, from Palo, Leyte, may be the same, although of this I have only leaf specimens.

5. **Garcinia luzoniensis** sp. nov. § *Mangostana*.

Arbor usque ad 10 m alta; ramis flavidis, teretibus, ramulis nigrican-

tibus, teretibus vel plus minus angulatis; foliis oblongo-ellipticis, breviter obtuse acuminatis, basi acutis, 8 ad 12 cm longis, nervis tenuibus, circiter 35 utrinque; cymis axillaribus, 2 cm longis; floribus masculinis 4-meris; staminibus numerosis, in phalangibus stipitatis dense congestis; pistilli rudimento fungiforme; fructibus globosis, 1.5 cm diametro, 1-locellatis, 1-spermis.

A tree 10 m high or less, the branches terete, rather slender, yellowish, the branchlets blackish, terete or somewhat angled. Leaves oblong-elliptical, 8 to 12 cm long, 2.5 to 4 cm wide, subcoriaceous, dark-colored when dry, shining on both surfaces, the lower surface somewhat paler than the upper, the apex with a short, blunt acumen, the base acute; petioles black, 1 cm long or less; nerves very numerous, slender, about 35 on each side of the midrib, anastomosing, the secondary ones and reticulations nearly as prominent at the primary ones. Inflorescence of axillary, short-peduncled, 2 cm long cymes, in the upper axils only. Male flowers 4-merous, pedicelled. Outer two sepals orbicular-ovate, obtuse, 2 mm long, the inner two orbicular, concave, 3.5 mm in diameter. Petals 4, orbicular or orbicular-elliptic, equaling the inner sepals. Stamens numerous, in four stipitate phalanges opposite the petals, the stipes about 1.5 mm long, the anthers 2-celled, sessile, mostly on the inner face and margins of the phalanges, forming a somewhat flattened head 2 mm in diameter. Rudimentary ovary stipitate, the stipe 1.5 mm long, the stigma rounded, 2.5 mm in diameter, the margin obscurely 4-lobed. Fruit black when dry, globose, smooth, 1.5 cm in diameter, 1-celled, with a single large seed, crowned by the entire, disciform, sessile stigma which is about 5 mm in diameter.

Luzon, Province of Tayabas, Atimonan, *Whitford 678, 739*, August, 1904, in forests at an altitude of from 15 to 100 m.

6. **Garcinia eugeniaefolia** Wall. Cat. (1828) no. 4873; Hook. f. Fl. Brit. Ind. 1 (1874) 268; King in Journ. As. Soc. Beng. 59[2] (1890) 150; Vesque in DC. Monog. Phan. 8 (1893) 343.

Mindoro, *For. Bur. 6762, 6767, 6818, 11398, 11487 Merritt*, March, April, May, 1907–08; *For. Bur. 12195, 12197, 12203 Rosenbluth*, April–June, 1908.

The above specimens agree closely with specimens from Singapore, coll. Ridley, identified with Wallich's species, with specimens from Java named *Garcinia brevirostris* Scheff., and with the various descriptions of the species, and I do not hesitate to refer the Mindoro specimens here. King states that Scheffer's species is identical with Wallich's, and judging from the material before me I consider that he is correct. T., *Basan, Basal;* Mang., *Banotan.*

Penang to Perak, the Andaman Islands, Singapore and Banca; new to the Philippines.

7. **Garcinia dives** Pierre Fl. Forest. Cochinch. Enum. XXXV, *pl. 90 B;* Vesque Epharm. 2: *t. 134, 135;* DC. Monog. Phan. 8 (1893) 360.

Garcinia maingayi Vidal Sinopsis Atlas (1883) 14, *t. 11, f. C*, non Hook. f.

Garcinia bosobosocnsis Pierre ex Vesque in DC. Monog. Phan. 8 (1893) 484.

Garcinia cowa Vidal Sinopsis Atlas (1883) *t. 11, f. D;* Rev. Pl. Vasc. Filip. (1886) 53 (?) non Roxb.

Garcinia venulosa Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 97, non Choisy.

Luzon, Province of Pampanga, Arayat, *Merrill 1394, 1407:* Province of Zambales, Cabangan, *Merrill 3004:* Province of Batangas, Looc, *For. Bur. 7644 Curran & Merritt:* Province of Bataan, Lamao River, *For. Bur. 6253, 6404 Curran: For. Bur. 2494, 3062 Borden; Whitford 1240; Williams 704; For. Bur. 2511 Meyer:* Province of Rizal, *For. Bur. 1120, 2651, 2658, 2974 Ahern's collector:* Province of Camarines, *Ahern 259.* Panay, *Cuming 1659* (type number). Mindanao, Lake Lanao, *Mrs. Clemens 977, 1008.*

A widely distributed endemic species, previously confused by me with *Garcinia venulosa* (Blanco) Choisy, but to which Blanco's description does not at all closely apply, although the species is sometimes received under the native name cited by him. The species erroneously identified by Vidal as *G. maingayi* Hook. f., and of which he figured the staminate flowers, appears to me to be referable here, the drawing seems to have been made from immature specimens, and its accuracy is very doubtful. On this imperfect drawing Pierre based his *Garcinia bosobosoensis*, which is also here reduced to *G. dives.* The specimens referred by Vidal to *Garcinia cowa* Roxb., do not appear to me to be that species, and I have doubtfully referred here, *Garcinia cowa* Vidal, non Roxb., although I am not at all sure that the pistillate flower figured by him as Roxburgh's species, is really that of *Garcinia dives.* The type of *Garcinia dives* is *Cuming 1659*, which according to the Kew list was collected in Panay. The fruits appear to be always 1-celled. Pamp., *Pildis;* T., *Malabilucao, Tatlang anac, Bilucao;* Z., *Paniguiuen.*

8. **Garcinia mangostana** Linn. Sp. Pl. (1753) 635; Pl. & Tr. Mém. Guttif. (1862) 170; Pierre Fl. Forest. Cochinch. *t. 54;* Vidal Sinopsis Atlas (1883) *t. 11, f. F.;* Vesque in DC. Monog. Phan. 8 (1893) 386.

The only Philippine specimen of this species that I have seen is one collected on Mangsi Island by the Wilkes Expedition, and now in the U. S. National Herbarium. It is commonly cultivated in the Sulu Archipelago, in some parts of southern Mindanao, and in southern Negros. It does not thrive as far north as Manila, but the fruits are to be found in the Manila markets in season, mostly imported from Singapore, rarely from Jolo. The mangosteen.

9. **Garcinia benthami** Pierre Fl. Forest. Cochinch. *t. 55, 56;* Vesque Epharm. 2: *t. 109, 110;* DC. Monog. Phan. 8 (1893) 392.

Palawan, *For. Bur. 3787 Curran*, February, 1906; *For. Bur. 7430 Manalo*, March, 1907, the former from Agoho Point and the latter from the Bilaran trail: locally known as *Bunog.*

The specimens agree closely with Pierre's figures and description, and also with specimens from trees cultivated in the botanical garden at Buitenzorg.

Cochinchina; new to the Philippines.

10. **Garcinia cumingiana** Pierre Fl. Forest. Cochinch. Enum. XI. *t. 78, f. F. E.;* Vesque in DC. Monog. Phan. 8 (1893) 434.

Luzon, Province of Ilocos Sur, *Cuming 1124* (cotype); *For. Bur. 5661 Klemme*, November, 1906.

The only specimen that I have seen that exactly matches Cuming's specimen is *Klemme 5661*, which is from the same province in which Cuming's specimen was collected, according to Cuming's list of localities at Kew. The rudimentary ovary in the staminate flowers is wanting, but otherwise the specimens agree perfectly with those referred to *G. venulosa* below. I suspect that *G. cumingiana* is only a form of Blanco's species, but careful field work and a full series of specimens will be necessary to prove this. Il., *Galasan.*

11. **Garcinia calleryi** Pierre Fl. Forest. Cochinch. Enum. XV. *t. 79, f. B;* Vesque in DC. Monog. Phan. 8 (1893) 406.

Luzon, Province of Laguna, Calauan, *Callery 56*, in Herb. Mus. Paris.

I have not seen the type of this species, and it is known to me only by the description and figure. Pierre found some flowers which he called neuter, which contained some more or less petaloid staminodes. In all the material I have examined in manifestly allied species, I have found no corresponding flowers. However, I am very doubtful if the species is really distinct from *G. cumingiana* Pierre, and at the same time from *G. venulosa* Choisy. As with the preceding species, careful field work and a complete series of specimens will be necessary to establish the relation of this species to the next.

12. **Garcinia venulosa** (Blanco) Choisy Guttif. Ind. 34; Pl. & Tr. Mém. Guttif. (1862) 172; Pierre Fl. Forest. Cochinch. Enum. XV; Vidal Cat. Pl. Prov. Manila (1880) 18; Phan. Cuming. Philip. (1885) 96; Rev. Pl. Vasc. Filip. (1886) 53; Vesque in DC. Monog. Phan. 8 (1893) 408.

Cambogia venulosa Blanco Fl. Filip. (1837) 435; ed. 2 (1845) 302; ed. 3, 2: 197.

Garcinia cornea F.-Vill. Nov. App. (1880) 16; Vidal Rev. Pl. Vasc. Filip. (1886) 53, non Linn.

Garcinia blancoi Pierre Fl. Forest. Cochinch. Enum. XV, *t. 79, C;* Vesque in DC. Monog. Phan. 8 (1893) 405.

LUZON, Province of Rizal, Bosoboso, *Bur. Sci. 1486 Ramos:* Province of Laguna, Santa Maria Mavitac, *For. Bur. 10110 Curran:* Province of Bulacan, Angat, *For. Bur. 11179 Aguilar:* Province of Batangas, Taal, *For. Bur. 7660 Curran & Merritt:* Province of Tayabas, Laguimanoc, *Merrill 4020:* Province of Sorsogon, *Elmer 7308.* MINDORO, Baco River, *Merrill 1802.* MINDANAO, District of Zamboanga, *For. Bur. 9210 Whitford & Hutchinson;* San Ramon, *Hallier;* Sax River, *Williams 2112.*

This is one of the most widely distributed species in the Philippines, well characterized by its densely nerved leaves, which have peculiar, dark-colored, obscure, very fine, longitudinal reticulations. It is the only species known to me to which Blanco's description at all closely applies. Blanco speaks especially of the terminal inflorescence, the fine veins, the stamens "en mucho número, colocados sobre el gérmen," and the fruit globose and without ribs, and the above specimens represent the only species known to me having the above combination of characters, while it is common and widely distributed as Blanco states, it being known to him from Batangas, Rizal, Bataan, and the Visayan Islands. I can see no valid reason for distinguishing *Garcinia blancoi* Pierre as a distinct species, and am very doubtful if *G. cumingiana* Pierre and *G. calleryi* Pierre, above, will prove to be distinct when more is known about them, in spite of the different floral characters discovered and figured by Pierre. The native name given by Blanco, *Taclang anac*, does not appear on any of the above specimens, but it is a very loosely applied term, and is found on various sheets representing several other species of the genus. *Garcinia venulosa* was previously erroneously interpreted by me, and many specimens were distributed under this name which are for most part referable to *G. dives* Pierre. T., *Gatasan, Piris;* Moro, *Mangala.*

13. **Garcinia tetrandra** Pierre Fl. Forest. Cochinch. *t. 84 D;* Enum. XX; Vesque Epharm. 2: *t. 143, 144;* DC. Monog. Phan. 8 (1893) 419.

MINDANAO, District of Misamis, *Cuming 1611* (type number): District of Zamboanga, San Ramon, *Copeland 1608*, January, 1905: Lake Lanao, Camp Keithley, *Mrs. Clemens*, June, 1907.

The locality of Cuming's specimens is taken from his own list at Kew, and is undoubtedly correct, as the species has as yet not been found outside of

Mindanao. Pierre gives the locality as "Philippines" but Vesque erroneously adds "Manila."

14. Garcinia rubra sp. nov. § *Oxycarpus.*

Arbor vel arbuscula, 3 ad 10 m alta; ramis ramulisque tenuibus, teretibus; foliis membranaceis, oblongo-ellipticis, usque ad 13 cm longis, apice valde acuminatis, basi acutis, nervis 10 ad 12 utrinque, subtus distinctis, reticulis laxis; floribus masculinis axillaribus, fasciculatis, sessilibus, 4-meris, rubris, circiter 4 mm longis; staminibus 4; ovarii rudimento nullo.

A shrub or small tree, 3 to 10 m high. Branches slender, terete, dark-reddish-brown, more or less wrinkled when dry, the branchlets frequently paler. Leaves membranaceous, oblong-elliptic or oblong, 9 to 13 cm long, 2.5 to 5 cm wide, slightly shining, the apex gradually and rather long slenderly acuminate, the base acute; nerves 10 to 12 on each side of the midrib, distinct, obscurely anastomosing near the margin, the reticulations very lax; petioles slender, 1 cm long or less. Staminate flowers sessile in many-flowered fascicles on warty protuberances in the axils of leaves or more frequently in the axils of fallen leaves, red, cylindrical. Sepals 4, subequal, orbicular-ovate, obtuse, about 2 mm long. Petals 4, 4.5 mm long, about 1.5 mm wide, oblong, obtuse or acute. Anthers 4, basifixed, about 1 mm long, oblong-obovoid, apparently 2-celled, sessile at the apex of the 1 mm long androgynophore; rudimentary ovary none. Fruit depressed-globose, nearly 2 cm thick and 1.5 cm long, when dry with about 7 rather prominent ridges, and with the same number of cells, each with a single seed.

The type of this species was collected by *R. C. McGregor, no. 192*, Baco River, Mindoro, April, 1905, it is represented also by the following specimens from the same locality: *Merrill 4054, For. Bur. 6204, 6208 Merritt*, as well as by additional material from other parts of Mindoro, Mount Halcon, *For. Bur. 4322 Merritt;* Pola, *Merrill 2459;* Abra de Ilog, *For. Bur. 8776 Merritt;* Bongabong River, *Whitford 1375;* Camantigue, *For. Bur. 3657 Merritt;* Paluan, *For. Bur. 9974 Merritt.* From the material available, I can see no valid reason for distinguishing the following: Luzon, Province of Rizal, *Bur. Sci. 2636 Ramos:* Province of Sorsogon, *For. Bur. 10534 Curran.* Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 745*, and one specimen without number.

Garcinia rubra is very similar to *G. binucao* (Blanco) Choisy in gross characters, but the leaves are of different shape, more acuminate, not so much narrowed towards the base, while the male flowers are quite different. The fruit of the two species is similar, but smaller in the present one than in *G. binucao.* It is well characterized by its narrow, red, fascicled four-anthered flowers.

15. Garcinia binucao (Blanco) Choisy Guttif. Ind. 31; Pl. & Tr. Mém. Guttif. (1862) 205; Pierre Fl. Forest. Cochinch. Enum. XXVIII; Vesque in DC. Monog. Phan. 8 (1893) 154; Merr. in Govt. Lab. Publ. 35 (1906) 75; Philip. Journ. Sci. 1 (1906) Suppl. 97.

Stalagmites dulcis Vid. Cat. Pl. Prov. Manila (1880) 18, non Roxb.

Garcinia duodecandra Pierre Fl. Forest. Cochinch. Enum. XXVIII, *t. 84, f. E;* Vesque l. c. 113.

Cambogia binucao Blanco Fl. Filip. (1837) 434; ed. 2 (1845) 302; ed. 3,2:197.

Garcinia cambogia F.-Vill. Nov. App. (1880) 16, non Desr.

Luzon, Province of Benguet, Baguio, *Elmer 8944; Bur. Sci. 2498 Mearns;* Sablan, *Elmer 6103:* Province of Zambales, Botolan, *Merrill 2962;* Cabangan, *Merrill 3012:* Province of Bataan, Lamao River, *Whitford 369; For. Bur. 612, 713, 783 Borden:* Province of Tayabas, Guinayangan, *Merrill 2014:* Province of Camarines, Pasacao, *Ahern 78.* Mindoro, *Cuming 1509* (cotype of *G. duodecandra* Pierre). Burias, *For. Bur. 1734 Clark.* Guimaras, *For. Bur. 218 Gammill.* Negros, Himagaan River, *For. Bur. 4257 Everett.*

Like many other species described by Blanco, his *Cambogia binucao* has long been doubtful. I am confident, however, that the above specimens represent his species, as his description applies closely, with the exception of the description of the stamens, and it is the only species known to me to which the name *Bilucao* is applied, and is, moreover, common and widely distributed, especially in the regions from which Blanco secured most of his material. The fruits are edible, and are prominently ridged when dry, as described by Blanco, the latter character confined to very few species so far as the Philippines are concerned. Cuming's specimen, cited above, the type number of *Garcinia duodecandra* Pierre, is the only one I have seen with flowers, the other specimens having fruits, or a few with leaves only. From the material at present at hand, I can see no valid reason for holding *G. duodecandra* Pierre distinct from Blanco's species. T., *Bilucao;* Z., *Baucoc;* V., *Batuan.*

16. **Garcinia mindanaensis** sp. nov. § *Hebradendron.*

Arbor parva vel mediocris, ramulis ramulisque teretibus; foliis ellipticis vel oblongo-ellipticis, papyraceis, utrinque acuminatis vel basi acutis, 13 ad 18 cm longis, nervis utrinque circiter 12, distantibus, laxis; floribus masculinis axillaribus fasciculatis, breviter pedicellatis vel subsessilibus, 4-meris; petalis oblongo-obovatis, 7 mm longis; antheris circiter 20, in capitulo congestis, peltatis.

A small or medium-sized tree. Branches and branchlets terete, olivaceous. Leaves elliptical to oblong-elliptical, papyraceous, 13 to 18 cm long, 4 to 8 cm wide, somewhat shining, the apex rather strongly acuminate, rarely subacute, the base slightly acuminate or acute; nerves about 10 on each side of the midrib, rather distant, ascending, anastomosing, the reticulations lax; petioles 1 to 1.5 cm long. Staminate flowers in axillary fascicles, red, the buds globose, the pedicels very short. Outer two sepals reniform, 2.5 mm long and 5 mm wide, the inner two orbicular, 4 to 5 mm in diameter. Petals 4, in anthesis oblong-obovate, about 7 mm long. Stamens about 20, united into a 4-angled or rounded mass about 2.5 mm in diameter; anthers rounded, peltate, sessile, their dehiscence circumscissile; rudimentary ovary none. Fruit (immature) ovoid, small.

Mindanao, Lake Lanao Camp Keithley, *Mrs. Clemens s. n.*, March, 1907, and *no. 467*, April, 1906, as well as three other unnumbered sheets.

17. **Garcinia lateriflora** Blume Bijdr. (1825) 214; Walp. Repert. 1 (1842) 394; Choisy Guttif. Ind. 37; Pl. & Tr. Mém. Guttif. (1862) 357; Pierre Fl. Forest. Cochinch. Enum. XXXII, *pl. 85, f. C*[1], *C*[2]; Vesque Epharm 2: *t. 127, 128;* DC. Monog. Phan. 8 (1893) 474.

Camiguin (Babuyanes), *Bur. Sci. 4043 Fénix.* Luzon, Province of Tayabas (Principe), Baler, *Merrill 1037:* Province of Bataan, Lamao River, *For. Bur. 615,*

712 Borden; Bur. Sci. 1574, 1575 Foxworthy, October, 1906: Province of Rizal, Tanay, *Bur. Sci. 3280 Ramos:* Province of Tayabas, Lucban, *Elmer 8043.*

From the material at present available I can see no sufficient reason for separating the above specimens from Blume's species, hitherto known only from Java. They agree very closely with authentic material in our herbarium, received from the Botanical Garden at Buitenzorg, and also closely with the various descriptions of the species. None of the Philippine material has pistillate flowers, but the male flowers and fruits answer the description closely, while the arrangement of the staminodes in the female flowers is the same as in Blume's species, as shown in specimens with immature fruits. T., *Tatlang anac;* in Baler, *Paglá.*

PHILIPPINE ERICACEÆ.

By Elmer D. Merrill.

(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

This family is represented in the Philippines by four known genera, *Rhododendron, Vaccinium, Gaultheria* and *Diplycosia*, all of wide geographic distribution, except the last which is confined to the Indo-Malayan region. About forty species are already known from the Archipelago, mostly confined to *Rhododendron,* 16 species, and *Vaccinium,* 19 species, while the two remaining genera have two species each.

Without exception our species of this family are plants of medium and higher altitudes, generally occurring on exposed ridges of the higher mountains and above an altitude of 1,000 m, although a few species have been found in Mindoro and Mindanao in very humid localities, at lower altitudes. On many of the higher mountains the predominating species in the elfinwood on the exposed ridges belong to *Vaccinium* and *Rhododendron,* and some species of these genera are found in the more sheltered ravines. The two species of *Gaultheria* are always terrestrial as well as most of *Vaccinium* and many of *Rhododendron.* The species of *Diplycosia* may be either terrestrial, subscandent, or suberect terrestrial shrubs, or under certain circumstances pseudo-parasitic. *Vaccinium* ranges from small plants a few inches in height (*V. microphyllum*) to trees often 20 or 25 feet in height (*V. cumingianum*), being mostly terrestrial, although some species appear to be indifferently terrestrial or epiphytic, while at least one, *V. vidalii,* has the strangling habit of most species of *Ficus* of the section *Urostigma. Rhododendron* does not show so great a range in size as does *Vaccinium,* the smallest one that I have seen being about two feet in height, but epiphytic species are more abundant than in the latter genus.

Of the thirty-nine species below enumerated in the four genera, thirty-six are confined to the Philippines, so far as can be determined at present; showing a remarkably high percentage of endemism. An examination of the table given below, giving the distribution of the species of *Rhododendron* and *Vaccinium* of China, Formosa, and Malaya, including New

Guinea, will prove that the endemism is nearly as great in all these regions as it is in the Philippines.

	Rhododendron.		*Vaccinium.*	
	Total.	Endemic.	Total.	Endemic.
Borneo	20	16	8	5
Java	8	1	11	4
Malay Peninsula	8	4	10	4
Sumatra	11	3	4	0
Celebes	3	1	4	0
New Guinea	19	19	9	9
China	135	125	16	13
Formosa	6	3	3	2
Philippines	16	16	19	18

Of the Philippine species, *Gaultheria cumingiana* has been found in Formosa, and *G. borneensis* in Luzon, Borneo and apparently also in Formosa. *Vaccinium microphyllum* Bl. is found in Celebes, Ternate, and probably also in Borneo and the Malay Peninsula, although its exact distribution is a matter of some doubt. The remaining species are mostly local in distribution, but some, notably *Vaccinium villarianum*, *Rhododendron quadrasianum*, and *R. kochii* are found on most, if not all high mountains from northern Luzon to southern Mindanao, thus supplying some evidence as to the homogeneity of the Archipelago.

The presence of these numerous species of *Ericaceæ* on the mountains of the Philippines, indicates the subtemperate nature of the vegetation of the higher peaks, a character of the higher mountains of the entire Malayan region.

Several genera of the family are found in Formosa, southern China, the Malay Peninsula and in Borneo that have not as yet been found in the Philippines, and some of these, especially *Agapetes*, may be expected to be found later in the Archipelago.

KEY TO THE GENERA.

Ovary inferior; fruit a berry ..... 1. *Vaccinium*
Ovary superior; fruit a capsule.
  Capsule 5-valved, loculicidal; calyx surrounding the capsule and succulent in fruit; flowers small; plants usually aromatic.
    Anthers with two horns at the apex ..... 2. *Gaultheria*
    Anthers not horned at the apex ..... 3. *Diplycosia*
  Capsule septicidal; calyx not enlarged and succulent in fruit; anthers dehiscing by pores; flowers medium or large ..... 4. *Rhododendron*

1. VACCINIUM Linn.

Flowers axillary, solitary or fascicled.
  Leaves less than 2 cm long.
    Leaves entire ..... 1. *V. microphyllum*
    Leaves crenate ..... 2. *V. whitfordii*
  Leaves 5 to 10 cm long.
    Flowers 5 mm long or less ..... 3. *V. lanaense*
    Flowers about 1.5 cm long ..... 4. *V. apoanum*
Flowers in axillary racemes.
  Leaves 5 cm long or less.
    Leaves obtuse, acute, or slightly acuminate, never caudate-acuminate.
      Leaves 4 to 5 cm long.
        Leaf-margins somewhat glandular; anthers not awned ..... 5. *V. bauksii*
        Leaf-margins not glandular; anthers with two prominent dorsal awns. 6. *V. palawanense*
      Leaves 3 cm long or less.
        Leaves obtuse at the apex ..... 7. *V. pyriforme*
        Leaves acute or somewhat acuminate at the apex.
          Leaves at least one-half as wide as long, oval ..... 8. *V. villarii*
          Leaves more than twice as long as broad, oblong to oblong-lanceolate.
            Racemes usually much longer than the leaves; pedicels 1 to 1.5 cm long; leaf-margins more or less glandular ..... 9. *V. vidalii*
            Racemes usually shorter than the leaves; pedicels less than 1 cm long; leaf-margins not glandular ..... 10. *V. cumingianum*
    Leaves long-caudate-acuminate.
      Young branches and racemes more or less pubescent and with numerous pedicellate capitate glands ..... 11. *V. tenuipes*
      Young branches and racemes glabrous ..... 12. *V. caudatum*
  Leaves exceeding 5 cm in length.
    Leaves distinctly petioled, petiole usually about 1 cm long, always 5 mm long or more.
      Flowers 1.5 to 2 cm long.
        The whole plant glabrous ..... 13. *V. barandanum*
        Leaves and inflorescence pubescent ..... 14. *V. indutum*
      Flowers 1 cm long or less.
        The whole plant glabrous.
          Bracts, if any, caducous ..... 15. *V. benguetense*
          Bracts prominent, persistent ..... 16. *V. philippinense*
        Inflorescence capitate-glandular ..... 17. *V. luzoniense*
    Leaves subsessile or shortly petioled; petiole never exceeding 5 mm in length; leaf-apex acute or slightly acuminate.
      Inflorescence glabrous; leaves sessile or subsessile ..... 18. *V. jagori*
      Inflorescence and fruits somewhat pubescent; leaves distinctly petioled. 19. *V. halconense*

1. **V. microphyllum** Blume Bijdr. (1826) 851; Miq. Mus. Bot. Lugd.-Bat. 1 (1863) 38; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 221.

V. mindorense Rendle in Journ. Bot. 34 (1896) 355; Merr. in Philip. Journ. Sci. 2 (1907) Bot. 293.

MINDORO, Mount Halcon (Dulangan), *Whitehead* in Herb. Mus. Brit.; *Merrill 5676; For. Bur. 4414 Merritt.* PANAY, Mount Midiaas, *Yoder.* MINDANAO, District of Davao, Mount Apo, *Copeland 1037, 1417* and *s. n.*

This is a critical species, the exact range of which outside of Celebes and the Philippines is somewhat doubtful, but extending to Borneo, Malacca and Perak according to King and Gamble. I had previously identified the small congested form from the summit of Mount Apo with Blume's species, but an examination of his type in Herb. Leiden shows that the lax form, typified by *Vaccinium mindorense* Rendle, is closer to it. From the notes I made on the types of *V. mindorense* and *V. microphyllum*, and from a reëxamination of the Philippine material I can not find any distinguishing characters, and accordingly have here reduced Rendle's species. On Mount Halcon, according to my own observations, and on the Cuernos Mountains in Negros, according to Elmer, the species occurs both as an epiphyte and terrestrial, and I have both terrestrial and epiphytic forms from Mount Apo. At first sight the Apo epiphytic form appears to be very different from the terrestrial one, but careful examination shows no distinguishing characters except vegetative ones, the terrestrial form occurring at higher altitudes in exposed situations and naturally having smaller and more densely crowded leaves than has the epiphytic form, while the whole plant is much congested.

Diplycosia microphylla Becc., was described by Beccari without any reference to *Vaccinium microphyllum* Blume, but was considered by Hooker f. to represent Blume's species, in which he was followed by King and Gamble. It is possible that Hooker f. was correct and that *Diplycosia microphylla* Becc. is really the same as Blume's species. Unfortunately I have no specimens for comparison and this question will have to be determined at a later date.

2. **V. whitfordii** Merr. in Philip. Journ. Sci. 2 (1907) Bot. 295.

Luzon, District of Lepanto, near Balbalasan, *For. Bur. 5741 Klemme*, November, 1906, alt. 1,500 m. Mindoro, Mount Halcon, *Merrill 5798*, November, 1906, alt. 2,400 m. Negros, Mount Silay, *Whitford 1534*, May, 1906, alt. 1,000 to 1,200 m.

An erect terrestrial and epiphytic shrub 0.7 to 3 m high, in vegetative characters closely resembling the Bornean *Vaccinium coriaceum* Hook., but differing from that species in its axillary solitary flowers, *V. coriaceum* having 8- to 10-flowered racemes.

3. **V. lanaense** Merr. in Philip. Journ. Sci. 3 (1908) Bot. 161.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 131*, March, June, 1906, and six sheets without number, September, October, 1906–07.

Epiphytic or pseudo-epiphytic on *Ficus*, altitude about 800 m.

4. **V. apoanum** Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 39.

Mindanao, District of Davao, Mount Apo, *Copeland 1105*, April, 1904; *Williams 2550*, March, 1905, alt. 1,900 to 2,300 m; Province of Misamis, Mount Malindang, *For. Bur. 4708 Meadus & Hutchinson*, May, 1906, alt. 1,800 m. Panay, Mount Midiaas, *Yoder*, April, 1905. Negros, Mount Silay, *Whitford 1497*, May, 1906, alt. 1,000 to 1,200 m.

5. **V. banksii** Merr. in Govt. Lab. Publ. (Philip.) 35 (1906) 45; Philip. Journ. Sci. 2 (1907) Bot. 293.

Negros, Canlaon Volcano, *Banks*, March, 1902, altitude 1,300 to 1,350 m. Mindoro, Mount Halcon, *Merrill 5506*, November, 1906, altitude 2,400 m.

The Mindoro specimen differs from the type in having a glabrous inflorescence, somewhat broader flowers and longer filaments which are prominently pilose. Additional material may prove it to be distinct.

6. **Vaccinium palawanense** sp. nov.

Arbor parva usque ad 6 m alta, inflorescentia excepta glabra; foliis late oblanceolatis vel elongato-elliptico-oblanceolatis, coriaceis, nitidis, circiter 5 cm longis, basi cuneatis, apice breviter obtuse acuminatis, marginibus revolutis, integris; racemis axillaribus, folia aequantibus, sparse pubescentibus; floribus circiter 8 mm longis; corolla tubulari, medio plus minus inflata, ore vix contracta; staminibus 10; antheris dorso 2-aristatis, appendicibus tubulosis, circiter 0.5 mm longis, poris orbicularibus dehiscentibus.

A small tree or shrub reaching a height of about 6 m, the trunk 12 cm in diameter, glabrous except the inflorescence. Branches terete, glabrous, grayish, the branchlets somewhat angled. Leaves broadly oblanceolate or oblong-elliptical-oblanceolate, about 5 cm long, 1 to 1.8 cm wide, coriaceous, brownish when dry, glabrous, the upper surface shining, the lower dull and somewhat glandular-punctate, the apex shortly and obtusely acuminate, the base gradually narrowed, cuneate, the margins entire, rather strongly recurved; lateral nerves 2 or 3 on each side of the midrib, not distinct, ascending, the reticulations nearly obsolete; petioles stout, about 2 mm long. Racemes axillary, solitary, about as long as the leaves, somewhat pubescent, each with from 6 to 14 flowers. Flowers white to light-pink, fragrant, their pedicels 5 to 7 mm long, articulated with the calyx. Calyx tube subglobose, 2 mm long, the lobes 5, ovate, acute, about 1.4 mm long, their margins slightly ciliate. Corolla tubular, about 8 mm long, 3 mm in diameter, somewhat swollen at about the middle, the mouth not contracted; lobes 5, erect, broadly triangular-ovate, somewhat auricled at the base, less than 1 mm long. Stamens 10, inserted on the base of the corolla; filaments nearly 3 mm long, lanate; anthers 1.5 mm long, the dorsal awns two, erect, slender, curved, about 0.8 mm long, the apical tubes cylindrical, about 0.5 mm long, opening by terminal pores. Disk glabrous, tumid; style 7 to 8 mm long, slightly pubescent; ovary 5-celled.

Palawan, Mount Victoria, *Bur. Sci. 696 Foxworthy*, March 23, 1906, on rocky slopes along streams at an altitude of about 1,000 m. A form of the same species is apparently represented by *Bur. Sci. 649 Foxworthy*, same locality, but from an altitude of 1,750 m, a shrub 1.5 to 2 m high on exposed ridges, which differs from the type in having somewhat more pubescent racemes and shorter dorsal awns on the anthers.

A species with much the appearance of *Vaccinium banksii* Merr., but differing in many characters, notably in the presence of dorsal awns on the anthers, these being absent in *V. banksii*.

7. **V. pyriforme** Merr. in Philip. Journ. Sci. 2 (1907) Bot. 295.

Mindoro, Mount Halcon, *For. Bur. 4424 Merritt*, June, 1906, an epiphytic scandent or subscandent shrub, altitude 1,600 m.

A species resembling *Vaccinium microphyllum* in habit and vegetative characters but at once distinguished by its racemose inflorescence.

8. **V. villarii** Vidal Rev. Pl. Vasc. Filip. (1886) 166; Ceron Cat. Pl. Herb. Manila (1892) 105; Merr. in Philip. Journ. Sci. 2 (1907) Bot. 294.

V. microphyllum F.-Vill. Nov. App. (1883) 121, non Reinw.

V. varingiaefolium Vidal Sinopsis Atlas (1883) *t. 60, f. D*, non Miq.

Luzon, Province of Benguet, Baguio, *For. Bur. 951 Barnes*, May, 1904; *Merrill 1166*, January, 1903; *Williams 1156, 1458*, June, September, 1904; *Elmer 5955*, March, 1904; *Topping 56*, January, 1903; *Bur. Sci. 4274, 2830 Mearns*, April and July, 1907, common in open grass-lands 1,500 to 2,000 m alt.: Provinces of Tayabas and Laguna, Mount Banajao, *Bur. Sci. 2390 Foxworthy*, March, 1907; *For. Bur. 7891 Curran & Merritt*, November, 1907; *Bur. Sci. 6063 Robinson*, March, 1908, exposed ridges at about 2,200 m alt.: Province of Albay, Mayon Volcano, *Bur. Sci. 2949 Mearns*, June, 1907; *Bur. Sci. 6493 Robinson*, September, 1908, alt. 1,000 m. Mindoro, Mount Halcon, *Merrill 5502*, exposed ridges at 2,400 m alt. Mindanao, District of Davao, Mount Apo, *Copeland 1052, 1418*, April and October, 1904; *Williams 2576*, March, 1905, 2,000 to 3,000 m.

Variable in size, usually less than 1 m high, but sometimes higher, found at high altitudes from northern Luzon to southern Mindanao, the fruit edible, well flavored. By typographical errors Vidal describes the leaves as 10 to 25 cm long, and the calyx tube as 3 cm long, which should be read as mm in each case.

9. **Vaccinium vidalii** Merrill & Rolfe sp. nov.

Arbuscula subglabra 2.5 ad 4 m alta; foliis oblongo-ovatis, elliptico-ovatis, vel oblongo-lanceolatis, coriaceis, nitidis, supra glabris, subtus glabris vel in costa sparse pilosis, 2.5 ad 3 cm longis, basi acutis, apice obtuse acuminatis; racemis axillaribus, folia aequantibus vel superantibus, paucifloris; floribus longe pedicellatis; corolla cylindraceo-urceolata, circiter 4 mm longa; staminibus 10; antheris productis, poris apicaliter dehiscentibus, dorso aristatis.

A nearly glabrous shrub 2.5 to 4 m high. Branches and branchlets glabrous, terete, gray or reddish-brown. Leaves alternate, coriaceous, oblong-ovate, elliptical-ovate or oblong-lanceolate, 2.5 to 3 cm long, 0.8 to 1.5 cm wide, the upper surface glabrous, very shiny, the lower surface dull or shining, glabrous, or the midrib slightly pilose, the base acute, the apex shortly and obtusely acuminate, the margins entire, usually with rather prominent marginal glands simulating teeth; nerves nearly obsolete, the reticulations entirely so; petioles 2 mm long or less, sometimes slightly pubescent. Racemes axillary, solitary, 5 cm long or less, glabrous, each with from two to six long-pedicelled flowers, the pedicels 1 to 1.5 cm long. Calyx-tube broadly ovoid, the teeth 5, small. Corolla cylindrical-urceolate, about 4 mm long, 3 to 3.5 mm in diameter, slightly contracted above, the lobes 5, ovate, acute, reflexed, about 1 mm long. Stamens 10; filaments lanate, attenuate above; anthers 2 mm long, each with two, slender, 0.6 mm long awns on the back, the apical tubes nearly 1 mm long, opening by slightly oblique, orbicular pores. Disk prominent, densely pubescent. Style 3 mm long, glabrous. Fruit globose, 4 mm in diameter, glabrous except the persistent pubescent annulus.

Luzon, Province of Zambales, Mount Tapulao, *For. Bur. 8256 Curran & Merritt*, December, 1907; *Bur. Sci. 4765, 5132 Ramos*, same date.

A species growing on exposed ridge-forests at an altitude of about 1,400 m, epiphytic or pseudo-epiphytic, having the strangling habit of most species of *Ficus* of the section *Urostigma*. It has also been collected by Vidal in the Caraballo Mountains, Province of Nueva Ecija, Luzon, no. 3144 in Herb. Kew.

In many respects the present species resembles *Vaccinium cumingianum* Vidal, but differs especially in its relatively broader leaves, different flowers and lax racemes.

10. **V. cumingianum** Vidal Rev. Pl. Vasc. Filip. (1886) 167; Ceron Cat. Pl. Herb. Manila (1902) 105; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 112.

V. sp. (*aff. V. coriaceum*) Vidal Sinopsis Atlas (1883) *t. 60, f. C.*

Luzon, Province of Benguet, *Loher 5077;* Pauai, *Bur. Sci. 4404 Mearns*, July, 1907; Mount Tonglon (Santo Tomas), *Merrill 4817; Elmer 5804:* Province of Zambales, Mount Pinatubo, *Bur. Sci. 2535 Foxworthy*, April, 1907: Mount Tapulao, *Bur. Sci. 4783, 5093 Ramos*, December, 1907: Province of Pampanga, Mount Abu, *Bur. Sci. 1911 Foxworthy*, December, 1906: Provinces of Tayabas and Laguna, Mount Banajao, *Cuming 805* (type number); *Elmer 9212; For. Bur. 7893, 7882, 7889 Curran & Merritt; Whitford 963; For. Bur. 878 Klemme:* Province of Bataan, Mount Mariveles, *For. Bur. 1330, 1558 Borden; Whitford 245, 459; For. Bur. 2649 Meyer; Merrill 281*, Dec. Philip. Forest Fl.: Province of Albay, Mount Mayon, *Bur. Sci. 6501 Robinson*, September, 1908, alt. 1,100 m.

A tree 5 to 8 m high growing on exposed ridges at from 1,000 to 2,250 m alt.

11. **Vaccinium tenuipes** sp. nov.

Arbuscula epiphytica vel terrestris usque ad 3 m alta; ramulis racemisque plus minus pubescentibus et capitellato-stipitato-glandulosis; foliis coriaceis, ovatis, oblongis, vel oblongo-lanceolatis, 3 ad 5 cm longis, basi rotundatis, apice longe caudato-acuminatis; racemis axillaribus, folia aequantibus vel superantibus, tenuibus; floribus longe pedicellatis, corolla 1 cm longa, anguste conico-urceolata; staminibus 10; antheris vix productis, poris orbicularibus dehiscentibus.

A terrestrial or epiphytic shrub about 3 m high. Branches terete, glabrous, gray or blackish when dry, the branchlets slender, somewhat pubescent, and with numerous, long, spreading, capitellate-glandular hairs, which are also found on the inflorescence. Leaves alternate, ovate to oblong or even oblong-lanceolate, 3 to 5 cm long, 1 to 2.5 cm wide, coriaceous, shining, glabrous, brown when dry, the base rounded, the apex long and slenderly caudate-acuminate, the acumen usually one-third the length of the leaf, the margins strongly recurved; nerves obsolete or nearly so; petioles about 3 mm long, glabrous. Racemes axillary, solitary, about as long as the leaves, very slender, few-flowered, somewhat pubescent and with numerous spreading capitate-glandular hairs, the pedicels slender, 1 to 2 cm long, each with one or two lanceolate, acuminate, about 1.5 mm long bracts in the lower part. Calyx-tube short, the lobes 5, triangular-ovate, acute or slightly acuminate, about 1.5 mm long. Corolla pink or red, glabrous, narrowly conical-urceolate, 1 cm long,

about 4.5 mm in diameter below, the upper half narrowed and about 2 mm in diameter above, the lobes 5, broadly ovate, obtuse, 1 mm long, erect. Stamens 10, inserted on the base of the corolla; filaments 3 mm long, lanate below, attenuate above; anthers oblong, 1.5 mm long, the apex not produced, truncate, opening by two orbicular pores, the back not spurred. Disk prominent, rugose, glabrous or nearly so; style stout, 1 cm long, somewhat pilose.

Luzon, Province of Cagayan, Cana Voleano, *R. N. Clark*, August, 1908, altitude about 900 m. Mindoro, Ibalo River, *For. Bur. 11485 Merritt*, May, 1908, altitude about 600 m; Mount Halcon, *Merrill 6133*, November, 1906, sterile, altitude about 1,500 m. Negros, Cuernos Mountains, *Elmer 9819, 10108*, altitude about 1,200 m.

A species of the section *Epigynium*, well characterized by its very strongly caudate-acuminate, almost nerveless leaves, very slender few-flowered axillary racemes and long-pedicelled flowers, and especially by the numerous, long, capitate-glandular hairs on the young branches and inflorescence.

12. **V. caudatum** Warb. in Perk. Frag. Fl. Philip. (1905) 173.

Philippines, without locality, *Cuming 905*, type number, (Province of Albay, ex Cuming's list in Herb. Kew).

A species manifestly closely allied to *Vaccinium benguetense* Vidal, and differing from that species only in some minor characters, slightly smaller leaves and somewhat shorter petioles, obscure nerves and glabrous filaments. The only specimens I have seen are those collected by Cuming, one of which is before me.

13. **V. barandanum** Vidal Rev. Pl. Vasc. Filip. (1886) 169; Ceron Cat. Pl. Herb. Manila (1892) 105.

V. hutchinsonii Merr. in Philip. Journ. Sci. 2 (1907) Bot. 294.

Luzon, District of Lepanto, Mount Data, *Merrill 4580; For. Bur. 5672 Klemme;* Province of Benguet, *Loher 3779;* Mount Santo Tomas, *Elmer 5806;* Baguio, *For. Bur. 971 Barnes.* Mindoro, Mount Halcon, *Merrill 5524.*

This species grows at altitudes of from 1,500 to 2,250 m and is usually a terrestrial shrub or small tree 4 to 8 m high, although on Mount Halcon it grows as an epiphyte. It is distinguished among the Philippine species by its relatively large flowers which are 1.5 cm to 2 cm long. *Vaccinium hutchinsonii*, I am convinced, is only a broad leaved form of Vidal's species, and is accordingly here reduced. The type of *V. barandanum* Vid. was from the District of Lepanto, Luzon.

14. **V. indutum** Vidal Rev. Pl. Vasc. Filip. (1886) 169.

Luzon, District of Bontoc, *Vidal 1831*, in Herb. Kew.

This species has been collected but once, and is characterized by its tomentose leaves and inflorescence. According to Vidal, it is closely allied to *V. barandanum*, and as Vidal does not give the length of the flowers, it has been assumed, in making the key to the species, that they are about the same as in *V. barandanum*.

15. **V. benguetense** Vidal Rev. Pl. Vasc. Filip. (1886) 168; Ceron Cat. Pl. Herb. Manila (1892) 105.

Luzon, Province of Benguet, *Vidal 1515* (type), *1534*, in Herb. Kew; *Loher 3781;* Baguio, *Elmer 8663;* Bugias, *Merrill 4653;* Province of Zambales, Mount Pinatubo, *Bur. Sci. 2564, 2566, 2579 Foxworthy;* Mount Tapulao, *Bur. Sci. 4983*

Ramos. MINDORO, Magasanantubig River. *For. Bur. 12033 Merritt; For. Bur. 12194 Rosenbluth.*

The Benguet specimens are from altitudes of 1,500 m or above, while those from Zambales are from 700 to 800 m. The Mindoro specimens were collected at an altitude of about 200 m, and differ in having smaller, thinner and less prominently veined leaves than the type, in vegetative characters being very similar to *Vaccinium caudatum* Warb., but they have the lanate filaments of *V. benguetense*. A tree 7 to 12 m high.

16. **Vaccinium philippinense** Warb. in Perk. Frag. Fl. Philip. (1905) 174.

LUZON, without locality, *Cuming 832.* type number, (Province of Tayabas, Luzon, ex Kew List).

The only specimens of this species that I have seen are those collected by Cuming, one of which is in our herbarium. It is very closely allied to *Vaccinium benguetense* Vidal, apparently differing chiefly in its persistent bracts and slightly more prominent calyx-teeth.

17. **V. luzoniense** Vidal Rev. Pl. Vasc. Filip. (1886) 168; Ceron Cat. Pl. Herb. Manila (1892) 105.

LUZON, Province of Benguet, Loo, *Loher 3775;* Baguio, *For. Bur. 5143 Curran; Williams 1296,* altitude 1,500 to 2,250 m.

The type of this species, *Vidal 1535,* was from the District of Lepanto, Luzon, and it seems to be closely matched by the specimens cited above. The species can be readily recognized by the peculiar capitate-glandular hairs of the inflorescence, this character being found in only one other known Philippine species, the very different *V. tenuipes* above described.

18. **V. jagori** Warb. in Perk. Frag. Fl. Philip. (1905) 174; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 112.

LUZON, without locality, *Jagor 852,* type in Herb. Berol.: Province of Zambales, Mount Tapulao, *Bur. Sci. 5024 Ramos; For. Bur. 9503, 9512 Curran & Merritt,* December, 1907, alt. 1,400 to 2,000 m: Province of Bataan, Mount Mariveles, *Bur. Sci. 1654, 1655 Foxworthy; Elmer 7026; Whitford 145, 1101; Merrill 3955; For. Bur. 2623 Meyer.* alt. 1,050 to 1,350 m.

A small tree, 6 to 10 m high, growing on exposed ridges at altitudes of from 1,050 to 2,000 m, recognizable by its nearly sessile leaves. I have seen the type of the species in the Berlin Herbarium, and the above specimens agree closely with it.

19. **V. halconense** Merr. in Philip. Journ. Sci. 2 (1907) Bot. 293.

LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8101 Curran & Merritt,* December, 1907; *Bur. Sci. 4697 Ramos,* alt. 1,400 to 1,700 m. MINDORO. Mount Halcon, *For. Bur. 4422 Merritt,* June, 1906; *Merrill 5665,* November, 1906, alt. 1,350 to 1,600 m.

A species manifestly allied to *Vaccinium jagori* Warb., but distinguished by its pubescent inflorescence and fruits, and distinctly petioled leaves.

2. GAULTHERIA Linn.

Leaves ovate, acuminate, 3 to 9 cm long ..... 1. *G. cumingiana*
Leaves oblong or narrowly obovate-oblong, acute or obtuse, less than 1.5 cm in length ..... 2. *G. borneensis*

1. **G. cumingiana** Vidal Rev. Pl. Vasc. Filip. (1886) 170; Phan. Cuming. Philip. (1885) 184; Ceron Cat. Pl. Herb. Manila (1892) 105; Merr. in Philip. Journ. Sci. 2 (1907) Bot. 292; Hayata in Bot. Mag. Tokyo 20 (1906) 72; Journ. Coll. Sci. Tokyo 25 [19] (1908) 150.

Luzon, District of Lepanto, near Balbalasan, *For. Bur. 5698 Klemme*, alt. 1,600 m: Province of Benguet, Baguio, *Williams 951;* Pauai, *Bur. Sci. 4277 Mearns;* Mount Tonglon (Santo Tomas), *Elmer 6253; For. Bur. 4958 Curran;* Baguio to Ambuklao, *Merrill 4376;* Bugias, *Merrill 4672:* Province of Laguna, Mount Banajao, *For. Bur. 7896, 8009 Curran & Merritt*, November, 1907: Province of Albay, Mayon Volcano, *Bur. Sci. 2923 Mearns; Bur. Sci. 6500 Robinson.* Mindoro, Mount Halcon, *Merrill 5725.*

Widely distributed in the highlands of north-central Luzon, at altitudes of from 1,500 to 2,250 m, also at high altitudes on other mountains in southern Luzon and in Mindoro. It has been collected several times in Formosa.

2. **G. borneensis** Stapf in Trans. Linn. Soc. Bot. II 4 (1894) 190, *pl. 15, f. C, 4–6;* Rendle in Journ. Bot. 34 (1896) 355.

Luzon, Province of Benguet, Panai to Baguio, *Merrill 4796*, altitude 1,800 m; Pauai, *Bur. Sci. 4283, 4286 Mearns*, July, 1907, altitude about 2,200 m.

This species was originally described and figured from material collected on Mount Kinabalu, British North Borneo, and soon afterwards was collected in northern Luzon by Whitehead and reported from the Philippines by Rendle. I have examined the type of the species in Herb. Kew, and can see no valid reason for distinguishing the Philippine form even as a variety. Judging from the description and figure, the Formosan species *G. itoana*, recently described by Hayata, is quite the same as the Bornean and Luzon form. *G. borneensis*, as noted by Stapf, is allied to *Gaultheria antipoda* of Tasmania and New Zealand. Other species confined to Formosa, Luzon, and Borneo are *Boea swinhoii* Hance, *Euphrasia borneensis* Stapf, and *Mallotus playfairii* Hemsl.

3. DIPLYCOSIA Blume.

Leaves and branches glabrous, the pedicels obscurely pubescent..... 1. *D. merrittii*
Leaves and branches with few or many, long setose hairs..... 2. *D. luzonica*

1. **D. merrittii** Merr. in Philip. Journ. Sci. 2 (1907) Bot. 293.

Mindoro, Mount Halcon, *For. Bur. 4413, 4415, 4437 Merritt*, June, 1906; *Merrill 5670*, November, 1906, altitude 1,400 to 1,700 m. Palawan, Mount Victoria, *Bur. Sci. 666 Foxworthy*, March, 1906, altitude 1,100 m.

2. **D. luzonica** (A. Gray) Merr. in Philip. Journ. Sci. 2 (1907) Bot. 293.

Gaultheria luzonica A. Gray in Proc. Amer. Acad. 5 (1861) 324.

Diplycosia scandens Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 219.

Luzon, District of Lepanto, Balbalasan, *For. Bur. 5693 Klemme*, November, 1906, alt., 1,600 m; Mount Data, *Merrill 4597*, November, 1905, altitude 2,250 m, type of *D. scandens:* Province of Benguet, Mount Santo Tomas, *Elmer 5932; Williams 1341*, altitude about 2,200 m: Province of Laguna, Mount Banajao, *Wilkes Expedition*, in U. S. Nat. Herb. (type); *For. Bur. 7884, 7892 Curran & Merritt*, November, 1907, altitude about 2,200 m. Mindanao, Province of Misamis, Mount Malindang, *For. Bur. 4779 Mearns & Hutchinson*, May, 1906.

An endemic species like the preceding, widely distributed in the Philippines at higher altitudes. The species described by me as *D. scandens*, is certainly only a form of *D. luzonica*, with somewhat thinner leaves and rather more hairy branches and leaves than the type.

4. RHODODENDRON Linn.

Leaves acuminate or acute.
Leaves and branches densely appressed-hirsute-setose ..... 1. *R. subsessile*
Leaves and branches glabrous, or at most only lepidote.
Flowers 3 cm long or less.
Flowers 1.5 to 2 cm long, red; leaves 6 cm long ..... 2. *R. apoanum*
Flowers 3 cm long, yellow; leaves 8 to 10 cm long ..... 3. *R. xanthopetalum*
Flowers 3.5 to 6 cm long.
Leaves very densely brown-lepidote beneath; flowers tubular, crimson, about 5 cm long ..... 4. *R. nortonae*
Leaves glabrous beneath or with scattered lepidote scales only.
Ovary rather densely hirsute ..... 5. *R. kochii*
Ovary glabrous.
Corolla white, 3.5 to 4 cm long; leaves sharply acuminate. 6. *R. schadenbergii*
Corolla red, 5 to 6 cm long; leaves acute or slightly acuminate, dull. 7. *R. spectabile*
Corolla yellow, 4.5 to 5 cm long; leaves acute or slightly acuminate, rarely obtuse, shining ..... 8. *R. clementis*
Leaves obtuse, rounded, or emarginate.
Flowers 3 to 4.5 cm long, white.
Flowers 3 cm long, subcampanulate; leaves usually 2.5 to 4.5 cm long, rarely 5.5 cm in length ..... 9. *R. vidalii*
Flowers 4 to 4.5 cm long, infundibuliform; leaves 6 to 8 cm long. 10. *R. mindanaense*
Flowers 4 cm long, the corolla tubular, slender; leaves 4 to 6 cm long. 11. *R. copelandi*
Flowers 2 to 2.5 cm long, red.
Flowers 2.5 cm long, campanulate.
Leaves oblong-obovate or oblong-oblanceolate, 2.5 to 5.5 cm long. 12. *R. curranii*
Leaves obovate or orbicular-obovate, rarely oval, 2.5 to 5.5 cm long. 13. *R. whiteheadii*
Flowers 2 cm long, tubular; leaves narrowly oblong-obovate. 14. *R. malindangense*
Flowers 1.5 cm long or less.
Flowers mostly 1.5 cm long; leaves 5 to 9 mm wide, sometimes narrower, narrowly obovate-oblong ..... 15. *R. quadrasianum*
Flowers mostly about 1 cm long; leaves linear-oblong, mostly 2 to 4 mm wide ..... 16. *R. rosmarinifolium*

1. **R. subsessile** Rendle in Journ. Bot. 34 (1896) 357; Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 40.

Luzon, District of Lepanto, Mount Data, *Whitehead*, in Herb. Mus. Brit. (type); *Merrill 4606:* Province of Benguet, Suyoc to Pauai, *Merrill 4690;* Pauai, *Bur. Sci. 4275 Mearns;* Mount Tonglon (Santo Tomas), *For. Bur. 5032 Curran; Mearns s. n.; Merrill 4815; Williams 1223, 2001; Elmer 5799; For. Bur. 11090 Whitford; For. Bur. 922 Barnes.*

Widely distributed and very common in the highlands of northern Luzon, from 1,800 to 2,250 m altitude: apparently very closely allied to the Formosan *R. oldhami* Maxim.

2. **R. apoanum** Stein in Gartenflora 34 (1885) 194, *pl. 1196;* Vidal Rev. Pl. Vasc. Filip. (1886) 172; Merr. l. c. 43.

R. sp. affine *R. retuso* Benn., Vidal Sinopsis Atlas (1883) *t. 53. f. E.*

R. jasminiflorum F.-Vill. Nov. App. (1883) 353, non Hook.

Mindanao, District of Davao, Mount Apo, *DeVore & Hoover 293, 375,* May, 1903; *Copeland 1045, 1440,* April and October, 1904; *Williams 2559,* March, 1905, altitude 2,500 to 3,100 m.

A species known only from Mount Apo, manifestly allied to *Rhododendron tubiflorum* DC., of Java, and less closely allied to *R. celebicum* Miq., of Celebes.

3. **R. xanthopetalum** Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 41; Philip. Journ. Sci. 1 (1906) Suppl. 111.

Luzon, Province of Bataan, Mount Mariveles, *Whitford 332,* May, 1904; *For. Bur. 6279 Curran,* February, 1907, altitude 1,200 m. Mindoro, Ibalo River, *For. Bur. 11429 Merritt,* May, 1908, altitude 800 m.

An epiphytic shrub with yellow flowers, apparently rare; allied to *Rhododendron teysmanni* Miq., of Java, Sumatra, and ? Celebes.

4. **R. nortonae** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 220.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 500,* an epiphyte, altitude about 800 m, known only from this locality.

5. **R. kochii** Stein in Gartenflora 34 (1885) 193, *t. 1195;* Vidal Rev. Pl. Vasc. Filip. (1886) 41; Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 41.

R. schadenbergii Merr. l. c., pro parte, non Warb.

R. javanicum Vid. Rev. Pl. Vasc. Filip. (1886) 170; F.-Vill. Nov. App. (1883) 353, non Blume.

R. sp. (aff. *R. javanicum*) Vidal Sinopsis Atlas (1883) *t. 60, f. F.*

Luzon, Province of Bataan, Mount Mariveles, *Merrill 3255; Whitford 450; Elmer 6856; For. Bur. 790, 2117 Borden; Leiberg 6033; For. Bur. 6284 Curran; Bur. Sci. 1629 Foxworthy; Topping 806,* altitude 1,000 to 1,400 m; Province of Tayabas, Mount Banajao, *Whitford 958; For. Bur. 7868 Curran & Merritt,* altitude 1,800 to 2,250 m. Mindanao, Province of Misamis, Mount Malindang, *For. Bur. 4674 Mearns & Hutchinson,* May, 1906, altitude 1,800 m; District of Davao, Mount Apo, *DeVore & Hoover 73bis.*

Many of the above specimens were previously erroneously identified by me as *Rhododendron schadenbergii* Warb., from which they differ notably in the hirsute ovary. The shape of the leaves is variable, and but few of the specimens are as prominently acuminate as shown in the original figure, and they average smaller than the measurements given in the original description. The species is described as having five stamens, but the figure apparently shows ten, the latter number agreeing with our specimens.

6. **R. schadenbergii** Warb. in Perk. Frag. Fl. Philip. (1905) 172; Merr. l. c. 40, pro parte.

Luzon, Province of Abra, *Schadenberg* in Herb. Berol.; Province of Benguet, Mount Santo Tomas, *Williams 990, 1348;* Baguio, *Elmer 6519.*

This species, as here interpreted, is closely allied to *R. kochii* Stein, differing notably in its glabrous ovaries. The type, which I have seen in the Berlin Herbarium, is in very poor condition, having been dried out from alcoholic material, and consequently much shriveled, so that an examination of it was very unsatisfactory; consequently my conception of the species has been based largely on the elaborate original description, with which the above specimens agree fairly well. Most of the specimens previously referred by me to this species are, I believe, referable to *Rhododendron kochii* Stein.

7. **R. spectabile** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 42.

MINDANAO, District of Davao, Mount Apo, *Copeland 1438; DeVore & Hoover 369*, in part, altitude about 2,500 m.

A species apparently allied to *Rhododendron javanicum* Blume, known only from this locality.

8. **R. clementis** Merr. in Philip. Journ. Sci. **3** (1908) Bot. 160.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 732*, September-October, 1906, and three unnumbered sheets from the same locality, a species closely allied to *R. xanthopetalum*, but with larger flowers.

9. **R. vidalii** Rolfe in Journ. Bot. **24** (1886) 348; Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 43; Philip. Journ. Sci. **1** (1906) Suppl. 111.

R. verticillatum Vidal Rev. Pl. Vasc. Filip. (1886) 171; Ceron Cat. Pl. Herb. Manila (1892) 106, non Low.

R. lussoniense Rendle in Journ. Bot. **34** (1896) 356; Merr. l. c., 43.

LUZON, Province of Cagayan, Cana Volcano, *R. N. Clark s. n.*, altitude 930 m: Province of Bataan, Mount Mariveles, *Merrill 3743, 3868; For. Bur. 1591 Borden; Whitford 452*, altitude 1,000 to 1,200 m: Province of Tayabas, Mount Banajao, *Elmer 7475;* Mount Malaraya, *For. Bur. 7839 Curran & Merritt*, altitude 1,000 m.

A shrub, usually of small size and epiphytic, the flowers white. The type of the species was from the District of Bontoc, while the type of *R. lussoniense* Rendle, in Herb. Mus. Brit., is labeled Bagnen, Mount Polis, which is also in the same district. The species is somewhat variable in the form of its leaves.

10. **R. mindanaense** Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 41.

MINDANAO, District of Davao, Mount Apo, *Copeland 1042; DeVore & Hoover 73*, altitude about 3,000 m.

A species known only from Mount Apo.

11. **R. copelandi** Merr. in Govt. Lab. Publ. **29** (Philip.) (1905) 42.

MINDANAO, District of Davao, Mount Apo, *Copeland 1034, 1439; DeVore & Hoover 292, 382; Williams 2681*, altitude 2,500 to 3,100 m.

Also known only from Mount Apo.

12. **R. curranii** Merr. in Philip. Journ. Sci. **3** (1908) Bot. 255.

LUZON, Province of Zambales, Mount Tapulao, *For. Bur. 8061 Curran & Merritt; Bur. Sci. 4988 Ramos*, December, 1907, altitude 2,000 m.

A species allied more closely to *R. whiteheadii* Rendle, than to *R. lussoniense* Rendle, but with longer and relatively narrower, quite differently shaped leaves. Additional material may prove the two species too closely allied to be kept separate.

13. **R. whiteheadii** Rendle in Journ. Bot. **34** (1896) 356; Merr. l. c. 43.

LUZON, District of Bontoc, Mount Polis, *Whitehead*, in Herb. Mus. Brit.

I have seen only the type of this species, which is from Mount Polis, according to the label.

14. **R. malindangense** Merr. in Philip. Journ. Sci. **3** (1908) Bot. 256.

MINDANAO, Province of Misamis, Mount Malindang, *For. Bur. 4705 Mearns & Hutchinson*, May, 1906, altitude about 1,800 m.

In the original description of this species the leaves are erroneously described as oblong-ovate, which should be corrected to oblong-obovate.

15. **R. quadrasianum** Vidal Rev. Pl. Vasc. Filip. (1886) 170; Merr. Govt. Lab. Publ. (Philip.) **29** (1905) 43; Philip. Journ. Sci. **1** (1606) Suppl. 111; l. c. **2** (1907) Bot. 292.

R. retusum F.-Vill. Nov. App. (1883) 353, non R. Br.

Luzon, Province of Zambales, Mount Pinatubo, *Bur. Sci. 2537 Foxworthy*, alt. 1,600 to 1,800 m: Province of Bataan, Mount Mariveles, *Leiberg 6032; Elmer 6765; For. Bur. 2090 Borden; Whitford 278, 1104; Merrill 3215*, altitude 1,200 to 1,400 m: Province of Batangas, Mount Agas, *For. Bur. 7716 Curran & Merrit*, November, 1907, altitude 1,050 m: Province of Tayabas, Mount Banajao, *Cuming 804; For. Bur. 872 Klemme; For. Bur. 7888 Curran & Merritt*, altitude about 2,200 m: Province of Laguna, Mount Maquiling, *For. Bur. 7703 Curran & Merritt*, altitude 1,100 m: Province of Albay, Mount Mayon, *Bur. Sci. 6502 Robinson*, altitude 1,300 m. Mindoro, Mount Halcon, *Merrill 6158; For. Bur. 4408 Merritt*, latitude 1,350 to 1,600 m. Negros, Canlaon Volcano, *Banks*. Mindanao, District of Davao, Mount Apo, *Williams 2543; Copeland 1036; DeVore & Hoover 287*, altitude 2,600 to 3,000 m.

Apparently the most common and widely distributed Philippine *Rhododendron*, found on most or all high mountains from north-central Luzon to south-eastern Mindanao.

Var. **intermedium** var. nov.

R. cuneifolium Rendle in Journ. Bot. **34** (1906) 355; Merr. in Govt. Lab. Publ. (Philip.) **29** (1905) 43, non Stapf.

A form intermediate between *R. quadrasianum* Vid., and *R. rosmarinifolium* Vid., with the leaf-form of the former, but with leaves almost as narrow as the latter, and might with almost equal propriety be considered a veriety of *R. rosmarinifolium*. From the leaf-form it appears to be dwarfed *R. quadrasianum*, and is accordingly considered under that species. It is the form credited to the Philippines by Rendle as *R. cuneifolium* Stapf, a Bornean species, and can be readily distinguished from Stapf's species by its pubescent pedicels.

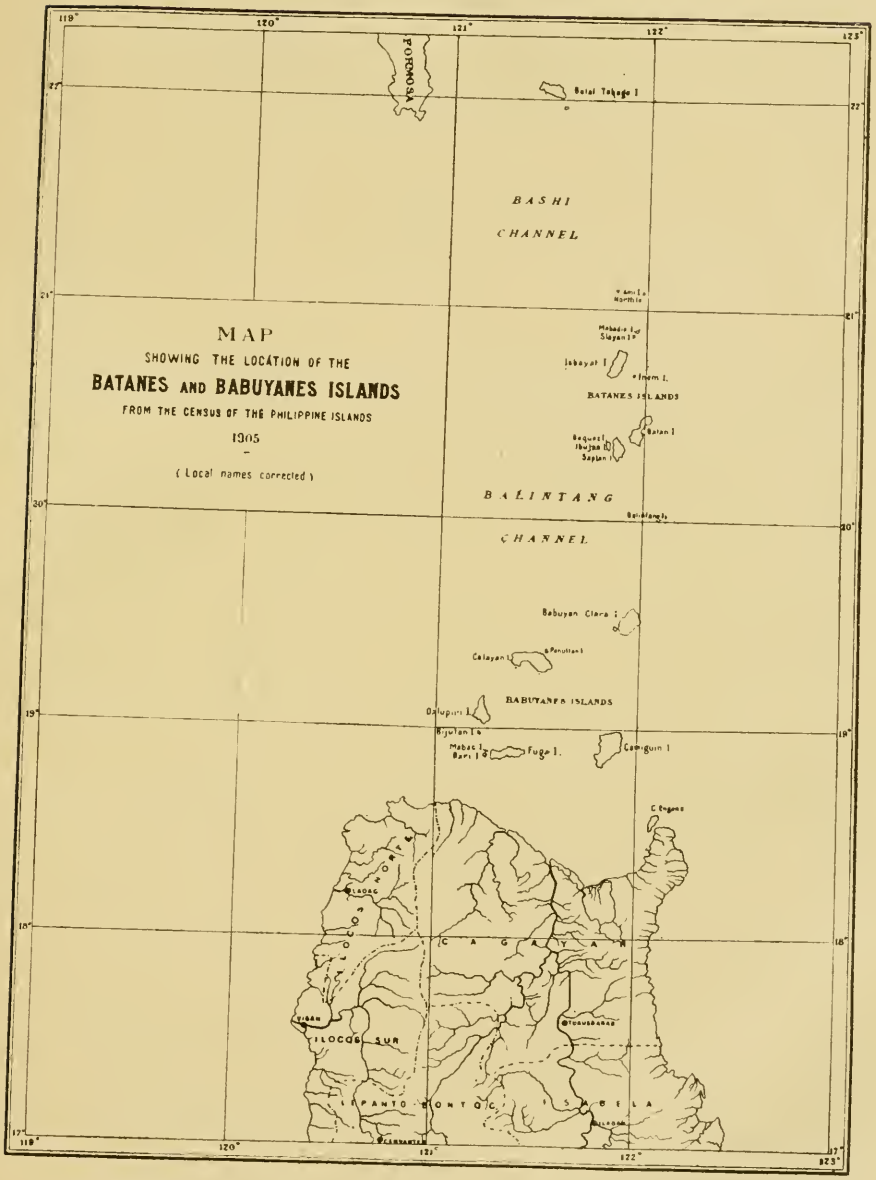
Luzon, Province of Zambales, Mount Tapulao, *For. Bur. 8063, 8086 Curran & Merritt; Bur. Sci. 5082a Ramos*, December, 1907, altitude about 2,100 m. Mindoro, Mount Halcon, *Merrill 5736; Whitehead* in Herb. Mus. Brit.

I have examined Whitehead's specimen, cited above, and consider it to be referable here, rather than to *R. cuneifolium* Stapf, although it is closely related to the Bornean species.

16. **R. rosmarinifolium** Vidal Rev. Pl. Vasc. Filip. (1886) 172; Merr. l. c. 43.

Luzon, Province of Benguet, Baguio, *Elmer 6377;* Mount Tonglon (Santo Tomas), *Elmer 5798; Williams 1335; For. Bur. 5035 Curran;* Suyoc to Pauai, *Merrill 4752*, altitude 1,800 to 2,200 m.

The typical form of this species seems to be confined to the table-land of north-central Luzon and is very distinct, although manifestly allied to *R. quadrasianum* Vidal. On mountains farther south intermediate forms occur, as noted above.


MAP
SHOWING THE LOCATION OF THE
BATANES AND BABUYANES ISLANDS
FROM THE CENSUS OF THE PHILIPPINE ISLANDS
1905
(Local names corrected)
FORMOSA
Botel Tobago I
BASHI
CHANNEL
Mabudis I
Siayan I
Ibbayat I
Inem I.
BATANES ISLANDS
Batan I
Sabtang I
BALINTANG
CHANNEL
Babuyan Claro I.
Calayan I
Panuitan I
BABUYANES ISLANDS
Dalupiri I.
Fuga I.
Camiguin I
C. Engaño
CAGAYAN
ILOCOS SUR
APAYAO
ISABELA
Tuguegarao
Vigan
Aparri

ON A COLLECTION OF PLANTS FROM THE BATANES AND BABUYANES ISLANDS.

By Elmer D. Merrill.

(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

The Batanes, or Bashi, and the Babuyanes Islands form a group of small islands extending from near the north coast of Luzon to within about 160 kilometers of the southern point of Formosa. The Batanes are the most northern, consisting of 10 islands, of which the largest are Ibayat, Batan, and Sabtan, and the entire group is of volcanic formation, with the exception of the small islands of Desquey and Ibujos, and possibly Ibayat, nothing being known regarding the latter, Desquey and Ibujos being formed of coral limestone. Y'Ami Island, the most northern point of the Philippines, is about 270 kilometers north of Cape Engaño the nearest point of Luzon, 107 kilometers south of the Japanese Island of Little Botel Tobago, and 160 kilometers from the most southern point of Formosa. These islands are separated from Formosa by the Bashi Channel with a minimum depth of 1009 fathoms, while to the south the probably shallow channel of Balintang lies between them and the Babuyanes. It is said that on a clear day the Formosan mountains can be seen from the summit of Mount Iraya on Batan Island. The physiography of this group has been considered by Mr. Henry G. Ferguson of this Bureau, from whose paper the above information is taken.[1] Sabtan has an area of about 6 square miles, while Batan and Ibayat have each an area of about 27 square miles, the former two being mountainous, the highest peak being Mount Iraya on Batan Island, its altitude being about 1,140 m. Ibayat is comparatively low, its highest point being about 240 m. The islands are subject to the heavy monsoons, and typhoons are very prevalent, these constant and heavy winds no doubt having much influence on the vegetation. Batan is largely covered with grass-lands, forests for most part occurring only in the sheltered ravines. Ibayat is said to be the most fertile island of the group, but is considered to be unhealthy and is sparsely populated, its vegetation being partly forest and partly grass-lands.

[1] *This Journal* 2 (1908) *Gen. Sci.* 1–24.

The Babuyanes group consists of about nine islands, the largest of which are Babuyan, Calayan, Dalupiri, Fuga, and Camiguin. Babuyan has an approximate area of 38 square miles, its highest altitude being about 960 m. Dalupiri is a low island for its greater part covered with grass-lands, its area being about 20 square miles. Fuga is also low, with an area of about 27 square miles, with few trees, and these mostly near the coast, the interior being covered by grass-lands. Calayan is slightly larger than Fuga, with a moderately high central range of hills, covered with heavy forest with occasional patches of cogon grass. Camiguin is the largest island of the two groups, its area being given as about 60 square miles, and is rather rough and densely forested, its two highest peaks being respectively about 827 and 735 m in altitude. Some of the information regarding Fuga and Calayan was taken from McGregor.[2] Areas of the different islands was taken from the Gazetteer of the Philippine Islands. The nomenclature of some of these islands is somewhat confusing, and care should be taken not to confound Camiguin Island of the Babuyanes group with Camiguin Island off the north coast of Mindanao, the latter being the Camiguin visited by the Challenger Expedition, while Batan Island of the Batanes group should not be confused with Batan Island off the east coast of Albay Province, southern Luzon, nor with Bataan Province of central Luzon.

In the following paper about 415 species are considered, but of the flowering plants collected, a few species of *Zingiberaceæ*, and about 10 species of *Orchidaceæ*, are not included, the material not being determined at this time. Considerable collections of fungi, lichens, mosses and scale-mosses were made, but no attempt has been made to include these.

The collection as a whole has shown the striking affinity of the flora of both groups to that of Luzon and the Philippines in general, and the comparatively slight relationship to that of Formosa. No less than 15 species, enumerated in the present paper, or about 28 per cent of the total, are at present known only from the Philippines, giving a high percentage of endemism, while representatives of the following list of 42 genera, all characteristic of the Philippine and Malay flora in general, are found in the two groups, but not as yet in Formosa, and representatives of but 10 of these have been found in southern China: *Casuarina, Pipturus, Leucosyke, Tinospora, Limacia, Anamirta, Talauma, Phaeanthus, Polyalthia, Myristica, Knema, Intsia, Wallaceodendron, Pterocarpus, Melicope, Lunasia, Micromelum, Chisocheton, Cyclostemon, Cleistanthus, Claoxylon, Homalanthus, Semecarpus, Turpinia, Gonocaryum, Ellatostachys, Pometia, Thespesia, Dillenia, Adenia, Medinilla, Boerlagiodendron, Aegiceras, Maba, Fagraea, Geniostoma, Cyrtandra, Trichosanthes, Argostemma, Sarcocephalus, Villaria,* and *Guettarda.*

[2] Bull. Philip. Museum 4 (1904) 1–17.

A certain southward extension of the Formosan flora was to be expected, but this is exceedingly weak in comparison with the northward extension of the Philippine flora. But two genera are represented in the collection, previously unrecorded from the Philippines, *Erythraea*, represented by *E. spicata* (L.) Pers., an introduced species in Formosa, and *Phoenix*, represented by a new variety of *Phoenix hanceana* Naud., previously known from Formosa and southern China. Eight additional species only, not previously reported from the Philippines, *Ischaemum ciliare* Retz., *Lilium longiflorum* Thunb., *Elatostema platyphyllum* Forst., *Chenopodium acuminatum* Willd., *Pueraria thunbergiana* (S. & Z.) Benth., *Lysimachia mauritiana* Lam., *Clerodendron trichotomum* Thunb., and *Gynura elliptica* Yabe & Hayata, can be considered as having reached the two groups through Formosa. Of the above list but a single species, *Gynura elliptica* Yabe & Hayata, was previously known only from Formosa, while *Ischaemum ciliare, Chenopodium acuminatum, Elatostema platyphyllum,* and *Lysimachia mauritiana* are species of wide distribution, and *Lilium longiflorum, Pueraria thunbergiana,* and *Clerodendron trichotomum* are Japanese types extending to southern China, Formosa, and the two last to Luzon.

My knowledge of the Formosan flora is based on the published works of Matsumura and Hayata,[3] and Hayata,[4] and on various supplementary papers published by the latter in the Tokyo Botanical Magazine; on a considerable number of Formosan plants in the Herbarium of this Bureau, received from Tokyo, and on the material in the Herbarium of the College of Science at Tokyo, which I had an opportunity of examining in June, 1907, in company with Dr. Hayata. The paucity of Philippine types in the Formosan collections at Tokyo is very striking, in comparison with the abundance of northern and continental types, and this character of the Formosan flora has been emphasized by Dr. Hayata in his latest publication. It seems evident, from information at present at hand, that the Formosan flora is not closely related to that of the Philippines, although due to the proximity of Luzon and Formosa, a certain number of species common and confined to Formosa and the Philippines are found. A list of these species is given below: *Bergia glandulosa* Blanco, *Illigera luzonensis* (Presl) Merr., *Rhamnus formosana* Matsum., *Uncaria florida* Vid., *Morinda parvifolia* Bartl., *Gynura elliptica* Yabe & Hayata, *Tabernaemontana cumingiana* A. DC., *Gaultheria cumingiana* Vidal, *Isanthera discolor* Maxim., *Callicarpa formosana* Rolfe, *Scutellaria luzonica* Rolfe, *Croton cumingii* Muell. Arg., *Villebrunea trinervis* Wedd., *Rubus rolfei* Vidal (var. *hirsutus* Hayata, in Formosa), *Ainsliaea reflexa* Merr., *Geodorum nutans* (Presl) Ames,

[3] Enum. Pl. Formosa, *Journ. Coll. Sci. Tokyo* **22** (1906) 1–702.
[4] Flora Montana Formosae, l. c. **25**[19] (1908) 1–260.

Phalaenopsis aphrodite Reichb. f., *Dicksonia smithii* Hook., *Davallia cumingii* Hook., and *Polypodium meyenianum* Schott. This list of but 20 species is very small when compared with the list of over 50 known exclusively from Celebes and the Philippines,[5] the Celebes-Philippine list including two genera confined to the two groups, *Wallaceodendron*, monotypic, and *Reinwardtiodendron*, two species; moreover the flora of Formosa is infinitely better known than is that of Celebes. Three species, *Boea swinhoii* Hance, *Mallotus playfairii* Hemsl., and *Gaultheria borneensis* Stapf, have the peculiar distribution of from Formosa to Luzon and northern Borneo.

A certain number of species extend from Japan to southern China, Formosa and Luzon, and another group, Himalayan types, extends from the Himalayan region eastward to the mountains of Formosa and Luzon, and sometimes to Japan, but these can not be considered as throwing much light on the individual relationships of the floras of Luzon and Formosa, as, at least the Himalayan types, might have reached the two islands independently, and at entirely different periods.

The collections adds to our knowledge of the Philippine flora two genera, *Erythraea*, represented by the introduced *E. spicata* (L.) Pers., and *Phoenix*, represented by a new variety of *P. hanceana* Naud., and the following 12 species, previously described from extra-Philippine regions: *Ischaemum ciliare* Retz., *Setaria verticillata* (L.) Beauv., *Lilium longiflorum* Thunb., *Podocarpus polystachyus* R. Br., *Elatostema platyphyllum* Forst., *Chenopodium acuminatum* Willd., *Pueraria thunbergiana* (S. & Z.) Benth., *Lysimachia mauritiana* Lam., *Ipomoea stolonifera* (Cyrilli) Poir., *Clerodendron trichotomum* Thunb., and *Gynura elliptica* Yabe & Hayata, while 24 species have been described as new, 15 in the present paper, 9 in preceding ones.

The material on which the present paper was based, was collected, in part, in June, 1907, by Major E. A. Mearns, surgeon, United States Army, on the Islands of Batan and Fuga, but mostly by Mr. Eugenio Fénix of this Bureau, who in company with Mr. R. C. McGregor, also of this Bureau, spent the greater part of June and July on the islands of Batan, Sabtan, Babuyan, and Camiguin, a very few specimens being collected on Y'Ami Island. For the opportunity of having these collections made, this Bureau is indebted to Major-General Leonard Wood, and to the Honorable Dean C. Worcester, Secretary of the Interior of the Philippine Government.

The ferns enumerated below were identified by Dr. E. B. Copeland, of the Bureau of Education, Manila, and the palms by Dr. O. Beccari, Florence, Italy; all the other identifications, unless otherwise stated, were made by the author.

[5] Merrill, *This Journal* 1 (1906) *Suppl.* 171.

HYMENOPHYLLACEÆ.

HYMENOPHYLLUM Smith.

H. dilatatum (Forst.) Sw.
BATAN, Santo Domingo de Basco, *3845 Fénix.*
Widely distributed in the Philippines; Malaya to tropical Australia and Polynesia.

H. blumeanum Spreng.
BATAN, Santo Domingo de Basco, *3847 Fénix.*
Rare in the Philippines; tropical Asia.

TRICHOMANES Linn.

T. javanicum Bl.
BATAN, Mount Iraya, *3793 Fénix.*
Common in the Philippines; tropical Asia to Australia and Polynesia.

T. minutum Bl.
BATAN, Santo Domingo de Basco, *3846 Fénix.*
Widely distributed in the Philippines; Malaya.

T. cupressoides Desv.
BATAN, Mount Iraya, *3832 Fénix.*
Rather common in the Philippines; tropical Asia and Malaya.

T. sp.
BATAN, *3808, 3843 Fénix.*

CYATHEACEÆ.

ALSOPHILA R. Br.

A. glauca (Bl.) J. Sm.
BATAN, Santo Domingo de Basco, *3654 Fénix.*
Tropical Asia and Malaya; widely distributed in the Philippines.

CYATHEA Sm.

C. fenicis Copel. supra 354.
BATAN, Santo Domingo de Basco, *3797 Fénix.* N. v. *Garagad.*
Known only from this locality.

POLYPODIACEÆ.

DRYOPTERIS Adan.

D. adenophora C. Chr.
BATAN, Santo Domingo de Basco, *3796 Fénix.* N. v., *Tubjú.*
Widely distributed in the Philippines; Celebes.

D. dissecta (Forst.) O. Ktz.
BATAN, Santo Domingo de Basco, *3655 Fénix.*
Widely distributed in the Philippines; India to Madagascar, Malaya, Australia, and Polynesia.

D. gongylodes (Schkuhr) O. Ktz.
CAMIGUIN, *3962 Fénix.*
Common in the Philippines; widely distributed in the tropics.

D. luzonica Christ.
BATAN, Santo Domingo de Basco, *3156 Mearns.*
Known only from the Philippines.

D. microloncha Christ.
BATAN, Santo Domingo de Basco, *3165 Fénix.*
Known only from the Philippines.

D. parasitica (L.) O. Ktz.
BATAN, Santo Domingo de Basco, *3780 Fénix.* N. v., *Apat.*
Widely distributed in the Philippines; tropical and subtropical regions of the World.

D. sparsa (Ham.) O. Ktz.
BATAN, Mount Iraya, *3829 Fénix.*
Widely distributed in the Philippines; India to China, Malaya and Mauritius.

D. setigera (Bl.) O. Ktz.
BATAN, Santo Domingo de Basco, *3138, 3149, 3162 Mearns; 3649 Fénix.*
Widely distributed in the Philippines; Japan to India, Malaya, Australia and Polynesia.

TECTARIA Cav.

T. crenata Cav.
BATAN, Santo Domingo de Basco, *3157, 3158, 3159, 3161, 3166 Mearns.*
Common and widely distributed in the Philippines; Malay Peninsula.

T. irregularis (Presl) Copel., var. **macrodon** Copel.
BABUYAN, *3915 Fénix.* CAMIGUIN, *4045, 4058 Fénix.*
Widely distributed in the Philippines; India to Malaya.

LEPTOCHILUS Kaulf.

L. heteroclitus (Presl) C. Chr.
BATAN, Mount Iraya, *3827 Fénix.* BABUYAN, *3912 Fénix.*
Widely distributed in the Philippines; Asia to Malaya and Polynesia.

NEPHROLEPIS Schott.

N. biserrata (Sw.) Schott.
BATAN, Santo Domingo de Basco, *3683, 3779 Fénix.*
Widely distributed in the Philippines; tropics generally.

N. hirsutula (Forst.) Presl.
BATAN, Santo Domingo de Basco, *3163 Mearns.*
Widely distributed in the Philippines; tropics generally.

DIPTERIS Reinw.

D. conjugata Reinw.
BATAN, Mount Iraya, *3819 Fénix.*
Throughout the Philippines at higher altitudes; tropical Asia to Malaya, and Polynesia.

DAVALLIA Smith.

D. solida (Forst.) Sw.
CAMIGUIN, *4149 Fénix.*
Widely distributed in the Philippines; Malaya, Polynesia and Queensland.

ODONTOSORIA (Presl) Fée.

O. chinensis (Linn.) J. Sm.
BATAN, Santo Domingo de Basco, *3577, 3686 Fénix.*
Widely distributed in the Philippines; Japan to tropical Asia, Malaya, Polynesia and Madagascar.

LINDSAYA Dry.

L. repens (Bory) Bedd.
BATAN, Mount Iraya, *3804 Fénix.*
Widely distributed in the Philippines; tropical Asia, Polynesia, Malaya, and Mauritius.

L. davallioides Bl.
BATAN, Mount Iraya, *3803 Fénix.*
Widely distributed in the Philippines; Malaya.

ATHYRIUM Roth.

A. japonicum (Thunb.) Copel.
BATAN, Santo Domingo de Basco, *3812 Fénix.* BABUYAN, *3899 Fénix.*
Northern Luzon, Japan to China and tropical Asia.

ASPLENIUM Linn.

A. nidus Linn.
BATAN, Mount Iraya, *3791 Fénix.* BABUYAN, *3890 Fénix.*
Widely distributed in the Philippines; tropical Asia to Polynesia, Malaya, Australia, and eastern Africa.

A. prionurus J. Sm.
BATAN, Santo Domingo de Basco, *3792 Fénix.* CAMIGUIN, *4137 Fénix.*
Endemic in the Philippines.

A. unilaterale Lam.
BABUYAN, *3900 Fénix.*
Widely distributed in the Philippines; Japan to Polynesia, Malaya, tropical Asia and Africa.

WOODWARDIA Smith.

W. radicans (Linn.) Smith, var. **prolifera** W. & A.
BATAN, Santo Domingo de Basco, *3773 Fénix.*
The species in northern Luzon; Mediterranean region to southern China and Java, the variety otherwise not known from the Philippines.

ADIANTUM Linn.

A. caudatum Linn.
BATAN, Santo Domingo de Basco, *3709 Fénix.*
Very common in the Philippines; tropical Asia, Africa, Malaya, to New Hebrides.

A. capillus-veneris Linn., var.
BATAN, Santo Domingo de Basco, *3152 Mearns.*
A widely distributed species, known from the Philippines only from northern Luzon.

PTERIS Linn.

P. cretica Linn.
BATAN, Santo Domingo de Basco, *3164 Fénix.*
Widely distributed in the Philippines; tropical and subtropical regions of the World.

P. ensiformis Burm.

Batan, Santo Domingo de Basco, *3671 Fénix.*

Widely distributed in the Philippines; India to China, Malaya, Australia, and Polynesia.

P. quadriaurita Retz.

Batan, Santo Domingo de Basco, *3564, 3560 Fénix; 3148, 3150 Mearns.* Babuyan, *3913 Fénix.* Camiguin, *4029 Fénix.*

Widely distributed in the Philippines; tropical and subtropical regions of the World.

P. tripartita Sw.

Batan, Santo Domingo de Basco, *3698 Fénix.*

Widely distributed in the Philippines; tropical Asia, Africa, Malaya, Australia, and Polynesia.

HISTIOPTERIS J. Sm.

H. incisa (Thunb.) J. Sm.

Batan, Mount Iraya, *3824 Fénix.*

Widely distributed in the Philippines; tropical and subtropical regions of the World.

VITTARIA Smith.

V. elongata Sw.

Camiguin, *4143 Fénix.*

Widely distributed in the Philippines; tropical Asia to Malaya, Polynesia and Australia.

ANTROPHYUM Kaulf.

A. parvulum Bl.

Batan, Santo Domingo de Basco, *3788 Fénix.*

Widely distributed in the Philippines; Malaya.

POLYPODIUM Linn.

P. hirtellum Bl.

Batan, Mount Iraya, *3802, 3844 Fénix.*

Widely distributed in the Philippines at higher altitudes; central China to Malaya and New Caledonia.

P. palmatum Bl.

Batan, Mount Iraya, *3805 Fénix.*

Widely distributed in the Philippines at higher altitudes; Malaya.

P. phymatodes Linn.

Batan, Santo Domingo de Basco, *3563 Fénix; 3153, 3155 Mearns.*

Throughout the Philippines; tropical Asia, Africa, Malaya, Polynesia, and Australia.

P. punctatum (Linn.) Sw.

Camiguin, *4141 Fénix.* Sabtan, *3759 Fénix.*

Widely distributed in the Philippines at higher altitudes; tropical Asia and Africa to Malaya, Polynesia, and Australia.

CYCLOPHORUS Desv.

C. adnascens (Sw.) Desv.

Batan, Santo Domingo de Basco, *3621 Fénix.*

Throughout the Philippines; tropical Asia to Malaya and Polynesia.

C. acrostichoides (Forst.) Presl.

CAMIGUIN, *4088 Fénix.*

Widely distributed in the Philippines; India to Malaya, Polynesia, and Queensland.

DRYNARIA J. Sm.

D. quercifolia (Linn.) J. Sm.

BATAN, Santo Domingo de Basco, *3168 Mearns.* CAMIGUIN, *4099 Fénix.*

Throughout the Philippines; tropical Asia to Malaya, Polynesia, and the Fiji Islands.

SCHIZAEACEÆ.

LYGODIUM Sw.

L. japonicum (Thunb.) Sw.

BATAN, Santo Domingo de Basco, *3154a Mearns.*

Common in the Philippines; Japan to India, Malaya, and Australia.

L. circinatum (Burm.) Sw.

SABTAN, *3766 Fénix.* CAMIGUIN, *3948 Fénix.*

Very common in the Philippines; tropical Asia to Malaya and Queensland.

L. mearnsii Copel.

BATAN, Santo Domingo de Basco, *3136 Mearns* (type); *3651 Fénix.* BABUYAN, *3916 Fénix.*

Known only from the Batan and Babuyan Islands.

MARATTIACEÆ.

ANGIOPTERIS Hoffm.

A. angustifolia Presl.

BABUYAN, *3897 Fénix.*

Endemic in the Philippines.

MARATTIA Sw.

M. ternatea DeVr. & Hartig.

CAMIGUIN, *4150 Fénix.*

Not uncommon in the Philippines; Moluccas.

OPHIOGLOSSACEÆ.

HELMINTHOSTACHYS Kaulf.

H. zeylanica (Linn.) Hook.

CAMIGUIN, *4095 Fénix.*

Throughout the Philippines; tropical Asia to Australia and New Caledonia.

LYCOPODIACEÆ.

LYCOPODIUM Linn.

L. cernuum Linn.

BATAN, Mount Iraya, *3830 Fénix.*

Throughout the Philippines; tropical and subtropical regions of the World.

L. squarrosum Forst.

CAMIGUIN, *4142 Fénix.*

Widely distributed in the Philippines; India to Formosa, Malaya, Polynesia, and the Mascarene Islands.

L. pinifolium Desv.
Batan, Mount Iraya, *3828 Fénix.*
Widely distributed in the Philippines; Malaya.

SELAGINELLACEÆ.

SELAGINELLA Spring.

S. spp.
Three species are represented in the collection, but I am not able to identify them satisfactorily at the present time: Batan, *3617, 3667 Fénix.* Camiguin, *4076 Fénix.*

CYCADACEÆ.

CYCAS Linn.

C. circinalis Linn.
Camiguin, *3977 Fénix; Worcester s. n.*
Widely distributed in the Philippines; India to Malaya and Polynesia.

TAXACEÆ.

PODOCARPUS L'Hérit.

P. polystachyus R. Br. ex Mirb. in Mém. Mus. 13 (1825) 75; Pilger in Pflanzenreich 18 (1903) 79.
Batan, Santo Domingo de Basco, *3586 Fénix.*
Not previously reported from the Philippines; Singapore, Sumatra, and Java.

TYPHACEÆ.

TYPHA Linn.

T. orientalis Presl.
Camiguin, *4061 Fénix.*
Philippines, Japan, and northern China.

PANDANACEÆ.

FREYCINETIA Gaudich.

F. scabripes Warb.
Batan, near the summit of Mount Iraya, *3806 Fénix.* N. v., *Uyod.*
Known otherwise only from central Luzon.

F. williamsii Merr.
Batan, Mount Iraya, *3786 Fénix.* N. v., *Vayasubas.*
Known otherwise only from Luzon.

PANDANUS Linn.

P. tectorius Soland.
Sabtan, *3731, 3738 Fénix.* Camiguin, *4006, 4103 Fénix.* N. V., *Ujango.*
Along the seashore throughout the Philippines; India to Malaya and Polynesia.

GRAMINEÆ.

COIX Linn.

C. lachryma-jobi Linn.
Batan, Santo Domingo de Basco, *3809 Fénix.* Camiguin, *3956 Fénix.* N. v., *Agagay.*
Throughout the Philippines; warmer parts of the World.

IMPERATA Cyr.

I. cylindrica, var. **koenigii** (Retz.) Benth.

BATAN, Santo Domingo de Basco, *3678 Fénix; 3134 Mearns.* CAMIGUIN, *4015 Fénix.* N. v., *Buchid.*

MISCANTHUS Anders.

M. japonicus (Thunb.) Anders.

BATAN, Santo Domingo de Basco, *3689 Fénix.* BABUYAN, *3917 Fénix.* N. v., *Viau.*

Not common in the Philippines; Japan to China and Malaya.

M. sinensis Anders.

BATAN, Mount Iraya, *3818 Fénix.* N. v., *Viau.*

Common in the Philippines at medium and higher altitudes; Japan and China to Borneo and Celebes.

POGONATHERUM Beauv.

P. paniceum (Lam.) Hack.

BATAN, Santo Domingo de Basco, *3636 Fénix.* BABUYAN, *3901 Fénix.*

Common throughout the Philippines; Japan to India and Malaya.

ROTTBOELLIA Linn. f.

R. exaltata Linn. f.

BATAN, Santo Domingo de Basco, *3815 Fénix.* N. v., *Annaray.*

Widely distributed in the Philippines; tropics of the World.

MANISURIS Sw.

M. granularis Linn. f.

BATAN, Santo Domingo de Basco, *3721 Fénix.*

Widely distributed in the Philippines; tropics of the World.

ISCHAEMUM Linn.

I. ciliare Retz. Obs. 6 (1791) 36; Hack. in DC. Monog. Phan. 6 (1889) 225.

BATAN, Santo Domingo de Basco, *3169 Mearns.*

India and Ceylon to China and Formosa; not previously found in the Philippines, although credited to the Archipelago by F.-Villar, certainly on an erroneous identification.

I. muticum Linn.

CAMIGUIN, *4021 Fénix.*

Along the seashore throughout the Philippines; British India to Formosa and Malaya.

APLUDA Linn.

A. mutica Linn.

BATAN, Santo Domingo de Basco, *3638 Fénix.*

Common throughout the Philippines; India to China, Malaya, Australia and Polynesia.

ANDROPOGON Linn.

A. micranthus var. **spicigerus** (Benth.) Hack.

CAMIGUIN, *4040 Fénix.* BABUYAN, *3918 Fénix.* SABTAN, *3726 Fénix.*

Northern Luzon; China, Australia, and New Caledonia.

A. halepensis var. **propinquus** (Kunth.) Merr.

BATAN; Santo Domingo de Basco, *3837 Fénix.* CAMIGUIN, *4047 Fénix.*

Widely distributed in the Philippines; the variety extending from Ceylon to Amboina.

A. serratus Thunb., var. **nitidus** (Vahl) Hack.

Batan, Santo Domingo de Basco, *3704 Fénix.*

Widely distributed in the Philippines; India to Formosa and Malaya.

A. nardus Linn., var. **hamatulus** (Nees) Hack.

Sabtan, *Petrelli s. n.*

Not common in the Philippines, the variety extending to southern China and Formosa.

THEMEDA Forsk.

T. gigantea (Cav.) Hack.

Batan, Santo Domingo de Basco, *3632 Fénix.* Babuyan, *3922 Fénix.*

Widely distributed in the Philippines; some varieties in India, China and Malaya.

PASPALUM Linn.

P. scrobiculatum Linn.

Camiguin, *3969 Fénix.*

Common and widely distributed in the Philippines; tropical and subtropical regions of the World.

DIGITARIA Scop.

D. sanguinalis (Linn.) Scop.

Batan, Santo Domingo de Basco, *3681 Fénix.* N. v., *Dibubat.*

Widely distributed in the Philippines; temperate and tropical regions of the World.

D. consanguinea Gaudich.

Camiguin, *4013, 4063 Fénix.* Batan, Santo Domingo de Basco, *3595 Fénix.* N. v., *Balisibis.*

Very common and widely distributed in the Philippines; Malaya and Polynesia.

D. violascens Link.

Batan, Santo Domingo de Basco, *3587 Fénix.*

Not common in the Philippines; tropical Asia, America and Malaya.

PANICUM Linn.

P. colonum Linn.

Camiguin, *4019 Fénix.*

Common throughout the Philippines; tropical and subtropical regions of the World.

P. stagninum Retz.

Camiguin, *3937 Fénix.*

Common in the Philippines; tropical Asia and Malaya.

P. repens Linn.

Camiguin, *3975 Fénix.*

Common and widely distributed in the Philippines; tropical and subtropical regions of the World, especially near the seashore.

P. pilipes Nees.

Camiguin, *4012 Fénix.*

Common throughout the Philippines; India to Madagascar, Malaya, Australia and Polynesia.

P. patens Linn.

Batan, Santo Domingo de Basco, *3693 Fénix.* Camiguin, *3947 Fénix.*

Widely distributed in the Philippines; India to southern China, Malaya, and Polynesia.

OPLISMENUS Beauv.

O. compositus (Linn.) Beauv.
BATAN, Santo Domingo de Basco, *3692 Fénix*. N. v., *Balisibis*.
Widely distributed in the Philippines; tropics of both hemispheres.

SETARIA Beauv.

S. italica (Linn.) Beauv.
BATAN, Santo Domingo de Basco, *3170 Mearns; 3629 Fénix*. N. v., *Rautnocara*.
Cultivated in the Philippines, as in most tropical and temperate regions.

S. verticillata (Linn.) Beauv.
CAMIGUIN, *4041 Fénix*.
Near the seashore; not previously reported from the Philippines; temperate and tropical regions of the World.

SPINIFEX Linn.

S. squarrosus Linn.
CAMIGUIN, *3980 Fénix*.
Along the seashore throughout the Philippines; British India to southern China, Malaya, and Australia.

ELEUSINE Gaertn.

E. indica (Linn.) Gaertn.
BATAN, Santo Domingo de Basco, *3630 Fénix*.
Common in the Philippines; tropics of both hemispheres.

ERAGROSTIS Host.

E. tenella (Linn.) R. & S.
BATAN, Santo Domingo de Basco, *3635 Fénix*.
Common in the Philippines; tropical Asia, Africa, and Malaya.

CENTOTHECA Desv.

C. lappacea (Linn.) Desv.
BATAN, Santo Domingo de Basco, *3657 Fénix*. CAMIGUIN, *4054 Fénix*.
Common in the Philippines; tropical Asia, Africa, Malaya, Australia, and Polynesia.

SCHIZOSTACHYUM Nees.

S. acutiflorum Munro.
CAMIGUIN, *4031 Fénix*.
Widely distributed in the Philippines; endemic.

CYPERACEÆ.

KYLLINGA Rottb.

K. monocephala Rottb.
BATAN, Santo Domingo de Basco, *3684 Fénix*. CAMIGUIN, *3959 Fénix*.
Common in the Philippines; warm regions of the Old World, from eastern Asia to Polynesia.

PYCREUS Beauv.

P. polystachyus Beauv.
BATAN, Santo Domingo de Basco, *3174 Mearns; 3588 Fénix*.
Common in the Philippines; in all warm countries, especially near the sea.

CYPERUS Linn.

C. haspan Linn.
CAMIGUIN, *3953 Fénix.*
Common in the Philippines; all warm countries.

C. compressus Linn.
BATAN, Santo Domingo de Basco, *3634 Fénix.* N. v., *Captos.*
Common in the Philippines; warmer parts of both hemispheres.

C. distans Linn. f.
BATAN, Santo Domingo de Basco, *3676 Fénix.*
Common in the Philippines; in most warm countries.

C. radiatus Vahl.
CAMIGUIN, *3939 Fénix.*
Rather common in the Philippines; all warm countries.

MARISCUS Vahl.

M. cyperinus (Retz.) Vahl.
BATAN, Santo Domingo de Basco, *3675 Fénix.* CAMIGUIN, *3943 Fénix.* N. v., *Janá.*
Widely distributed in the Philippines; Ceylon to Polynesia.

M. stuppeus (Forst. f.) comb. nov.
Cyperus stuppeus Forst. f. Prodr. (1786) 89.
Mariscus albescens Gaudich. in Freycinet. Voy. (1826) 415.
Cyperus pennatus Lam. Ill. 1 (1791) 144.
BATAN, Santo Domingo de Basco, *3175 Fénix.*
Along the seashore throughout the Philippines; tropical Asia to Polynesia.

ELEOCHARIS R. Br.

E. afflata Steud.
CAMIGUIN, summit of the volcano, *4130 Fénix.*
High altitudes in northern Luzon; India to Japan.

FIMBRISTYLIS Vahl.

F. diphylla (Retz.) Vahl.
SABTAN, *3734 Fénix.*
Common in the Philippines; all warm and tropical countries.

F. miliacea Vahl.
CAMIGUIN, *3961 Fénix.*
Common in the Philippines; common from tropical Asia to Polynesia, in tropical Africa and America scattered.

F. spathacea Roth.
BATAN, Santo Domingo de Basco, *3575 Fénix; 3171, 3172, 3173 Mearns.* CAMIGUIN, *4042 Fénix.* BABUYAN, *3926 Fénix.*
Not common in the Philippines; tropical Asia, America, and the Mascarene Islands.

BULBOSTYLIS Kunth.

B. barbata (Rottb.) Kunth.
BATAN, Santo Domingo de Basco, *3711 Fénix.* N. v., *Jumót.*
Widely distributed in the Philippines; warmer parts of the Old World.

CLADIUM R. Br.

C. latifolium Merr.
BATAN, summit of Mount Iraya, *3822 Fénix.*
A species known only from the higher mountains of the northern Philippines.

SCLERIA Berg.

S. scrobiculata Nees.
CAMIGUIN, *3950 Fénix.* SABTAN, *3747 Fénix.*
Widely distributed in the Philippines; Andaman Islands to Riu Kiu and New Guinea.

CAREX Linn.

C. cruciata Wahl.
BATAN, Mount Iraya, *3801 Fénix.*
Not previously reported from the Philippines, but common on the higher mountains of northern Luzon; India to China and Madagascar.

PALMÆ.

DAEMONOROPS Bl.

D. gaudichaudii Mart.
CAMIGUIN, *4066 Fénix.*
A widely distributed species in the Philippines; endemic.

CALAMUS Linn.

C. mollis Blanco.
CAMIGUIN, *4032 Fénix.*
Widely distributed in the Philippines; endemic.

C. siphonospathus Mart.. var. **batanensis** Becc. supra 342.
BATAN, in thickets near Mount Iraya, *3611 Fénix.* N. v., *Valit.*

C. mitis Becc. supra 341.
CAMIGUIN, *4075 Fénix.* BATAN, Santo Domingo de Basco, *3817 Fénix*, from a cultivated specimen, the fruit white, edible. N. v., *Tebdas.*

PINANGA Bl.

P. barnesii Becc.
CAMIGUIN, *4144 Fénix.*
Luzon and Mindoro at medium altitudes.

P. elmerii Becc.
CAMIGUIN, *4149 Fénix.*
Common in the Philippines at medium and higher altitudes; endemic.

P. urosperma Becc. supra 341.
CAMIGUIN, in forests, *4044 Fénix.*

P. batanensis Becc. supra 340.
BATAN, along mountain streams, *3841 Fénix.*

ARECA Linn.

A. catechu Linn.
BATAN, Santo Domingo de Basco, *3834 Fénix.* N. v., *Dapiau.*
Cultivated throughout the Philippines; India, Malaya, etc.

PHOENIX Linn.

P. hanceana Naud., var. **philippinensis** Becc. supra 339.

Sabtan, *3744 Fénix*. N. v., *Vovaroy*.

The first representative of the genus to be found in the Philippines, the leaves being used extensively by the inhabitants of Sabtan and neighboring islands for making the characteristic rain-coats known as Suôt. The species in southern China.

ARACEÆ.

AGLAONEMA Schott.

A. haenkei Schott.

Camiguin, *4089 Fénix*.

Philippines and Celebes.

FLAGELLARIACEÆ.

FLAGELLARIA Linn.

F. indica Linn.

Camiguin, *4094 Fénix*. Sabtan, *3758 Fénix*. N. v., *Anay*.

Widely distributed in the Philippines; India to Formosa, Malaya, Polynesia, and Australia.

COMMELINACEÆ.

COMMELINA Linn.

C. benghalensis Linn.

Batan, Santo Domingo de Basco, *3590 Fénix; 3230 Mearns*.

Widely distributed in the Philippines; widely distributed in the tropics of the Old World.

C. nudiflora Linn.

Camiguin, *3938 Fénix*. Sabtan, *3728 Fénix*. N. v., *Cajasi*.

Widely distributed in the Philippines; tropics of the World.

POLLIA Thunb.

P. sorzogonensis (E. Meyer) Endl.

Baluyan, *3891 Fénix*. Batan, Santo Domingo de Basco, *3697 Fénix; 3211 Mearns*. Camiguin, *4058 Fénix*.

Widely distributed in the Philippines; India to Formosa and Malaya.

LILIACEÆ.

LILIUM Linn.

L. longiflorum Thunb. Trans. Linn. Soc. 2 (1794) 333; Baker in Journ. Linn. Soc. Bot. 14 (1875) 229.

Y'Ami, *Worcester s. n.* Batan, Santo Domingo de Basco, *3774 Fénix*. N. v., *Vonitan*.

Not previously found in the Philippines, the second species of the genus for the Archipelago; Japan to southern China and Formosa.

DRACAENA Vand.

D. angustifolia (Rumph.) Roxb.

Batan, Santo Domingo de Basco, *3661, 3842 Fénix*.

Common and widely distributed in the Philippines; India to Malaya, and Australia.

DIANELLA Lam.

D. ensifolia (Linn.) Red.

Batan, Santo Domingo de Basco, *3142 Mearns.*

Widely distributed in the Philippines at higher altitudes; Mascarene Islands, tropical Asia to Formosa and the Riu Kiu Islands, Malaya, Australia, to Polynesia and the Hawaiian Islands.

AMARYLLIDACEÆ.

CURCULIGO Gaertn.

C. recurvata Dryand.

Batan, Santo Domingo de Basco, *3826 Fénix.*

Widely distributed in the Philippines; India to Formosa, Malaya, and Australia.

DIOSCOREACEÆ.

DIOSCOREA Linn.

D. pentaphylla Linn.

Batan, Santo Domingo de Basco, *3659 Fénix.*

Widely distributed in the Philippines; tropical Africa to Asia, and Malaya.

CASUARINACEÆ.

CASUARINA Forst.

C. equisetifolia Forst.

Camiguin, *4121 Fénix.*

Widely distributed in the Philippines; southern Asia to Malaya, Australia and Polynesia, but not reported from southern China or Formosa.

PIPERACEÆ.

PIPER Linn.

P. spp.

Two species are represented in the collection, Batan, *3652 Fénix;* Camiguin, *4092 Fénix.* I have not been able to specifically identify either with satisfaction.

ULMACEÆ.

TREMA Lour.

T. amboinensis Blume.

Batan, Santo Domingo de Basco, *3813 Fénix.* N. v., *Anariong.*

Abundant and widely distributed in the Philippines; British India to Formosa, Malaya, and Polynesia.

MORACEÆ.

ARTOCARPUS Forst.

A. rubrovenia Warb.

Batan, Santo Domingo de Basco, *3581, 3814 Fénix.* N. v., *Mulní.*

Not uncommon in the Philippines; endemic.

A. communis Forst.

Camiguin, *4069 Fénix.* Batan, Santo Domingo de Basco, *3613 Fénix.* N. v., *Tipujó.*

Forms of the widely distributed bread-fruit, with entire or nearly entire leaves, the fruit edible. Malaya and Polynesia, cultivated and wild, exceedingly variable.

FICUS Linn.

F. ampelas Burm.

Sabtan, *3754 Fénix.*

Rather common in the Philippines; India to Malaya.

F. caudatifolia Warb.

Camiguin, *4131, 4107 Fénix.* Batan, Santo Domingo de Basco, *3781 Fénix.* N. v., *Alintabao.*

An endemic form, closely allied to *F. rostrata* Lam., and frequently so identified.

F. stipulosa Miq. Ann. Mus. Lugd.-Bat. 3 (1867) 287; King. in Ann. Bot. Gard. Calcutta 1[1] (1887) 284.

Urostigma stipulosum Miq. in Lond. Journ. Bot. 6 (1847) 568.

Urostigma caulocarpum Miq. l. c., non *Ficus caulocarpa* Miq. Ann. Mus. Lugd.-Bat. 3 (1867) 235.

Ficus infectoria Roxb., var. *caulocarpa* (Miq.) King, l. c. 63.

Batan, Santo Domingo de Basco, *3706 Fénix.*

Common and widely distributed in the Philippines; Borneo.

The synonymy of this species is rather complicated, as Miquel in 1867 described *Ficus caulocarpa* without any reference to his earlier *Urostigma caulocarpum*, the latter being based on a Philippine specimen, *Cuming no. 1930*, and the former on Celebes material. As the specific name *caulocarpa* is thus invalidated in *Ficus* for the present form, another name becomes necessary, and I have here adopted *Ficus stipulosa* Miq., to designate the Philippine form. King l. c. 184, expresses the opinion that *F. stipulosa* Miq., is identical with *Urostigma caulocarpum* Miq., and after examining the various numbers of Cuming's Philippine plants, I am of the same opinion. *F. stipulosa* Miq., is certainly only immature *Urostigma caulocarpum*, with the stipules not fallen. The form is exactly matched by some of our recently collected material.

F. megacarpa Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 14.

F. elliptica Miq. in Lond. Journ. Bot. 7 (1848) 440, non H. B. K.

Camiguin, *4104 Fénix.*

A species known only from the Philippines.

Ficus elliptica Miq., was described from a sterile specimen, Philippines, *Cuming 1927*, and was later reduced by Miquel himself to *F. disticha* Blume, in which he was followed by King. I have examined Cuming's specimen and am of the opinion that it is identical with the species which I described as *F. megacarpa*, which is not at all allied to *F. disticha* Blume. Miquel's name is however invalidated by the earlier *F. elliptica* H. B. K.

F. hauili Blanco.

Camiguin, *3995 Fénix.* Batan, Santo Domingo de Basco, *3567 Fénix.* N. v., *Yabnay.*

This species is scarcely distinct from *Ficus leucantatoma* Poir., and is the Philippine form so identified by many authors. It has recently been described by Warburg as *Ficus didymophylla*, but Blanco's name is much the older, and should be maintained, if the plant is to be retained as distinct from *F. leucantatoma* Poir. Endemic in the Philippines.

Ficus mearnsii sp. nov. § *Eusyce.*

Frutex repens; ramis teretibus glabris, ramulis junioribus brunneis, plus minus ferrugineo-hirsutis; foliis subcoriaceis, suborbicularibus vel ellipticis, glabris, 5 ad 12 cm longis, apice rotundatis, basi late rotundatis, subpeltatis; nervis utrinque circiter 6, prominentibus, distantibus, anas-

tomosantibus; receptaculis axillaribus, solitariis vel binis, pedunculatis, subglobosis, rubris, glabris, 1 ad 1.3 cm diametro, basi 3-bracteolatis; pedunculis 1 ad 2 cm longis, pubescentibus.

A prostrate shrub spreading over the ground and rocks. Branches terete, glabrous, reddish-gray, the branchlets rather thick, reddish-brown, somewhat ferruginous-hirsute. Leaves suborbicular to elliptical, 5 to 12 cm long, 4.5 to 8 cm wide, subcoriaceous, brownish when dry, entire, smooth, slightly shining above, base and apex broadly rounded, the former, in young leaves, slightly subpeltate and very obscurely cordate, glabrous, or with very few hairs along the midrib beneath; nerves about 6 on each side of the midrib, prominent, distant, spreading, anastomosing into an arched marginal nerve, the reticulations rather close, distinct; petioles 0.5 to 2 cm long, ferruginous-pubescent. Receptacles axillary, solitary or in pairs, male and gall flowers in one set, fertile female flowers only in other sets, subglobose, glabrous, dark-red when mature, 1 to 1.3 cm in diameter, the peduncles 1 to 2 cm long, pubescent, the apex, just below the receptacle, with three small bracts. Staminate flowers pedicelled, the perianth segments 4, dark-purplish, 1 mm long, the pedicel with a single bracteole similar to the perianth segments; stamens usually 2, rarely 3, or even 4, the anthers 1.2 mm long. Gall flowers in the same receptacle, the perianth and bracteole as in the male flowers, the ovary ovoid, 1.2 mm long. Fertile female flowers in separate receptacles, the perianth small, the ovary ovoid, 1.5 mm in diameter, the interior wall of the receptacle with numerous triangular-ovate, dark-purple scales.

BATAN, Santo Domingo de Basco, *3573 Fénix* (type), *3232 Mearns.* BABUYAN, *3895 Fénix.* N. v., *Tapá.*

A species well characterized by its smooth elliptical or suborbicular leaves, distant nerves and pedicelled receptacles.

F. nota (Blanco) Merr.

CAMIGUIN, *4014 Fénix.*

One of the most common and widely distributed species of the genus in the Philippines; endemic.

F. philippinensis Miq.

BATAN, Santo Domingo de Basco, *3605, 3783 Fénix; 3783 Mearns.* N. v., *Nusú.*

A widely distributed endemic species of doubtful status.

The validity of this species is doubtful, King reducing it to *F. decaisneana* Miq., while Hemsley is of the opinion that it is identical with *F. gibbosa* Bl. (*F. insularis* Miq.) Elmer has recently described it again as *F. confusa.*

F. ulmifolia Lam. Encycl. 2 (1790) 499.

F. sinuosa Miq. in Lond. Journ. Bot. 7 (1848) 232.

CAMIGUIN, *4010 Fénix.* BABUYAN, *3919 Fénix.* BATAN, Santo Domingo de Basco, *3579 Fénix.* N. v., *Vaysi.*

The earliest description of this form is that of Lamarck, *F. ulmifolia* Lam. being based on Philippine material. The species was considered as a doubtful one by Miquel. *F. sinuosa* Miq., based on *Cuming 1921*, and var. *integrifolia* Miq., based on *Cuming 1924*, both from the Philippines, are manifestly one species, and

I am of the opinion that it is identical with Lamarck's. *F. sinuosa* Miq. has been reduced by King to *F. quercifolia* Roxb., with the description of which it does not well accord. *Ficus difformis* Lam. l.c. 500, also described from Philippine material, and also considered by Miquel as a doubtful species, is apparently the same as *F. ulmifolia* Lam. The species is exceedingly variable.

CONOCEPHALUS Blume.

C. grandifolius Warb.

BABUYAN, *3928 Fénix.* CAMIGUIN, *4148 Fénix.*

Previously known only from Luzon.

MORUS Linn.

M. alba Linn.

BATAN, Santo Domingo de Basco (cultivated), *3687 Fénix.* N. v., *Tangud.*

The mulberry, occasionally found in cultivation in the Philippines; cultivated in temperate and tropical regions generally.

URTICACEÆ.

LAPORTEA Gaudich.

L. mindanaensis Warb.?

BATAN, Santo Domingo de Basco, *3719 Fénix.* N. v., *Jateng.*

The identification is doubtful, specimens in fruit; an endemic species.

ELATOSTEMA Forst.

E. platyphyllum Wedd.

BATAN, Santo Domingo de Basco, *3608 Fénix.* N. v., *Reyrey.* The succulent stems are cooked as a pot-herb.

Not previously reported from the Philippines; Himalayan region to southern China and Formosa.

BOEHMERIA Jacq.

B. blumei Wedd.

BATAN, Santo Domingo de Basco, *3574 Fénix; 3227 Mearns.* N. v., *Tangao.*

Known only from the Philippines.

B. nivea Gaudich.

BATAN, Santo Domingo de Basco, *3204 Mearns.*

India to Japan and Malaya; occasionally found in cultivation in the Philippines, but certainly introduced. Ramie.

POUZOLZIA Gaudich.

P. indica (Linn.) Gaudich.

BATAN, Santo Domingo de Basco, *3695 Fénix.* CAMIGUIN, *3955 Fénix.*

Widely distributed in the Philippines; tropical Asia to Formosa, Malaya and Polynesia.

PIPTURUS Wedd.

P. asper Wedd.

CAMIGUIN, *3993 Fénix.*

Common and widely distributed in the Philippines; endemic.

VILLEBRUNEA Gaudich.

V. trinervis Wedd.

BABUYAN, *3910 Fénix.*

Widely distributed in the Philippines; Formosa.

LEUCOSYKE Zoll. & Mor.

L. capitellata (Poir.) Wedd.

SABTAN, *3752 Fénix*. BATAN, Santo Domingo de Basco, *3653 Fénix*. CAMIGUIN, *4134 Fénix*. N. v., *Bujuan*.

Widely distributed in the Philippines; Malaya.

LORANTHACEÆ.

LORANTHUS Linn.

L. spicifer (Presl) F.-Vill.

CAMIGUIN, *4111 Fénix*.

Widely distributed in the Philippines; endemic.

POLYGONACEÆ.

POLYGONUM Linn.

P. chinense Linn.

BATAN, Santo Domingo de Basco, *3673 Fénix; 3223 Mearns*. N. v., *Uonó*.

Widely distributed in the Philippines at medium altitudes; India to Japan, Formosa, and Malaya.

CHENOPODIACEÆ.

CHENOPODIUM Linn.

C. acuminatum Willd.

BATAN, Santo Domingo de Basco, *3807 Fénix*.

Not previously reported from the Philippines; Siberia to China, Japan, and Formosa.

AMARANTACEÆ.

AMARANTUS Linn.

A. viridis Linn.

CAMIGUIN, *3973 Fénix*.

Common and widely distributed in the Philippines; tropics generally.

DEERINGIA R. Br.

D. indica Zoll. & Mor.

CAMIGUIN, *4078 Fénix*. BATAN, Santo Domingo de Basco, *3222 Mearns; 3664 Fénix*. FUGA, *3239 Mearns*.

Common and widely distributed in the Philippines; Malaya to New Guinea.

NYCTAGINACEÆ.

BOERHAAVIA Linn.

B. diffusa Linn.

CAMIGUIN, *4035 Fénix*.

Common and widely distributed in the Philippines; tropics generally.

AIZOACEÆ.

MOLLUGO Linn.

M. spergula Linn.

CAMIGUIN, *4037 Fénix*.

Widely distributed in the Philippines; tropical Asia, Africa, Malaya, and Australia.

PORTULACACEÆ.

PORTULACA Linn.

P. oleracea Linn.
Batan, Santo Domingo de Basco, *3666 Fénix.*
Common throughout the Philippines; temperate and tropical regions of the World.

P. quadrifida Linn.
Sabtan, *3750 Fénix.*
Not common in the Philippines; tropical Asia and Africa.

MENISPERMACEÆ.

TINOSPORA Miers.

T. reticulata Miers.
Batan, *3614 Fénix.* N. v., *Camibiac.*
Widely distributed in the Philippines; endemic.

STEPHANIA Lour.

S. japonica Miers.
Batan, *3672 Fénix; 3229 Mearns;* (det. Diels). N. v., *Cureng.*
Japan.

LIMACIA Lour.

L. cuspidata (Wall.) Hook. f. & Th.
Camiguin, *4034 Fénix.*
Widely distributed in the Philippines; India to southern China and Malaya.

ARCANGELISIA Becc.

A. lemniscata (Miers) Becc. Malesia 1 (1877) 147.
Camiguin, *3981 Fénix;* (det. Diels).
Widely distributed in the Philippines but not previously reported from the Archipelago; Borneo and Celebes.

MAGNOLIACEÆ.

TALAUMA Juss.

T. luzonensis Warb.
Camiguin, *4070 Fénix.*
Previously known only from northern Luzon.

ANONACEÆ.

PHAEANTHUS Hook. f.

P. ebracteolatus (Presl) Merr.
Camiguin, *4057 Fénix.*
Common and widely distributed in the Philippines; endemic.

POLYALTHIA Blume.

P. clusiflora (Merr.) C. B. Robinson.
Babuyan, *3921 Fénix.*
Common and widely distributed in the Philippines; endemic.

MYRISTICACEÆ.

MYRISTICA Linn.

M. guatteriifolia A. DC.
CAMIGUIN, *4105 Fénix.*
Common and widely distributed in the Philippines; Labuan.

KNEMA Lour.

K. heterophylla (F.-Vill.) Warb.
CAMIGUIN, *4049 Fénix.*
Common and widely distributed in the Philippines; endemic.

LAURACEÆ.

LITSEA Lam.

L. sp.
BATAN, Santo Domingo de Basco, *3585, 3717 Fénix.* FUGA, *3244 Mearns.* N. v., *Tubjus.*
One specimen is with mature fruit, and the other two with unopened flowers; possibly *Actinodaphne.*

CASSYTHA Linn.

C. filiformis Linn.
SABTAN, *3730 Fénix.* CAMIGUIN, *4009 Fénix.* N. v., *Uauaquen.*
Common along the seashore throughout the Philippines; tropics generally.

HERNANDIACEÆ.

ILLIGERA Blume.

I. luzonensis (Presl) Merr.
CAMIGUIN, *4083 Fénix.* A single specimen with larger fruits than the typical form, and possibly a distinct species.
Philippines and Formosa.

PAPAVERACEÆ.

ARGEMONE Linn.

A. mexicana Linn.
BATAN, Santo Domingo de Basco, *3224 Mearns.*
A weed of American origin, now common throughout the Philippines, and the tropics generally.

CAPPARIDACEÆ.

POLANISIA Raf.

P. viscosa (Linn.) DC.
BATAN, Santo Domingo de Basco, *3560 Fénix.* N. v., *Cabáo.*
Widely distributed in the Philippines; tropics generally.

SAXIFRAGACEÆ.

HYDRANGEA Linn.

Hydrangea subintegra sp. nov.

Arbuscula circiter 1.5 m alta, inflorescentiis exceptis glabra; ramis ramulisque teretibus, rubro-brunneis; foliis oblongo-lanceolatis, membranaceis, acuminatis, 8 ad 11 cm longis, supra brunneis, subtus pallidioribus, integris vel obscure distanter denticulatis; cymis terminalibus 5 ad 7 cm longis, sparse fulvo-hirsutis; floribus exterioribus sterilibus, sepalis 4 petaloideis, obovoideis vel elliptico-obovoideis, 1 ad 1.3 cm longis, glabris; floribus interioribus 5-meris.

A shrub about 1.5 m high, erect, glabrous except the inflorescence, the branches terete, reddish-brown, smooth and somewhat shining. Leaves opposite, oblong-lanceolate, membranaceous, 8 to 11 cm long, 1.5 to 3 cm wide, the upper surface brownish when dry, the lower surface paler, somewhat shining, the margins entire, sometimes distantly and obscurely denticulate, the apex rather strongly acuminate, the base acute; primary nerves about 5 on each side of the midrib, distant, irregular, anastomosing, the secondary ones nearly as prominent, the reticulations lax; petioles 1 to 1.5 cm long. Cymes terminal, 5 to 7 cm long, slightly fulvous-hirsute. Outer flowers sterile, their 4 sepals petaloid obovoid to elliptical-obovoid, 1 to 1.3 cm long, glabrous, white, rounded at the apex, one usually larger than the other three; petals oblong or narrowly oblong-obovate, obtuse or retuse, 2 to 2.5 mm long: stamens 8; ovary rudimentary. Inner flowers pedicellate, pedicels 3 mm long: calyx teeth 5, oblong, 1 mm long: petals 5, narrowly obovate-oblong, obtuse or retuse, about 2.5 mm long, 1 mm wide; stamens 10; filaments 1.5 to 2 mm long; styles 3. Capsule narrowly ovoid, glabrous, 3 to 4 mm long.

Batan, Santo Domingo de Basco, *Bur. Sci. 3776 Fénix*, June, 1907. N. v., *Gagadang*.

Readily distinguished from the Philippine *Hydrangea lobbii* Maxim., by its entire or nearly entire, elongated leaves, which are not barbate in the axils beneath. It seems to be most closely allied to the Formosan *H. integra* Hayata, but has smaller leaves, four petaloid sepals to the outer flowers instead of two, and is apparently an erect shrub, not scandent.

PITTOSPORACEÆ.

PITTOSPORUM Banks.

P. odoratum Merr.

Sabtan, *3764 Fénix*.

Widely distributed in the central and northern Philippines at medium and higher altitudes; endemic.

LEGUMINOSÆ.

PITHECOLOBIUM Mart.

P. montanum Benth.

Sabtan, *3740 Fénix*.

Rather widely distributed in the Philippines; British India and Malaya.

WALLACEODENDRON Koorders.

W. celebicum Koorders.

CAMIGUIN, *4098 Fénix*, near the seashore.

A monotypic genus known only from Celebes and the Philippines, in the latter group not uncommon in some parts of Luzon. I am unable to distinguish from it the recently described *Pithecolobium williamsii* Elmer, from Luzon.

ACACIA Willd.

A. pennata Willd.

CAMIGUIN, *4038 Fénix*.

Rare in Luzon; British India to tropical Africa, Malaya, Southern China and ? Formosa.

INTSIA Thouars.

I. bijuga (Colebr.) O. Ktz.

CAMIGUIN, *4036 Fénix*.

Along the seashore throughout the Philippines; widely distributed in Malaya and Polynesia but not known from southern China or Formosa.

CASSIA Linn.

C. tora Linn.

BATAN, Santo Domingo de Basco, *3641 Fénix*.

A common weed in the Philippines; cosmopolitan in the tropics.

CAESALPINIA Linn.

C. pulcherrima Sw.

CAMIGUIN, *4077 Fénix*.

Common in cultivation in the Philippines, a native of tropical America.

SOPHORA Linn.

S. tomentosa Linn.

SABTAN, *3737 Fénix*. N. v., *Cápon*.

Along the seashore throughout the Philippines; cosmopolitan in the tropics.

CROTALARIA Linn.

C. incana Linn.

CAMIGUIN, *4085 Fénix*.

Widely distributed in the Philippines; tropical Asia, Africa, Malaya, and America, but not reported from southern China or Formosa.

DESMODIUM Desv.

D. umbellatum (Linn.) DC.

SABTAN, *3745 Fénix*. CAMIGUIN, *4115 Fénix*.

Near the seashore throughout the Philippines; tropical Asia to Formosa, Malaya, and Polynesia.

D. scorpiurus (Sw.) Desf.

BATAN, Santo Domingo de Basco, *3699 Fénix*.

A species of American origin, now common and widely distributed in the Philippines, but not as yet reported from any other part of the east.

D. leptopus A. Gray.

CAMIGUIN, summit of the volcano, *4132 Fénix*.

A widely distributed endemic species, allied to if not identical with *Desmodium gardneri* Benth., the latter species having been credited to southern China and Formosa by Forbes & Hemsley, based on young specimens which were doubtfully referred to it.

ALYSICARPUS Neck.

A. vaginalis (Linn.) DC.

Sabtan, *3735 Fénix.*

Widely distributed in the Philippines: tropical Asia, Africa, and Malaya, introduced into America.

DALBERGIA Linn. f.

D. ferruginea Roxb.

Sabtan, *3739 Fénix.*

Widely distributed in the Philippines; Malaya, but not known from Formosa or southern China.

DERRIS Lour.

D. uliginosa (Wall.) Benth.

Camiguin, *4001 Fénix.*

Common along the seashore throughout the Philippines; tropical Asia to Formosa, Africa, Malaya, and Australia.

ABRUS Linn.

A. precatorius Linn.

Sabtan, *3729 Fénix.* Camiguin, *4028 Fénix.* N. v., *Lasa.*

Common and widely distributed in the Philippines; cosmopolitan in the tropics of the World.

PTEROCARPUS Linn.

P. indicus Willd.

Camiguin, *3976 Fénix.*

Widely distributed in the Philippines, an important timber tree; tropical Asia to southern China and Malaya, but not known from Formosa.

PUERARIA DC.

P. thunbergiana (Sieb. & Zucc.) Benth.

Batan, Santo Domingo de Basco, *3833 Fénix.* Camiguin, *4116 Fénix.*

Japan to Formosa and southern China; not previously reported from the Philippines, but also represented in our herbarium by specimens from Luzon.

CANAVALIA Adans.

C. turgida Grah.

Camiguin, *4071 Fénix.* Batan, Santo Domingo de Basco, *3189 Mearns.*

Along the seashore throughout the Philippines; tropical Asia and Malaya. A form frequently identified as *C. obtusifolia* DC.

C. lineata (Thunb.) DC.

Batan, Santo Domingo de Basco, *3680 Fénix.*

Common along the seashore in the Philippines; widely distributed.

INDIGOFERA Linn.

I. anil Linn.

Batan, Santo Domingo de Basco, *3596 Fénix.* Camiguin, *3965 Fénix.* N. v., *Panay.*

Common in the Philippines; supposed to be a native of tropical America, but now widely distributed, wild and cultivated, in the tropics of the World.

I. tinctoria Linn.

Batan, Santo Domingo de Basco, *3705 Fénix.* N. v., *Tayum.*

Commoner than the preceding in the Philippines; distribution about the same as *I. anil* Linn.

I. trifoliata Linn.

SABTAN, *3724 Fénix.*

Not common in the Philippines; tropical Asia to southern China, Malaya and Australia, but not known from Formosa.

I. teysmanni Miq.

BATAN, Santo Domingo de Basco, *3190 Mearns.*

Rather common and widely distributed in the Philippines; southern China and Formosa through Malaya to New Caledonia. See Prain and Baker in Journ. Bot. 40 (1902) 143.

VIGNA Savi.

V. luteola (Jacq.) Benth.

CAMIGUIN, *4064 Fénix.*

Widely distributed in the Philippines; cosmopolitan in the tropics.

OXALIDACEÆ.

OXALIS Linn.

O. repens Thunb.

BATAN, Santo Domingo de Basco, *3209 Mearns; 3591 Fénix.* N. v., *Pichic.*

Widely distributed in the Philippines; tropical and temperate parts of the World, closely allied to *Oxalis corniculata* Linn.

ZYGOPHYLLACEÆ.

TRIBULUS Linn.

T. cistoides Linn.

FUGA, *3247 Mearns.*

Not common in the Philippines; widely distributed in tropical and warm regions of the World.

RUTACEÆ.

FAGARA Linn.

F. integrifoliola Merr.

BATAN, Santo Domingo de Basco, *3584 Fénix.* N. v., *Baroc.*

Rather widely distributed in the central and northern Philippines; endemic.

MELICOPE Forst.

M. luzonensis Engl.

BATAN, Santo Domingo de Basco, *3215, 3235 Mearns; 3603 Fénix.* N. v., *Ydacacayo.*

Common and widely distributed in the Philippines; endemic.

LUNASIA Blanco.

Lunasia babuyanica sp. nov.

Differt a *Lunasia amara* fructibus processibus mollibus dense stellato-tomentosis circiter 5 mm longis obtectis.

A shrub, with the general appearance of *Lunasia amara* Blanco, but with quite different fruits. Branches, branchlets, inflorescence, the lower surface of the leaves and midrib above rather densely pale-stellate-pubescent. Leaves alternate, obovate-oblong, 20 to 30 cm long, 8 to 12 cm wide, submembranous, shining, the apex shortly and abruptly blunt-acuminate, narrowed below toward the acute base, entire, the upper surface

stellate-pubescent along the midrib, the lower surface rather densely stellate-pubescent when young, becoming subglabrous in age; nerves about 22 on each side of the midrib, parallel, distinct; petioles 8 to 11 cm long, straight, stellate-pubescent. Panicles slender, narrow, axillary, 20 to 30 cm long, densely stellate-pubescent, the branches scattered, few, the longest ones scarcely exceeding 4 cm in length. Staminate flowers crowded into dense sessile heads 4 to 5 mm in diameter, arranged along the ultimate branchlets. Sepals 3, narrow, stellate-pubescent, about 1 mm long. Petals twice as long as the sepals. Stamens 3. Pistillate flowers not seen. Fruit of three 1 to 1.5 cm long carpels, the outside densely covered with rather soft, 5 mm long, densely stellate-tomentose processes.

CAMIGUIN (Babuyan Islands), *Bur. Sci. 4050 Fénix*, June 27, 1907, in thickets near the seashore.

A very characteristic species with the facies of *Lunasia amara* Blanco, but at once distinguished by its more pubescent leaves and its fruits being covered with numerous, soft, stellate-tomentose processes about 5 mm long.

Lunasia amara Blanco is very common and widely distributed in the Philippines, and is rather variable in vegetative characters. No representative of the genus is known from outside of the Malayan region.

MICROMELUM Blume.

M. tephrocarpum Turcz.

BATAN, Santo Domingo de Basco, *3647 Fénix*. CAMIGUIN, *3994 Fénix*.

A form endemic to the Philippines, scarcely distinct from the widely distributed *Micromelum pubescens* Blume.

MURRAYA Linn.

M. exotica Linn.

CAMIGUIN, *4114 Fénix*.

Common and widely distributed in the Philippines; tropical Asia to Formosa, Malaya, Australia and Polynesia.

M. crenulata Oliv.

SABTAN, *3742 Fénix*.

A species known only from the Philippines, not common.

CITRUS Linn.

C. hystrix DC.

BATAN, Santo Domingo de Basco, *3836 Fénix*. N. v., *Valatino*.

Widely distributed in the Philippines; British India to Malaya.

MELIACEÆ.

CHISOCHETON Blume.

C. philippinus (Turcz.) Harms.

CAMIGUIN, *4046 Fénix*.

Common and widely distributed in the Philippines; endemic.

AGLAIA Lour.

Aglaia elliptifolia sp. nov. § *Euaglaia.*

Arbor parva, usque ad 5 m alta, ramulis ramis paniculisque dense ferrugineo-lepidotis; foliis imparipinnatis, 2-jugatis, 20 ad 25 cm longis; foliolis submembranaceis, ellipticis, 8 ad 15 cm longis, pallidis, subtus plus minus lepidotis, apice rotundatis; paniculis usque ad 25 cm longis, multifloris; floribus spicatis, pedicellatis; staminibus 6 vel 5.

A small tree, 5 m high or less. Branches and branchlets densely ferruginous-lepidote, the younger parts often cupreous. Leaves 20 to 25 cm long, odd-pinnate, 2-, rarely 3-jugate, the rachis and petioles lepidote; leaflets elliptical, 8 to 15 cm long, 5 to 8 cm wide, pale, submembranous, rounded at both ends, or the base subacute, glabrous above, beneath lepidote, especially on the midrib and nerves; nerves about 9 on each side of the midrib, anastomosing, the reticulations lax; petiolules 5 to 7 mm long, that of the terminal leaflet longer. Panicles axillary, about as long as the leaves, densely lepidote, the lower branches 10 cm long or less. Flowers yellow, racemosely disposed on the ultimate branchlets, many, pedicellate, their pedicels lepidote, 1 to 2 mm long. Sepals 5, orbicular-reniform, rounded, lepidote, about 1 mm long. Petals 5, imbricate, glabrous, orbicular-ovate or elliptical, rounded, 2.5 to 3 mm long, free from the staminal tube. Staminal tube 2 mm long, obscurely toothed. Stamens 6; anthers triangular-ovate, 0.8 mm long, sessile, inserted on the inner upper portion of the tube, almost marginal, suberect or somewhat inflexed.

Sabtán, *Bur. Sci. 3733 Fénix*, June 4, 1907. Camiguin, *3984 Fénix*, June 21, 1907. Babuyan, *3909 Fénix*, June 17, 1907. In addition to the above specimens, one from Y'Ami Island, the most northern point in the Philippines, *Bur. Sci. 4152 Fénix*, may be referable here, but has longer petiolules and obscurely acuminate leaflets, in the latter respect approaching *Aglaia dentieulata* Turcz.

A species apparently most closely allied to *Aglaia dentieulata* Turcz., but at once distinguished by its elliptical, rounded, not acuminate leaflets, and other characters. Its anthers are inserted so close to the margin of the staminal tube, that it might almost be referred to the section *Hearnia*.

Aglaia elaeagnoidea Benth., var. **pallens** var. nov.

A typo differt foliolis minoribus, angustioribus, apice non cuspidatis, ramis ramulis paniculis foliisque densissime pallide lepidotis. Foliis imparipinnatis, 2-jugatis; foliolis 3 ad 5 cm longis, 1 ad 2 cm latis, breviter obscure acuminatis, basi inaequilateralibus, decurrento-acuminatis.

Camiguin, *4122 Fénix*, along the seashore. Batan, Santo Domingo de Basco, *3831 Fénix*.

Typical *Aglaia elaeagnoidea* Benth. has not been found in the Philippines as yet, its range according to C. DeCandolle being from Java to Australia and New Caledonia. The variety *formosana*, recently described from Formosa by Hayata,

is well characterized by its long panicles (20 to 30 cm). The variety above described appears to be quite distinct from Javan material in our herbarium that apparently well represents Bentham's species, and comparison with type material may warrant giving the present form specific rank. The wood is said to be very hard.

EUPHORBIACEÆ.

PHYLLANTHUS Linn.

P. niruri Linn.

Batan, Santo Domingo de Basco, *3722 Fénix.*

Common throughout the Philippines; widely distributed in the tropics of the World.

P. reticulatus Poir.

Camiguin, *3967 Fénix.*

Abundant throughout the Philippines; tropical Asia, Africa, Malaya, and northern Australia.

GLOCHIDION Forst.

Glochidion camiguinense sp. nov. § *Hemiglochidion.*

Arbor parva, 5 ad 6 m alta, glabra; foliis alternis, oblongo-ovatis vel elliptico-ovatis, pallidis, chartaceis, breviter acuminatis, leviter falcatis, usque ad 7 cm longis, nervis utrinque 9; floribus masculinis 6-meris, circiter 2 mm longis; antheris 3, erectis, connatis; floribus femineis 6-meris; ovario glabro, 5-loculare.

A small tree 5 to 6 m high, glabrous throughout. Branches terete, grayish, lenticellate, the branchlets brownish, somewhat angular. Leaves alternate, oblong-ovate to elliptical-ovate, pale, chartaceous, 5 to 7 cm long, 2 to 3 cm wide, somewhat falcate, the base rounded, inequilateral, the apex short-acuminate; nerves about 9 on each side of the midrib; petioles 2 to 3 mm long. Flowers axillary, fascicled, short-pedicelled, few in each axil. Staminate flowers: sepals 6, the outer ones 2 mm long, the inner slightly smaller; anthers 3, erect, connate, 1 mm long. Pistillate flowers similar in size to the staminate ones, the sepals 6. Ovary ovoid, glabrous, 5-celled, each cell 2-ovuled; style as thick as the ovary and not differentiated from it, depressed at the apex. Fruit depressed-globose, white, according to the collector, glabrous, 5-ridged, about 1 cm in diameter; seeds red when fresh.

Camiguin, *Bur. Sci. 4108 Fénix*, June 21, 1907. I am also disposed to refer here a specimen from the same island, *Fénix 4026*, with less pale leaves, and the style not so thick as the ovary.

Glochidion fenicis sp. nov. § *Euglochidion.*

Arbor parva, 6 ad 7 m alta, glabra; foliis submembranaceis, oblongo-ovatis, usque ad 16 cm longis, longe temuiter acuminatis, basi inaequilater rotundatis, nitidis, nervis utrinque 6 vel 7; floribus axillaribus, fasciculatis, circiter 1.5 mm longis; calycis segmentis 5; staminibus 5, antheris erectis connatis; fructibus glabris, depresso-globosis, circiter 5 mm diam.

A small tree 6 to 7 m high, glabrous throughout. Branches gray, terete, the branchlets reddish-brown, slender, the tips more or less angled. Leaves oblong-ovate, submembranous, 10 to 16 cm long, 5 to 6 mm wide, the base rather broad, inequilateral, rounded, narrowed upwards, the apex rather long and slenderly acuminate, shining, the lower surface slightly paler than the upper; nerves 6 or 7 on each side of the midrib, curved-ascending, obscurely anastomosing, rather distinct beneath; petioles 4 mm long or less. Flowers axillary, fascicled, pedicellate. Sepals 5, imbricate, ovate, 1.5 mm long. Stamens 5, the anthers erect, apiculate, 1.2 mm long, connate. Pistillate flowers 6-merous. Calyx segments 6, ovate, slightly acuminate, glabrous. Ovary ovoid, glabrous, depressed at the apex, the stylar column 6-fid, obscurely lobulate, 0.4 mm long, wider than long and inserted in the depressed apex of the ovary. Fruit yellowish, glabrous, depressed-globose, about 5 mm in diameter, with 10, very obscure, rounded ridges.

Batan, Santo Domingo de Basco, *Bur. Sci. 3696 Fénix*, June 1, 1907. N. v., *Annam*.

Apparently most closely allied to *Glochidion arnottianum* Muell. Arg., of southern China and Hongkong, but with quite different vegetative characters.

FLUGGEA Willd.

F. virosa (Roxb.) Baill. (*F. oborata* Wall.)

Camiguin, *4011 Fénix*.

Widely distributed in the Philippines; tropical Asia, Africa, Malaya, and Australia.

BREYNIA Forst.

B. cernua Muell. Arg.

Camiguin, *3997 Fénix*. Batan, Santo Domingo de Basco, *3718 Fénix*. N. v., *Antimantinid*.

Widely distributed in the Philippines; Malaya.

CYCLOSTEMON Blume.

Cyclostemon falcatus sp. nov. § *Eucyclostemon ?*

Arbor parva, fructibus exceptis glabra; ramis ramulisque griseis, teretibus; foliis coriaceis, nitidis, oblongis vel oblongo-ovatis, usque ad 10 cm longis, valde inaequilateralibus, falcatis, basi acutis, apice obtusis vel rotundatis, margine integris; floribus femineis axillaribus, solitariis, pedicellatis; fructibus 1 ad 1.5 cm longis, ovoideis, pubescentibus, 2-locularibus, exocarpio coriaceo.

A small tree or shrub 3 to 5 m high, glabrous except the fruits. Branches and branchlets pale-gray, terete. Leaves alternate, oblong or oblong-ovate, 6 to 10 cm long, 3 to 4.5 cm wide, coriaceous, shining, entire, very strongly inequilateral, falcate, the apex obtuse or rounded, the base inequilateral, acute; nerves 7 or 8 on each side of the midrib, distant, irregular, anastomosing, scarcely more distinct than are the secondary ones and reticulations, the reticulations obscure above, distinct

beneath; petioles stout, about 5 mm long. Flowers unknown. Fruit axillary, solitary, pedicelled, the pedicels 5 to 7 mm long, subtended at the base by several small, pale bracts, the fruits ovoid, 1 to 1.5 cm long, obtuse, gray or brownish, with numerous somewhat appressed short hairs, the pericarp coriaceous, 2-celled, each cell with two ovules.

CAMIGUIN, *Bur. Sci. 4033 Fénix*, June 22, 1907, along the seashore.

A species well characterized by its 2-celled ovary and very strongly inequilateral, falcate, obtuse leaves. The genus is well developed in the Philippines, with 6 or 7 species, but no representative is known from Formosa or southern China.

ANTIDESMA Linn.

A. lobbianum Muell. Arg.

BATAN, Santo Domingo de Basco, *3656 Fénix*. CAMIGUIN, *3996 Fénix*.

Widely distributed in the Philippines; endemic.

A. cumingii Muell. Arg.

CAMIGUIN, *4079 Fénix*.

Widely distributed in the Philippines; endemic. *A. membranaefolium* Elm., recently described, is quite the same.

CLEISTANTHUS Hook.

C. ovatus C. B. Robinson in Philip. Journ. Sci. 3 (1908) Bot. 194.

CAMIGUIN, *4051 Fénix*, (type).

Known only from this one collection. This genus has about 13 representatives in the Philippines, but none are known from southern China or Formosa.

CLAOXYLON Juss.

C. rubescens Miq., var. **meyenianum** Muell. Arg.

BATAN, Santo Domingo de Basco, *3639 Fénix*.

The species widely distributed in the Malayan region, the variety known only from the Philippines where it is common and widely distributed.

MALLOTUS Lour.

M. leucocalyx Muell. Arg.

CAMIGUIN, *4047 Fénix*.

Known only from the Philippines, the above specimen agreeing in all essential characters with typical material from Mindanao.

M. moluccanus Muell. Arg.

BATAN, Santo Domingo de Basco, *3714 Fénix*. N. v., *Ajem*.

Very common and widely distributed in the Philippines; tropical Asia to Formosa and Malaya.

M. philippinensis (Lam.) Muell. Arg.

CAMIGUIN, *4112 Fénix*.

Very common and widely distributed in the Philippines; tropical Asia to Formosa, Malaya, northern Australia and eastern Polynesia.

M. playfairii Hemsl.

CAMIGUIN, *4024 Fénix*.

Luzon; Formosa and northern Borneo.

M. ricinoides (Pers.) Muell. Arg.

BATAN, Santo Domingo de Basco, *3769 Fénix; 3202 Mearns.* CAMIGUIN, *3942 Fénix.* N. v., *Vanaiti.*

Widely distributed in the Philippines; Tenasserim to southern China.

MACARANGA Thouars.

M. tanarius (Linn.) Muell. Arg.

CAMIGUIN, *3990 Fénix*, a luxuriant form.

Widely distributed in the Philippines; southern China, the Riu Kiu Archipelago and Formosa, throughout Malaya.

M. cumingii Muell. Arg.

BATAN, near the summit of Mount Iraya, *3772 Fénix.* N. v., *Vanati.*

Widely distributed in the Philippines; endemic.

ACALYPHA Linn.

A. indica Linn.

BATAN, Santo Domingo de Basco, *3219 Mearns.*

A common weed throughout the Philippines; tropical Asia and Africa to Malaya and Polynesia.

A. grandis Benth., var. **velutina** Muell. Arg.

BATAN, Santo Domingo de Basco, *3192, 3194, 3225 Mearns.*

With several varieties in Malaya and Polynesia, the above variety confined to the Philippines.

A. stipulacea Klotz.

BATAN, Santo Domingo de Basco, *3607 Fénix; 3206 Mearns.* CAMIGUIN, *4084 Fénix.* N. v., *Ajas.*

The above specimens represent luxuriant forms of the species, with large bracts and large leaves, the latter sometimes cordate at the base. One specimen, *Fénix 3607*, is peculiar in having both staminate and pistillate flowers on the same plant, but it is certainly the same as the other specimens here cited. Very common and widely distributed in the Philippines; Malaya.

RICINUS Linn.

R. communis Linn.

BATAN, Santo Domingo de Basco, *3569 Fénix.* N. v., *Cataná.*

Widely distributed in the Philippines; tropical and temperate regions of the World, cultivated and spontaneous.

HOMALANTHUS Juss.

H. fastuosus (Muell. Arg.) F.-Vill.

BATAN, near the summit of Mount Iraya, *3771 Fénix.* N. v., *Tanúgtug.*

Widely distributed in the Philippines at medium and higher altitudes; known only from the Philippines.

EUPHORBIA Linn.

E. atoto Forst.

SABTAN, *3725 Fénix.* FUGA, *3242 Mearns.*

Along the seashore throughout the Philippines; Ceylon to Formosa, Malaya, northern Australia and Polynesia.

E. pilulifera Linn.

Batan, Santo Domingo de Basco, *3597 Fénix*. Camiguin, *3941 Fénix*. N. v., *Tairas*.

Common throughout the Philippines; tropics of the World.

E. serrulata Reinw.

Camiguin, *4016 Fénix*.

Widely distributed in the Philippines: Riu Kiu Archipelago to Formosa, southern China and Malayan Archipelago.

E. thymifolia Linn.

Batan, Santo Domingo de Basco, *3710 Fénix*.

A weed in and about towns throughout the Philippines; tropics of the World.

ANACARDIACEÆ.

SEMECARPUS Linn. f.

S. sp.

Batan, Santo Domingo de Basco, *3610 Fénix*. Leaf specimens only, not matched by any of the species in our herbarium but allied to *Semecarpus perrottetii* March. Said to be poisonous, as is the case with *S. perrottetii* March. N. v., *Anias*.

STAPHYLEACEÆ.

TURPINIA Vent.

T. pomifera DC.

Batan, Santo Domingo de Basco, *3778 Fénix*. N. v., *Malacatigui*.

Common and widely distributed in the Philippines; widely distributed in tropical Asia, and Malaya.

ICACINACEÆ.

GONOCARYUM Miq.

G. calleryanum (Baill.) Becc.

Camiguin, *3987 Fénix*.

Widely distributed in the Philippines; endemic.

SAPINDACEÆ.

CARDIOSPERMUM Linn.

C. halicacabum Linn.

Batan, Santo Domingo de Basco, *3604 Fénix; 3213 Mearns*.

Common and widely distributed in the Philippines; widely distributed in the tropics of the World.

ELATTOSTACHYS Radlk.

E. verrucosa (Bl.) Radlk.

Fuga, *3250 Mearns*.

Widely distributed in the Philippines; Java, Timor, etc., but not found in southern China or Formosa.

POMETIA Forst.

P. pinnata Forst.

Camiguin, *4081 Fénix*.

Widely distributed in the Philippines; eastern Malaya to New Guinea and Polynesia.

RHAMNACEÆ.

COLUBRINA L. C. Rich.

C. asiatica (Linn.) Brongn.
CAMIGUIN, *4093 Fénix*. SABTAN, *3761 Fénix*.
Common near the sea throughout the Philippines; India to Africa, Formosa, Malaya, Australia, and Polynesia.

VITACEÆ.

LEEA Linn.

L. philippinensis Merr.
SABTAN, *3756 Fénix*. N. v., *Niblaoen*.
Widely distributed in Luzon; endemic.

L. manillensis Walp.
BATAN, Santo Domingo de Basco, *3582 Fénix*. N. v., *Vodadin*.
Widely distributed in the Philippines; endemic.

L. aculeata Blume.
CAMIGUIN, *3945 Fénix*.
Widely distributed in the Philippines; Malaya.

AMPELOPSIS Michx.

A. heterophylla (Thunb.) Planch.
SABTAN, *Petrelli s. n.* CAMIGUIN, *4062 Fénix*.
Widely distributed in the Philippines; Japan to southern China and Formosa.

MALVACEÆ.

HIBISCUS Linn.

H. tiliaceus Linn.
BATAN, Santo Domingo de Basco, *3713 Fénix*. CAMIGUIN, *3991 Fénix*. N. v., *Janót*.
Common along the seashore throughout the Philippines; tropics of both hemispheres.

ABELMOSCHUS Medic.

A. moschatus Moench.
CAMIGUIN, *4055 Fénix*.
Widely distributed in the Philippines; tropical Asia, and Malaya, cultivated in other tropical countries.

THESPESIA Corr.

T. populnea (Linn.) Corr.
BATAN, Santo Domingo de Basco, *3616 Fénix*.
Widely distributed in the Philippines; tropical Asia, Africa, Malaya, and Polynesia, but not known from southern China or Formosa.

MALVASTRUM A. Gray.

M. coromandelinum (Willd.) Garke.
BATAN, Santo Domingo de Basco, *3598 Fénix*.
Widely distributed in the Philippines; tropics generally.

URENA Linn.

U. lobata Linn., var. **scabriuscula** A. Gray.
Batan, Santo Domingo de Basco, *3660 Fénix*. Camiguin, *4025 Fénix*.
Common throughout the Philippines; British India.

SIDA Linn.

S. rhombifolia Linn.
Batan, Santo Domingo de Basco, *3600 Fénix*. Camiguin, *3954 Fénix*.
Common throughout the Philippines; tropics generally.

STERCULIACEÆ.

MELOCHIA Linn.

M. corchorifolia Linn.
Camiguin, *3957 Fénix*.
Throughout the Philippines; tropics generally.

ABROMA Linn. f.

A. augusta Linn. f.
Camiguin, *3946 Fénix*. Batan, Santo Domingo de Basco, *3608 Fénix*. N. v., *Neguegan*.
Widely distributed in the Philippines; tropical Asia and Malaya.

KLEINHOFIA Linn.

K. hospita Linn.
Camiguin, *3999 Fénix*.
Throughout the Philippines; tropical Asia, Africa, and Malaya.

STERCULIA Linn.

S. oblongata R. Br.
Camiguin, *Worcester s. n.* Batan, *3712 Fénix*. N. v., *Jantác*.
Widely distributed in the Philippines; Celebes.

S. montana Merr.
Camiguin, *4113 Fénix*, in forests on the slopes of the volcano; previously known only from Mount Mariveles, Luzon.

DILLENIACEÆ.

DILLENIA Linn.

D. philippinensis Rolfe.
Camiguin, *4146 Fénix*.
Common and widely distributed in the Philippines; endemic.

GUTTIFERÆ.

CALOPHYLLUM Linn.

C. inophyllum Linn.
Batan, Santo Domingo de Basco, *3716 Fénix*. Camiguin, *4090 Fénix*. N. v., *Vultalao*.
Seashores throughout the Philippines; tropics of the World.

C. blancoi Pl. & Tr.
Batan, Santo Domingo de Basco, *3218 Mearns*.
Widely distributed in the Philippines; endemic.

GARCINIA Linn.

G. lateriflora Blume.
CAMIGUIN, *4142 Fénix.*
Rather widely distributed in the Philippines; Java.

THEACEÆ.

EURYA Thunb.

E. japonica Thunb.
BATAN, *3800 Fénix.*
Throughout the Philippines at higher altitudes; Japan to India, Malaya and Polynesia.

PASSIFLORACEÆ.

ADENIA Forsk.

A. coccinea (Blanco) comb. nov.
Modecca coccinea Blanco Fl. Filip. ed. 2 (1845) 453.
CAMIGUIN, *4059 Fénix.* FUGA, *3248 Mearns.*
Widely distributed in the Philippines; endemic.

BEGONIACEÆ.

BEGONIA Linn.

Begonia fenicis Merrill sp. nov. § *Diploclinium.*

Glabra, caudice repente; foliis oblique ovato-orbicularibus, acuminatis, irregulariter dentatis, cordatis, palmatim 7-9-nerviis, glabris; stipulis ovatis, brunneis, membranaceis, acuminatis, usque ad 1 cm longis; pedunculis erectis, foliis æqualibus vel longioribus apice dichotomis, bracteis caducis; floribus masculinis sepalis orbiculari-ovatis, 8 mm longis; capsulis trialatis, 12 ad 14 mm longis.

Glabrous throughout. Stem prostrate, rather thick, covered with numerous ovate, brown stipules. Leaves obliquely ovate-orbicular, membranous, 5 to 11 cm long, the apex rather sharply acuminate, the base cordate, the sinus narrow, the basal lobes rounded, margins irregularly dentate, the teeth small, apiculate; nerves 7 to 9; stipules ovate to broadly ovate, acuminate, brown, 1 cm long or less, petioles 6 to 13 cm long. Peduncles erect, equaling or exceeding the leaves, dichotomously branched above. Staminate flowers; sepals 2, orbicular-ovate, rounded, membranous, white or pale pink, 8 mm long. Petals 2, similar to the sepals but smaller. Stamens about 20; anthers oblong-obovoid, 1 to 1.2 mm long, the filaments 1 to 2 mm long. Pistillate flowers similar in size and color to the staminate; styles 3, 3.5 mm long or less, the stigmas papillose. Capsule 12 to 14 mm long, ovate to orbicular-ovate in outline, triangular, rounded at the base, the apex broad, somewhat apiculate, 3-winged, the wings 2.5 to 5 mm wide.

BATAN, Santo Domingo de Basco, *Bur. Sci. 3619 Fénix*, May 30, 1907, *3207*

Mearns, May 27, 1907, on rocky hillsides. BABUYAN, *3893 Fénix*, June 17, 1907. N. v., *Tapait*.

A species allied to *Begonia rhombicarpa* A. DC., but entirely glabrous, with larger more numerously nerved leaves, larger flowers and fruits and with much larger differently shaped stipules, the numerous brown stipules which nearly cover the stems being a striking characteristic of the present species.

THYMELAEACEÆ.

WIKSTROEMIA Endl.

W. viridiflora Meisn.

BATAN, Santo Domingo de Basco, *3566 Fénix; 3233 Mearns*. N. v., *Titipuhó*.

Southern China and the Philippines.

LYTHRACEÆ.

PEMPHIS Forst.

P. acidula Forst.

SABTAN, *3727 Fénix*. N. v., *Palupú*.

Along the seashore throughout the Philippines; eastern Africa, tropical Asia to Formosa, Malaya, Australia and Polynesia.

LAGERSTROEMIA Linn.

L. speciosa (Linn.) Pers.

BATAN, Santo Domingo de Basco, *3220 Mearns*.

Common throughout the Philippines; British India to southern China, Malaya and northern Australia.

LECYTHIDACEÆ.

BARRINGTONIA Forst.

B. racemosa (Linn.) Roxb.

CAMIGUIN, *3983 Fénix*.

Near the seashore throughout the Philippines; British India to Formosa, Malaya and Polynesia.

B. asiatica (Linn.) Kurz.

FUGA, *3254 Mearns*.

Along the seashore throughout the Philippines; Malay Peninsula and Archipelago to Formosa and Polynesia.

COMBRETACEÆ.

TERMINALIA Linn.

T. catappa Linn.

BATAN, Santo Domingo de Basco, *3690 Fénix*. N. v., *Savadúg*.

Common near the sea throughout the Philippines; British India to Formosa, Malaya and Polynesia, cultivated in many other tropical countries.

QUISQUALIS Linn.

Q. indica Linn.

CAMIGUIN, *3958 Fénix*.

Throughout the Philippines, common; tropical Asia to Formosa and Malaya.

MYRTACEÆ.

RHODOMYRTUS DC.

R. tomentosa (Ait.) Hassk.
CAMIGUIN, *4129 Fénix.*
Rare in the Philippines; southern China and Formosa to India and Malaya.

EUGENIA Linn.

Five species of the genus are represented in the collections of Fénix and Mearns, apparently mostly undescribed. Specific identifications have not been attempted at this time, as the Philippine species of this genus are now undergoing revision.

DECASPERMUM Forst.

D. paniculatum (Lindl.) Kurz.
SABTAN, *3741 Fénix.*
Very common in the Philippines; tropical Asia to Malaya and Australia.

MELASTOMATACEÆ.

ASTRONIA Blume.

A. cumingiana Vidal.
BATAN, Mount Iraya, *3782 Fénix.* N. v., *Busensen.*
Widely distributed in the Philippines at higher altitudes; Celebes.

MEDINILLA Blume.

M. magnifica Lindl.
BATAN, near the summit of Mount Iraya, *3820 Fénix.* CAMIGUIN, *4151 Fénix,* near the summit of the volcano.
Widely distributed in the Philippines; endemic.

MELASTOMA Linn.

M. polyanthum Blume.
SABTAN, *3743 Fénix.* BABUYAN, *3923 Fénix.*
Common and widely distributed in the Philippines; India to southern China, Malaya, and northern Australia.

Melastoma membranaceum Merrill sp. nov.

Frutex erecta, 1 ad 1.5 m alta; ramis, ramulis, foliis subtus ad nervos, petiolisque squamulis sparsis ovatis, rariter lanceolatis, adpressis obtectis; foliis ovato-lanceolatis, acuminatis, 9 ad 15 cm longis, 5-nerviis, membranaceis, nitidis, supra glabris; calycis lobis tubo longioribus, dentibus subulatis ciliatis apice penicillato-setosis alternantibus; calyce paleolis lanceolatis pauce ciliatis, non fasciculatis, adpressis, dense obtecto; floribus 5-meris, circiter 4 cm longis.

An undershrub 1 to 1.3 m high, with few branches, the branches and branchlets terete or somewhat compressed, light-gray or brownish, with few scattered ovate appressed scales. Leaves ovate-lanceolate, 9 to 15 cm long, 4 to 6 cm wide, base acute or rounded, apex acuminate, membranaceous, somewhat shining, beneath on the nerves with few appressed ovate, rarely lanceolate scales, above glabrous; nerves 5, prominent,

the transverse nervules numerous, curved upwards; petioles with few appressed scales, 1.5 to 2.5 cm long. Flowers in threes, the inflorescence terminal, 6 cm long. Calyx about 12 mm long, 8 mm thick, densely covered with imbricated, appressed, penicillate-acuminate slightly ciliate 1.2 mm long scales, the lobes 5, oblong-lanceolate, 1.8 cm long, 7 mm wide, penicillate-acuminate, the back densely scaly, the margins with scattered penicillate hairs, the alternating teeth 3 mm long, tipped with about three penicillate hairs. Petals obovate, obtuse, about 3 cm long, 2.4 cm wide, the apical margin ciliate, 7-nerved. Stamens 10, the longer ones with filaments about 2 cm long including the connective, the appendages about 2 mm long; anthers 11 mm long. Bracts ovate-lanceolate, acuminate, 2 cm long, densely paleaceous, the bracteoles similar, about 1.5 cm long.

Batan, Santo Domingo de Basco, *Bur. Sci. 3798 Fénix,* June 8, 1907. Camiguin, *Bur. Sci. 4109 Fénix,* July 3, 1907.

A species evidently allied to *Melastoma penicillatum* Naud., and *M. paleaceum* Naud., but with calyx scales more like species in the group with *M. polyanthum*, characterized by its membranaceous nearly glabrous leaves.

UMBELLIFERÆ.

CENTELLA Linn.

C. asiatica (Linn.) Urb.

Batan, Santo Domingo de Basco, *3628 Fénix.* Camiguin, *3966 Fénix.* N. v., *Tagaditac.*

Common throughout the Philippines; tropical and subtropical regions of the World.

SCHEFFLERA Forst.

S. odorata (Blanco) Merr. & Rolfe.

Sabtan, *3753 Fénix.* N. v., *Tugjic.*

Widely distributed in the Philippines; endemic.

BOERLAGIODENDRON Harms.

B. camiguinense Merr. in Philip. Journ. Sci. 3 (1908) Bot. 252.

Camiguin, *4135 Fénix.*

Known only from Camiguin.

B. pectinatum Merr. l. c. 253.

Batan, Mount Iraya, *3775 Fénix.*

Known only from Batan; the two most northern known species of the genus.

ONAGRACEÆ.

JUSSIEUA Linn.

J. suffruticosa Linn.

Camiguin, *3971 Fénix.*

Widely distributed in the Philippines; tropics of the World.

MYRSINACEÆ.

MAESA Forsk.

M. denticulata Mez.

Batan, Santo Domingo de Basco, *3205 Mearns; 3640 Fénix.*

Widely distributed and common in the Philippines; endemic.

AEGICERAS Gaertn.

A. corniculatum (Linn.) Blanco.

Fuga, *3255 Mearns.*

Along the seashore throughout the Philippines; British India to southern China, Malaya, and Australia. Not reported from Formosa.

ARDISIA Sw.

A. humilis (Burm.) Vahl.

Batan, Santo Domingo de Basco, *3214, 3216 Mearns; 3589 Fénix.* Fuga, *3245 Mearns.* N. v., *Pain.*

Common and widely distributed in the Philippines; India to southern China and Malaya.

PRIMULACEÆ.

LYSIMACHIA Linn.

L. mauritiana Lam. Encycl. 3 (1789) 572; Pax & Knuth, Pflanzenreich 22 (1905) 273.

L. linearifolia Hook. & Arn. Bot. Beechey Voy. (1841) 268; Duby in DC. Prodr. 8 (1844) 61; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1889) 53; Mats. & Hayata Enum. Pl. Formosa (1906) 221.

Batan, Santo Domingo de Basco, *3197, 3188 Mearns.*

British India to Japan, Formosa, Mauritius, Hawaiian Islands, Polynesia, and New Caledonia. Not previously reported from the Philippines; the fifth species of the genus to be found in the Archipelago.

SAPOTACEÆ.

PALAQUIUM Blanco.

P. bataanense Merr.

Batan, Santo Domingo de Basco, *3668 Fénix.* Camiguin, *4101 Fénix.* N. v., *Natú.*

Luzon.

EBENACEÆ.

MABA Forst.

M. buxifolia (Rottb.) Pers.

Camiguin, *4117, 3768 Fénix.*

Widely distributed in the Philippines; tropical Asia, Africa, and Australia, Malaya and Polynesia. Not known from southern China or Formosa.

DIOSPYROS Linn.

D. discolor Willd.

Batan, Santo Domingo de Basco, *3145 Mearns; 3839 Fénix.* N. v., *Camaya.*

Widely distributed in the Philippines, native and cultivated; Borneo. Cultivated in other tropical countries.

D. pilosanthera Blanco.

CAMIGUIN, *4000 Fénix.*

Widely distributed in the Philippines; endemic.

D. maritima Blume Bijdr. (1825) 669; Hiern Monog. Eben. (1873) 211.

FUGA, *3251 Mearns.*

Here first credited to the Philippines, but represented in our herbarium by many specimens from various parts of the Archipelago; widely distributed in Malaya, extending to northern Australia.

Diospyros sabtanense Merrill sp. nov. § *Ermellinus.*

Frutex 4 ad 5 m alta; foliis alternis, papyraceis, ellipticis, oblongo-ellipticis, vel obovato-ellipticis, apice obtusis, basi acutis, 6 ad 12 cm longis, supra nitidis; nervis utrinque 7 vel 8; floribus femineis axillaribus, sessilibus, solitariis vel binis, pubescentibus, 4-meris, tubo cylindraceo; staminodiis 8; ovario ovoideo, 8-loculari, loculis 1-ovulatis.

A shrub 4 to 5 m high. Branches and branchlets terete, brown, the former glabrous, the latter somewhat pubescent. Leaves alternate, papyraceous, elliptical, oblong-elliptical or obovate-elliptical, 6 to 12 cm long, 2.5 to 6 cm wide, the apex obtuse, the base acute, glabrous and shining on the upper surface, beneath glabrous or with very few scattered hairs; nerves 7 or 8 on each side of the midrib, distinct, anastomosing, the reticulations distinct, netted; petioles glabrous or slightly pubescent, 5 to 9 mm long. Pistillate flowers axillary, solitary or in pairs, sessile. Calyx broadly funnel-shaped, pubescent, the tube short, 3 mm in diameter, the lobes 4, orbicular, accrescent, pubescent, rounded, the margins reflexed. Corolla about 12 mm long, the tube cylindrical, about 6 mm long, 4.5 mm in diameter, appressed-pubescent outside, glabrous within, the lobes 4, erect in bud, in anthesis spreading, oblong-ovate or elliptical, blunt, coriaceous, glabrous inside, the median portion outside appressed-pubescent. Staminodes 8, about 4.5 mm long. Ovary ovoid, narrowed above, pubescent, 8-celled, each cell 1-ovuled; styles 5, about 3 mm long. Staminate flowers axillary, fascicled, sessile or subsessile, pubescent. Calyx cupular, 5 mm long, the teeth 4, ovate, acute. Corolla about 10 mm long. Stamens 12 to 14, unequal, 2-seriate; anthers narrowly lanceolate, apiculate, glabrous, 3 to 4 mm long, the cells dehiscing by lateral slits. Rudimentary ovary none.

SABTAN, *Bur. Sci. 3765, 3757 Fénix*, June 4, 1907, along mountain streams, the flowers yellow. N. v., *Canarem.*

A species probably allied to *Diospyros carthei* Hiern, but differing from it in many characters.

SYMPLOCACEÆ.

SYMPLOCOS Jacq.

S. ferruginea Roxb., var. **philippinensis** Brand.

CAMIGUIN, *4133 Fénix.*

The variety known only from the Philippines, the species widely distributed from India to southern China and Malaya.

GENTIANACEÆ.

ERYTHRAEA Rich.

E. spicata (Linn.) Pers. Syn. 1 (1805) 283; DC. Prodr. 9 (1845) 60; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 122; Mats. & Hayata Enum. Pl. Formosa (1906) 242.

Gentiana spicata Linn. Sp. Pl. (1753) 333.

Batan, Santo Domingo de Basco, *3142, 3144, 3231 Mearns,* May 27, 1907.

No representative of the genus has previously been found in the Philippines, and the present one has no doubt been introduced by way of Formosa.

Mediterranean region; introduced into Formosa, probably by early Portuguese colonists.

OLEACEÆ.

LINOCIERA Sw.

L. cumingiana Vidal.

Fuga, *3249 Mearns.* Sabtan, *3755 Fénix.* N. v., *Vasango.*

Widely distributed in the Philippines, endemic. A species of doubtful value.

LOGANIACEÆ.

FAGRAEA Thunb.

F. obovata Wall.

Camiguin, *4123 Fénix.*

Widely distributed in the Philippines; India to Malaya. No species of the genus is reported from Formosa or China.

GENIOSTOMA Forst.

Geniostoma batanense Merrill sp. nov.

Arbuscula 2 ad 3 m alta, inflorescentiis exceptis glabra; ramis ramulisque teretibus, griseis; foliis elliptico-ovatis vel oblongo-ovatis, submembranaceis, nitidis, 5 ad 8 cm longis, apice acuminatis, basi acutis, nervis utrinque 5 vel 6, subprominentibus; cymis axillaribus, fasciculatis, paucifloris, parce pubescentibus, circiter 1 cm longis; floribus circiter 3 mm longis.

A shrub 2 to 3 m high, glabrous except the inflorescence. Branches and branchlets terete, glabrous, light-gray. Leaves elliptical-ovate to oblong-ovate, 5 to 8 cm long, 2 to 3 cm wide, submembranous, blackish when dry, somewhat shining, the apex acuminate, the base acute; nerves 5 or 6 on each side of the midrib, rather distinct beneath, anastomosing, the reticulations nearly obsolete; petioles 5 to 8 mm long. Cymes axillary, fascicled, slightly pubescent or puberulent, about 1 cm long, few-flowered, the bracts and bracteoles ovate, similar, about 0.5 mm long. Calyx slightly pubescent, the lobes ovate, blunt or acute, 1 mm long. Corolla 3 mm long, the throat densely villous inside, the lobes about 1.5 mm long, ovate, reflexed, acute. Anthers 0.8 mm long. Ovary globose; style short; stigma ovoid, 0.6 mm in diameter.

Batan, Santo Domingo de Basco, *Bur. Sci. 3795 Fénix,* June 8, 1907. N. v. *Gagadang.*

A species allied to *Geniostoma cumingianum* Benth., but with larger leaves, and different inflorescence.

APOCYNACEÆ.

LOCHNERA Reichb.

L. rosea (Linn.) Reichb.
Batan, Santo Domingo de Basco, *3135, 3196 Mearns.*
Common, especially along the seashore, throughout the Philippines; a native of tropical America, now widely distributed in the tropics of the World.

TABERNAEMONTANA Linn.

T. pandacaqui Poir.
Batan, Santo Domingo de Basco, *3669 Fénix.*
Common and widely distributed in the Philippines; endemic.

T. cumingiana A. DC.
Camiguin, *3998 Fénix.*
Common and widely distributed in the Philippines; Formosa and (?) Java.

PARSONSIA R. Br.

P. confusa Merr.
Batan, Santo Domingo de Basco, *3626 Fénix.* N. v., *Devas.*
Known only from the Philippines.

CERBERA Linn.

C. odollam Gaertn.
Camiguin, *4007 Fénix.*
Along the seashore throughout the Philippines; seashores, India to Formosa, Malaya, Australia, and Polynesia.

ASCLEPIADACEÆ.

ASCLEPIAS Linn.

A. curassavica Linn.
Batan, Santo Domingo de Basco, *3572 Fénix.* N. v., *Daldal.*
Throughout the Philippines; a native of tropical America, now distributed throughout the warmer parts of the World.

GYMNEMA R. Br.

G. pachyglossum Schltr.
Babuyan, *3904 Fénix,* along the seashore.
Known only from the Philippines.

TYLOPHORA R. Br.

T. sp.
Batan, Santo Domingo de Basco, *3835 Fénix,* with fruits only, and impossible to determine to the species at the present time.

DISCHIDIA R. Br.

D. oiantha Schltr.
Camiguin, *3978 Fénix,* on trees near the seashore.
Known only from the Philippines.

D. myrtillus Schltr.
Camiguin, *4128 Fénix,* on trees at the summit of the volcano.
Known only from the Philippines.

D. sp.
CAMIGUIN, *4102 Fénix*, probably an undescribed species.

D. sp.
CAMIGUIN, *3934 Fénix*, a form apparently allied to *D. platyphylla* Schltr.

HOYA R. Br.

H. benguetense Schltr.
CAMIGUIN, *4124 Fénix*.
Known only from Luzon.

H. odorata Schltr.
BATAN, near the summit of Mount Iraya, *3789 Fénix*.
Mountains of Luzon and Mindoro.

PERGULARIA Linn.

P. filipes Schltr.
CAMIGUIN, *4097 Fénix*.
Known only from the Philippines.

TOXOCARPUS W. & A.

T. sp.
BATAN, Santo Domingo de Basco, *3658 Fénix*.

CONVOLVULACEÆ.

IPOMOEA Linn.

I. pes-caprae (Linn.) Sweet.
BATAN, Santo Domingo de Basco, *3226 Mearns; 3561 Fénix*. BABUYAN, *3905 Fénix*. N. v., *Vadino*.
Along the seashore throughout the Philippines; tropical and subtropical coasts of the World.

I. gracilis R. Br. Prodr. (1810) 484; House in Ann. N. Y. Acad. Sci. 18[2] (1908) 248.
I. denticulata (Desr.) Choisy, non R. Br.
SABTAN, *3732 Fénix*. N. v., *Ditadit*.
Near the seashore throughout the Philippines; tropics of the World.

I. stolonifera (Cyrilli) Poir. in Lam. Encycl. 6 (1804) 20; House in Ann. N. Y. Acad. Sci. 18[2] (1908) 213.
Convolvulus stoloniferus Cyrilli Pl. Rar. 1 (1788) 14.
Convolvulus littoralis Linn. Syst. ed. 10 (1759) 924. non *Ipomoea littoralis* Bl.
Convolvulus acetosaefolius Vahl Ecl. 1 (1796) 18.
Ipomoea acetosaefolia R. & S. Syst. 4 (1819) 246.
Ipomoea carnosa R. Br. Prodr. (1810) 485; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 158; Mats. & Hayata Enum. Pl. Formosa (1906) 261.
CAMIGUIN, *4091 Fénix*, along the seashore.
Seashores of tropical and subtropical regions of the World; not previously recorded from the Philippines, and here enumerated under its oldest valid specific name.

STICTOCARDIA Hallier f.

S. tiliaefolia (Desr.) Hallier f.
FUGA, *3241 Mearns*.
Widely distributed in the Philippines; tropical Asia, Africa and America.

MERREMIA Dennst.

M. nymphaeifolia (Bl.) Hallier f.

CAMIGUIN, *4027 Fénix.*

Widely distributed in the Philippines; Mascarenes, southeastern Asia, Malaya, Australia, and Polynesia.

BORRAGINACEÆ.

EHRETIA Linn.

E. microphylla Lam.

CAMIGUIN, *4017 Fénix,* normal form. BATAN, Santo Domingo de Basco, *3623 Fénix,* a peculiar dwarfed form with small, entire or nearly entire, fascicled leaves. N. v., *Palupo.*

Throughout the Philippines; British India to Formosa and Malaya.

E. philippinensis A. DC.

CAMIGUIN, *4110 Fénix.*

Widely distributed in the Philippines; endemic.

TOURNEFORTIA Linn.

T. argentea Linn. f.

FUGA, *3252, 3253 Mearns.* BATAN, Santo Domingo de Basco, *3762 Fénix.* BABUYAN, *3894 Fénix.* CAMIGUIN, *4004 Fénix.* N. v., *Uangta.*

Along the seashore throughout the Philippines; British India to Madagascar, Formosa, Malaya, Polynesia and Australia.

T. sarmentosa Lam.

CAMIGUIN, *3949 Fénix.*

Widely distributed in the Philippines; Mauritius and Seychelles through Malaya to Formosa and Australia.

HELIOTROPIUM Linn.

H. indicum Linn.

CAMIGUIN, *3970 Fénix.* BATAN, Santo Domingo de Basco, *3700 Fénix.*

A common weed throughout the Philippines; tropical Asia, Africa and America.

VERBENACEÆ.

LIPPIA Linn.

L. nodiflora Linn.

BATAN, Santo Domingo de Basco, *3201 Mearns; 3631 Fénix.* N. v., *Naculad.*

A common weed in the Philippines; tropical and warm temperate regions of the World.

CALLICARPA Linn.

Callicarpa denticulata Merrill sp. nov.

Arbuscula 2 ad 3 m alta; ramulis petiolisque densissime stellato-plumoso-pubescentibus; foliis ovatis vel late elliptico-obovatis, submembranaceis, usque ad 15 cm longis, apice breviter acuminatis, basi rotundatis vel subacutis, margine regulariter dentatis, subtus parce stellato-pubescentibus, punctis glandulosis copiosis notatis; cymis axillaribus circiter 5 cm longis, plus minus stellato-pubescentibus; floribus glanduloso-punctatis; filamentis longe exsertis, circiter 6 mm longis.

A shrub 2 to 3 m high. Branches light-gray, glabrous, the branchlets very densely stellate-plumose-pubescent. Leaves submembranous, 10 to 15 cm long, 5 to 9 cm wide, ovate to broadly elliptical-obovate, the apex short-acuminate, the base rounded to subacute, rarely slightly cordate, the margins dentate, the upper surface shining, glabrous or with few stellate hairs along the nerves, the lower surface usually paler, with scattered stellate hairs and with numerous minute, yellow, shining glands; nerves 5 to 6 on each side of the midrib, very prominent, the reticulations distinct, brown; petioles 1 to 1.5 cm long, densely stellate-plumose-pubescent, in age nearly glabrous. Cymes solitary, only in the upper axils, 5 cm long or less, peduncled, dichotomous, more or less stellate-pubescent, many-flowered. Calyx cupular, 1.5 mm long, obscurely 4-toothed, with few scattered stellate hairs and also with minute yellow glands. Corolla slightly glandular and also with scattered hairs, nearly 4 mm long, widened upward, the lobes elliptical, obtuse, about 1 mm long, purplish. Stamens long-exserted; filaments about 6 mm long; anthers somewhat glandular, 1.6 mm long. Ovary depressed-globose; style very slender, 1 cm long. Fruit globose, about 3 mm in diameter.

BATAN, Santo Domingo de Basco, *Bur. Sci. 3622 Fénix*, May 30, 1907. CAMIGUIN, *4023 Fénix*. N. v., *Anaif*.

A species well characterized by its relatively broad leaves, few cymes, and these only in the upper axils, the very long-exserted stamens and style. It has more the facies of *Premna* than of *Callicarpa*.

PREMNA Linn.

P. odorata Blanco.

BATAN, Santo Domingo de Basco, *3193 Mearns*.

Known only from the Philippines, where it is common and widely distributed.

P. subglabra Merr.

CAMIGUIN, *3940 Fénix*. BATAN, Santo Domingo de Basco, *3236 Mearns*. BABUYAN, *3927 Fénix*.

Rather widely distributed in the Philippines; endemic.

P. integrifolia Linn.

FUGA, *3238 Mearns*.

The common seacoast form that has been identified with the Linnean species, common throughout the Philippines along the seashore; India to Formosa, and Malaya.

There is some doubt as to the exact identity of the Linnean species, but whether or not true *Premna integrifolia* Linn., the specimen cited above seems also to be very close to *P. lacvigata* Miq., from Sumatra, and to *P. obtusifolia* R. Br., of northern Australia.

CLERODENDRON Linn.

C. intermedium Cham.

CAMIGUIN, *4145 Fénix*.

Very common and widely distributed in the Philippines; endemic, but with very closely allied forms found both in Formosa and in Celebes.

C. trichotomum Thunb. Fl. Jap. (1784) 256: Schauer in DC. Prodr. 11 (1847) 668; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1890) 262; Mats. & Hayata Enum. Pl. Formosa (1906) 303.

Batan, Santo Domingo de Basco, *3615 Fénix*. N. v., *Tungao*. Luzon, Province of Isabela, Casiguran, *3114 Mearns*, June, 1907.

Japan to Formosa, central and southern China; new to the Philippines.

VITEX Linn.

V. trifolia Linn.

Batan, Santo Domingo de Basco, *3176 Mearns*.

Along the seashore throughout the Philippines; British India to Formosa, Malaya, and Australia.

V. ovata Thunb.

Batan, Santo Domingo de Basco, *3212 Mearns; 3644 Fénix*. Camiguin, *4005 Fénix*.

Common along the seashore throughout the Philippines; Japan to Formosa, southern China and Malaya. Possibly not specifically distinct from the preceding.

LABIATÆ.

LEONURUS Linn.

L. sibiricus Linn.

Batan, Santo Domingo de Basco, *3570 Fénix; 3198 Mearns*.

Widely distributed in the Philippines; temperate and tropical regions of both Hemispheres, a native of the Old World.

ANISOMELES R. Br.

A. indica (Linn.) O. Ktze.

Camiguin, *4022 Fénix*.

Common and widely distributed in the Philippines; India to Formosa and Malaya.

COLEUS Lour.

Coleus pubescens Merrill sp. nov.

Herba erecta, stricta, circiter 75 cm alta; foliis utrinque densissime pubescentibus, ovatis, coriaceis, petiolatis, dentato-crenatis, acutis, 4 ad 6 cm longis; racemis circiter 20 cm longis, pubescentibus; floribus circiter 8 mm longis; calyce hirsuto, lobis lateralibus obtusis.

An erect unbranched herb about 75 cm high, rather densely pubescent. Stems angular, sulcate, pubescent, rather stout, brownish. Leaves coriaceous, ovate, 4 to 6 cm long, 3 to 4 cm wide, densely pubescent on both surfaces, the apex acute, the margins distinctly crenate-dentate, the base acute or decurrent-acuminate; nerves about 5 on each side of the midrib; petioles pubescent, 1 to 1.5 cm long. Racemes about 20 cm long, pubescent, leafy below, the flowers 10 or 12 at each node, the internodes about 1 cm long, the upper ones shorter. Pedicels slender, pubescent. Calyx hirsute, glandular, in anthesis about 3 mm long, in fruit 5 to 6 mm long, the posterior tooth elliptical-ovate, acute, the lateral ones obovate, rounded,

the anterior one narrow, cleft into two lanceolate, acuminate, teeth, 1 mm long. Corolla about 8 mm long, exserted, the tube slender, abruptly bent, the anterior lobe about 2 mm long, the posterior 5 mm long; anthers 0.5 mm long. Seeds nearly 1 mm in diameter.

BABUYAN, *Bur. Sci. 3892 Fénix*, June 17, 1908, along the seashore, flowers blue.

A species possibly allied to *Coleus formosana* Hayata, but much larger, densely pubescent, and with quite differently shaped calyx-lobes. Well characterized by its coriaceous, densely pubescent leaves.

OCIMUM Linn.

O. basilicum Linn.

BATAN, Santo Domingo de Basco, *3840 Fénix, Petrelli s. n.* N. v., *Valanoy.*

Common in cultivation throughout the Philippines; India to China, Formosa, Malaya, and Polynesia.

LEUCAS Benth.

L. javanica Benth.

BATAN, Santo Domingo de Basco, *3625 Fénix*, a dwarfed form.

Rather common in the Philippines; Formosa to Java.

SOLANACEÆ.

PHYSALIS Linn.

P. angulata Linn.

CAMIGUIN, *4003 Fénix.* FUGA, *3240 Mearns.*

Widely distributed in the Philippines; tropical and warm regions of the World.

CAPSICUM Linn.

C. frutescens Linn.

BATAN, Santo Domingo de Basco, *3646 Fénix.* N. v., *Sili.*

Common in the Philippines; cultivated in warm and tropical regions of the World.

SOLANUM Linn.

S. cumingii Dunal.

BATAN, Santo Domingo de Basco, *3565 Fénix.* CAMIGUIN, *3935 Fénix.* N. v., *Vajusa.*

Widely distributed in the Philippines; by some authors reduced to the widely distributed and cultivated *Solanum melongena* L.

S. ferox Linn.

BATAN, Santo Domingo de Basco, *3720 Fénix.* N. v., *Camadada.*

Widely distributed in the Philippines; India to Formosa and Malaya.

S. nigrum Linn.

BATAN, Santo Domingo de Basco, *3592 Fénix.* N. v., *Nateng.*

Widely distributed in the Philippines; tropical and temperate parts of the World.

S. biflorum Lour.

BATAN, Santo Domingo de Basco, *3838 Fénix*, a form differing from the type in having from 3 to 6 flowers in each axil.

A variable species found at medium and higher altitudes from Luzon to Mindanao; southern China to Formosa, the Malay Peninsula and Archipelago.

DATURA Linn.

D. alba Nees.

Batan, Santo Domingo de Basco, *3642 Fénix; 3210 Mearns.* N. v., *Siva.*

Common throughout the Philippines, by some authors considered as a variety of *Datura fastuosa* Linn.; tropical Asia to southern China and Formosa.

CESTRUM Linn.

C. nocturnum Linn.

Batan, Santo Domingo de Basco, *3707 Fénix,* cultivated.

There is some doubt as to the identity of this plant with the Linnaean species, it is possibly *C. parqui* L'Hér. Commonly cultivated in the Philippines, a native of tropical America.

SCROPHULARIACEÆ.

SCOPARIA Linn.

S. dulcis Linn.

Batan, Santo Domingo de Basco, *3606 Fénix.* Camiguin, *3963 Fénix.*

Widely distributed in the Philippines; tropics of the World, a native of tropical America.

CENTRANTHERA R. Br.

C. hispida R. Br.

Sabtan, *3746 Fénix.*

Widely distributed in the Philippines; India to southern China, Malaya, and Australia.

Hemsley[6] states under this species "we have referred the yellow flowered specimens to *C. Brunoniana* Wall., and the purple ones to *C. hispida* R. Br., without any confidence of their distinctness." Of the numerous sheets representing this species in our Philippine collection, all have yellow flowers, and following Hemsley's classification would be referable to *Centranthera brunoniana* Wall.

BONNAYA Link & Otto.

B. veronicaefolia Spreng.

Camiguin, *3960 Fénix.*

Widely distributed in the Philippines; India to Formosa and Malaya.

BIGNONIACEÆ.

RADERMACHERA Hassk.

R. fenicis Merr. in Philip. Journ. Sci. 3 (1908) Bot. 335.

Batan, Santo Domingo de Basco, *3583 Fénix.* N. v., *Balaybayan.*

Known only from this locality.

GESNERIACEÆ.

TRICHOSPORUM D. Don.

T. cardinale Copel. in Govt. Lab. Publ. (Philip.) 17 (1904) 46.

Camiguin, on trees, summit of the volcano, *4139 Fénix.*

Previously known only from Mount Apo, Mindanao.

CYRTANDRA Forst.

C. cumingii Clarke.

Batan, Santo Domingo de Basco, *3787 Fénix.*

Widely distributed in the Philippines; endemic.

[6] *Journ. Linn. Soc. Bot.* 26 (1890) 202.

Cyrtandra umbellifera Merrill sp. nov. § *Stellatae.*

Arbuscula 1.5 m alta; foliis oblongo-ellipticis, acuminatis, subintegris vel leviter crenatis, usque ad 20 cm longis, subfalcatis, membranaceis; inflorescentiis umbellatis, axillaribus, solitariis, ferrugineo-pubescentibus, pedunculis tenuibus, circiter 1.5 cm longis; floribus circiter 1 cm longis; calycis lobis anguste acuminatis, tubo longioribus.

A shrub about 1.5 m high. Branches grayish, terete, glabrous, the branchlets pubescent. Leaves opposite, subequal, oblong-elliptical, somewhat falcate, membranous, 16 to 20 cm long, 5 to 7 cm wide, glabrous above, beneath somewhat pale and with scattered appressed hairs on the midrib and nerves, the apex rather strongly acuminate, the base acute, the margins subentire or slightly crenate; petioles pubescent, 2.5 to 3.5 cm long. Flowers umbellate, umbels solitary, axillary, their pedicels slender, about 1.5 cm long, pubescent, each umbel 6- to 10-flowered, the bracts linear-lanceolate, pubescent, about 5 mm long; pedicels slender, pubescent, 5 to 7 mm long. Calyx pubescent with short spreading hairs, the tube broad, about 2 mm long, the teeth narrowly lanceolate, long-acuminate, 3 to 4 mm long. Corolla about 1 cm long, somewhat pubescent outside. Fruit (immature) glabrous, narrowly ovoid, long acuminate.

BATAN, near the summit of Mount Iraya, *Bur. Sci. 3785 Fénix,* June 8, 1907.

A species well characterized by its umbellate inflorescence.

ACANTHACEÆ.

ERANTHEMUM Linn.

E. curtatum Clarke.

BABUYAN, *3907 Fénix.* BATAN, Santo Domingo de Basco, *3612 Fénix.* CAMIGUIN, *4072 Fénix.*

Known only from the Philippines where it is rather widely distributed.

JUSTICIA Linn.

J. procumbens Linn.

BATAN, *3602, 3688 Fénix; 3199, 3200 Mearns,* luxuriant forms.

Widely distributed in the Philippines; India and Ceylon to Formosa, Malaya, and Australia.

BLECHUM P. Br.

B. brownei Juss.

BATAN, *3663 Fénix.*

A common and widely distributed weed in the Philippines, a native of tropical America; Formosa, fide Clarke in lit.

RUBIACEÆ.

DENTELLA Forst.

D. repens (Linn.) Forst.

BATAN, *3665 Fénix.*

Widely distributed in the Philippines in waste places; tropical Asia to Formosa through Malaya to Australia.

OLDENLANDIA Linn.

O. paniculata Linn.

Batan, *3195 Mearns; 3627 Fénix.* Babuyan, *3966 Fénix.*

A common and widely distributed weed in the Philippines; British India to Formosa, Malaya and Polynesia.

HEDYOTIS Linn.

H. radicans (Bartl.) Miq. Fl. Ind. Bat. 2 (1856) 181.

Metabolus radicans DC. Prodr. 4 (1830) 435.

Sclerococcus radicans Bartl. Herb. ex DC. l. c.

Batan, Mount Iraya, *3799 Fénix.*

Known only from the Philippines; the specimen cited above agrees closely with the original specimen, which I have examined in Herb. Prague.

OPHIORRHIZA Linn.

O. mungos Linn.

Batan, Santo Domingo de Basco, *3682 Fénix.* Sabtan, *3749 Fénix.* Babuyan, *3914 Fénix.* Camiguin, *3964, 4082 Fénix.*

British India to the Malay Peninsula, Java, Sumatra and the Philippines; not reported from China or Formosa.

ARGOSTEMA Wall.

A. solaniflorum Elm. Leafl. Philip. Bot. 1 (1906) 2.

Batan, near Mount Iraya, *3790 Fénix*, a luxuriant form.

A species of doubtful value, described from Luzon material; no representative of the genus is reported from Formosa or China.

WENLANDIA Bartl.

W. brachyantha Merr.

Batan, Santo Domingo de Basco, *3723 Fénix; 3139, 3208 Mearns.* Camiguin, *4120 Fénix.*

Luzon; doubtfully distinct from *W. glabrata* DC.

UNCARIA Schreb.

U. setiloba Benth. in Hook. Lond. Journ. Bot. 2 (1843) 223; Havil. in Journ. Linn. Soc. Bot. 33 (1897) 85.

U. florida Vid. Phan. Cuming. Philip. (1885) 176; Mats. & Hayata Enum. Pl. Formosa (1906) 182.

Camiguin, *4052 Fénix.*

Formosa, the Philippines, and Amboina.

SARCOCEPHALUS Afzel.

S. orientalis (Linn.) comb. nov.

Cephalanthus orientalis Linn. Sp. Pl. (1753) 95.

Nauclea orientalis Linn. Sp. Pl. ed. 2 (1762) 243.

Nauclea cordata Roxb. Fl. Ind. 1 (1820) 509.

Sarcocephalus cordatus Miq. Fl. Ind. Bat. 2 (1856) 133; Havil. in Journ. Linn. Soc. Bot. 33 (1897) 27.

Camiguin, *3992 Fénix.*

Widely distributed in the Philippines; British India to Ceylon, southern China, Malaya, Polynesia, and northern Australia.

The oldest specific name is here adopted for this common and widely distributed species. Linnaeus[7] first cites Fl. Zeyl. 53, in his description of the species, but adds other references, at least one of which represents a different species. Trimen[8] however, states under *Sarcocephalus cordatus* Miq., "Hermann's drawing (there is no specimen) is certainly this; which fixes Linnaeus's *Nauclea orientalis* as originally the same."

NAUCLEA Linn.

N. reticulata Havil.

BATAN, Santo Domingo de Basco, *3670 Fénix.*

Known only from the Philippines.

MUSSAENDA Linn.

M. macrophylla Wall.

BATAN, *3770 Fénix.* CAMIGUIN, *3985 Fénix.* BABUYAN, *3920 Fénix.*

British India to the Malayan Peninsula, the Philippines and Formosa.

The exact identity of the Philippine forms referred to this species is doubtful.

RANDIA Houst.

R. whitfordii Merr.

CAMIGUIN, *4056 Fénix.*

Previously known only from Luzon.

VILLARIA Rolfe.

V. littoralis Vidal.

Gardenia elliptica Elm. Leafl. Philip. Bot. 1 (1906) 6.

CAMIGUIN, *4002 Fénix.* BATAN, Santo Domingo de Basco, *3811 Fénix; 3137 Mearns.* BABUYAN, *3896 Fénix.*

Widely distributed in the Philippines; endemic.

GUETTARDA Linn.

G. speciosa Linn.

SABTAN, *3760 Fénix.* FUGA, *3243 Mearns.*

Common along the seashore throughout the Philippines; coasts of tropical Asia, eastern Africa, northern Australia, Malaya, and Polynesia, but not known from Formosa.

PAVETTA Linn.

P. indica Linn.

CAMIGUIN, *3982, 4060 Fénix.* SABTAN, *3748 Fénix*, glabrous forms.

Widely distributed in the Philippines, variable; India to Formosa. Malaya and northern Australia.

IXORA Linn.

I. macrophylla Bartl.

CAMIGUIN, *4080 Fénix.*

Widely distributed in the Philippines; endemic.

I. coccinea Linn.

CAMIGUIN, *3988, 4096 Fénix.* SABTAN, *3767 Fénix.* FUGA, *3256 Mearns.* BATAN, Santo Domingo de Baseo, *3662 Fénix.*

Widely distributed in the Philippines; variable, some forms cultivated for ornamental purposes; India and Malaya, not known from China or Formosa.

[7] Sp. Pl. (1753) 95.

[8] Fl. Ceyl. 2 (1894) 292.

PSYCHOTRIA Linn.

Psychotria cephalophora Merrill sp nov.

Arbuscula erecta, glabra; foliis membranaceis vel submembranaceis, elliptico-oblongis vel obovato-ellipticis, utrinque acuminatis, 11 ad 15 cm longis, nervis utrinque circiter 13; fructibus glabris, 5 mm longis, pedicellatis, in capitula globosa, 2.5 cm diametro congestis.

An erect glabrous shrub, the branches gray, terete, the branchlets brown, lenticellate, terete or slightly compressed. Leaves membranous or submembranous, elliptical-oblong or ovate-elliptical, 11 to 15 cm long, 5 to 7 cm wide, glabrous, the base somewhat acuminate, the apex rather abruptly and sharply acuminate; nerves prominent on both surfaces, about 13 on each side of the midrib, parallel, somewhat curved, the reticulations indistinct; petioles 1.5 to 2 cm long. Flowers unknown. Fruit obovoid, smooth, glabrous, not ridged, about 5 mm long, the pedicels about 5 mm long, arranged in a rather dense terminal globose head about 2.5 cm in diameter; seeds hemispherical, not ridged.

CAMIGUIN, in forests, *Bur. Sci. 4048 Fénix*, June 27, 1907.

A species well characterized by its congested inflorescence, forming, in fruit, a terminal subglobose head about 2.5 cm in diameter.

P. manillensis Bartl.

BABUYAN, *3908 Fénix*. BATAN, *3648 Fénix*, typical forms, agreeing with the type in Herb. Prague.

Known only from the Philippines where it is not uncommon.

GEOPHILA Don.

G. herbacea (Jacq.) O. Ktz.

BATAN, Santo Domingo de Basco, *3816 Fénix*.

Tropics of the World.

LASIANTHUS Jack.

L. obliquinervis Merr.

CAMIGUIN, *4074 Fénix*.

Rather widely distributed in the Philippines; endemic.

PAEDERIA Linn.

P. tomentosa Blume.

BATAN, Santo Domingo de Basco, *3221 Mearns; 3701 Fénix*.

Common and widely distributed in the Philippines; eastern India to Japan and Formosa, the Malay Peninsula and Archipelago.

MORINDA Linn.

M. bracteata Roxb.

CAMIGUIN, *3979 Fénix*. SABTAN, *3736 Fénix*.

Very common and widely distributed in the Philippines; tropical Asia, Malaya and northern Australia.

M. parvifolia Bartl. in DC. Prodr. 4 (1830) 449.

M. cumingiana Vid. Phan. Cuming. Philip. (1885) 184.

Lucinaea cumingiana Vid. l. c. 216; Rev. Pl. Vasc. Filip. (1886) 152.

BABUYAN, *3924 Fénix*. CAMIGUIN, *4119 Fénix*.

I have examined the type of Bartling's species in Herb. Prague, which was

from Luzon, and *Cuming 1242*, in Herb. Kew, the type of Vidal's species, which was from the Province of Ilocos Norte, Luzon, and consider them to be identical, and a *Morinda*, rather than *Lucinaea*. The same form is found in Formosa, Koshun, *Kawakami 1624*, distributed as *Psychotria serpens* Linn.

Luzon to Formosa.

SPERMACOCE Dill.

S. hispida Linn.

BATAN, Santo Domingo de Basco, *3708 Fénix.*

Throughout the Philippines; India to Formosa and Malaya.

CUCURBITACEÆ.

TRICHOSANTHES Linn.

T. quinquangulata A. Gray.

CAMIGUIN, *3989 Fénix.*

Widely distributed in the Philippines; endemic.

MELOTHRIA Linn.

M. indica Lour. var.

BATAN, Santo Domingo de Basco, *3694 Fénix.* N. v., *Simoncaram.*

Widely distributed in the Philippines; India to China and Malaya.

COMPOSITÆ.

VERNONIA Schreb.

V. patula (Dryand.)

Conyza patula Dryand. in Ait. Hort. Kew. **3** (1789) 184.

Conyza chinensis Lam. Encycl. **2** (1790) 83, non Linn.

Cyanthillium pubescens Blume Bijdr. (1826) 890.

Cyanthillium villosum Blume l. c. 889.

Vernonia albicans DC. in Wight Contrib. (1834) 6; Prodr. **5** (1836) 26.

Vernonia chinensis Less. Linnaea **6** (1831) 105, 674; Hook. f. Fl. Brit. Ind. **3** (1881) 235; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1888) 401, non *Conyza chinensis* Linn.

BATAN, Santo Domingo de Basco, *3599 Fénix.*

A common weed throughout the Philippines; Formosa, southern China, Malaya, and India.

The commonly used specific name for this species, *chinensis*, is invalid being based on *Conyza chinensis* Lam., non Linn., and accordingly what is apparently the earliest valid specific name for the species is here adopted. The name *patula* has been used in *Vernonia* by Martius, but only as a synonym, and does not prevent the adoption of Dryander's specific name for the present species.

Conyza chinensis Lam., is manifestly this species, and not the same as *C. chinensis* Linn., although the exact identity of the latter is doubtful. From the original description I suspected that Linnaeus really described the species here considered to be *Vernonia patula*, but this seems to be not the case.

The Linnean Herbarium does not clear up the matter, as at my request Mr. B. Dayton Jackson, Secretary of the Linnean Society, kindly examined the original specimens, and under the date of June 15, 1908, writes as follows: "There are three sheets pinned together by Linné himself. (1) Two specimens of the same plant, a *Blumea*, with the note Suratt. At foot of sheet in L's handwriting *'Conyza chinensis.'* (2) A single specimen which matches your specimen (*Vernonia chinensis* Less.); at the heel of it is written Ard. which means Arduino; a ticket in Arduino's handwriting is attached thus:—No. 27 an *Serratula glauca*

tua. L. has added *Conyza chinensis* and at the foot of the sheet *chinensis*. (3) Left hand scrap resembling a *Pluchea*, right hand a small specimen, at heel, *indica* apparently the same as No. 1."

The Linnean herbarium therefore contains under *Conyza chinensis*, at least three species, but probably none of these is the actual type, for Linnaeus cites only "Habitat in China, Toren." However, Arduino's specimen was apparently received by Linnaeus after the publication of the Species Plantarum, as indicated by the query "an *Serratula glauca* tua," and so can not possibly be the type of the species, even in part. As this is the only specimen of *Vernonia chinensis* in the Linnean Herbarium, it seems probable that Linnaeus' *Conyza chinensis* is really a *Blumea*.

Vernonia maritima sp. nov.

Planta parva, suffruticosa, 10 ad 20 cm alta; foliis alternis, spatulatis, oblongo-spatulatis, vel anguste oblongo-ellipticis, 1.5 ad 3 cm longis, 5 ad 10 mm latis, utrinque plus minus dense scarioso-pubescentibus, vix tomentosis, integris vel supra obscure dentatis, apice acutis vel breviter acuminatis. Capitulis longe pedunculatis, circiter 5 mm longis latisque; bracteis lanceolatis, acuminatis, plus minus scariosis, interioribus majoribus.

A small erect or diffuse usually much branched suffrutescent plant 10 to 20 cm high. Stems and branches brownish, more or less pubescent. Leaves alternate, spatulate, oblong-spatulate or narrowly oblong-elliptical, coriaceous, 1.5 to 3 cm long, 5 to 10 mm wide, on both surfaces more or less densely scariose-pubescent, not tomentose, usually narrowed toward the base, the apex acute or short acuminate, entire or above somewhat dentate; nerves about 3 on each side of the midrib; petioles 1 cm long or less, pubescent. Inflorescence a terminal few-flowered panicle, the peduncles 1 to 1.5 cm long, sometimes less, with scattered linear bracteoles. Heads about 5 mm long and wide; involucral bracts several-seriate, the outer ones much smaller than the inner, lanceolate, acuminate, somewhat scariose, the inner ones equaling the flowers. Flowers many, homogamous, the disk flat, somewhat fimbriate. Achenes oblong, usually somewhat curved, 4-angled, glabrous, 1.5 mm long, the pappus hairs few, deciduous, white, scabrid, 1.5 mm long. Corolla tubular, slender, 3 mm long, the lobes 1.2 mm long. Anthers 1.2 mm long. Style-arms 0.5 mm long.

Babuyan, on rocks near the sea, *Bur. Sci. 3925 Fénix*, June, 1907. A very similar form, with immature flowers is represented by *no. 3620*, from Batan Island.

A species apparently allied to the preceding, but quite distinct in size, habit and indumentum.

ELEPHANTOPUS Linn.

E. spicatus (Cass.) Juss.

Batan, Santo Domingo de Basco, *3685 Fénix*.

A common weed throughout the Philippines, introduced from tropical America; also found in Japan and Formosa.

E. mollis H. B. K.

CAMIGUIN, *4030 Fénix*. BATAN, Santo Domingo de Basco, *3677 Fénix*.

Like the preceding, common throughout the Philippines and introduced from tropical America.

ADENOSTEMMA Forst.

A. viscosum Forst.

CAMIGUIN, *3972 Fénix*.

A common weed throughout the Philippines; tropics of the World.

AGERATUM Linn.

A. conyzoides Linn.

CAMIGUIN, *3974 Fénix*. BATAN, Santo Domingo de Basco, *3568 Fénix*.

A common weed throughout the Philippines; tropical and subtropical regions of the World.

ERIGERON Linn.

E. linifolius Willd.

BATAN, Santo Domingo de Basco, *3673 Fénix; 3181 Mearns*.

Widely distributed in warm and tropical regions of the World.

SPHAERANTHUS Linn.

S. africanus Linn.

CAMIGUIN, *3968 Fénix*.

A common weed in the Philippines; tropical Africa, Asia, Malaya and Australia.

SIEGESBECKIA Linn.

S. orientalis Linn.

BATAN, Santo Domingo de Basco, *3178 Mearns; 3571 Fénix*.

Throughout the Philippines, usually at medium altitudes; tropical and subtropical regions of the World.

ECLIPTA Linn.

E. alba (Linn.) Hassk.

BATAN, Santo Domingo de Basco, *3633 Fénix; 3183, 3217 Mearns*. CAMIGUIN, *3952 Fénix*.

WEDELIA Jacq.

Wedelia biflora (Linn.) DC.

BATAN, Santo Domingo de Basco, *3624 Fénix; 3186 Mearns*. CAMIGUIN, *3944 Fénix*. BABUYAN, *3898 Fénix*.

Along the seashore throughout the Philippines; tropical Asia, Malaya and Polynesia.

BIDENS Linn.

B. pilosa Linn.

BATAN, Santo Domingo de Basco, *3601 Fénix; 3179 Mearns*. CAMIGUIN, *4086 Fénix*.

A common weed throughout the Philippines; tropical and subtropical regions of the World.

ARTEMISIA Linn.

A. vulgaris Linn.

BATAN, Santo Domingo de Basco, *3618 Fénix; 3184, 3185 Mearns*.

Introduced from Europe, occasionally cultivated in the Philippines and frequently spontaneous; widely distributed in temperate and warm regions of the World.

GYNURA Cass.

G. elliptica Yabe & Hayata in Journ. Coll. Sci. Tokyo 18[8] (1904) 25, *pl. 2.*

Batan, Santo Domingo de Basco, *3691 Fénix.* Sabtan, *Petrelli*, s. n.

Previously known only from Formosa, the specimens cited above agreeing well with the description and plate.

EMILIA Cass.

Emilia sonchifolia (Linn.) DC.

Batan, Santo Domingo de Basco. *3146, 3180, 3182 Mearns; 3593 Fénix.* Camiguin, *4020 Fénix.*

A widely distributed and variable weed in the Philippines; warm and tropical parts of the Old World, introduced into the New.

LACTUCA Linn.

L. dentata (Thunb.) C. B. Robins. in Philip. Journ. Sci. 3 (1908) Bot. 218.

Batan, Santo Domingo de Basco, *3645 Fénix.*

Throughout the Philippines at higher altitudes; Japan and Formosa.

L. squarrosa (Thunb.) Miq. Ann. Mus. Lugd.-Bat. 2 (1856) 189.

Prenanthes squarrosa Thunb. Fl. Jap. (1784) 303.

Prenanthes laciniata Houtt. Nat. Hist. 28 (1779) 381, *t. 66, f. 1,* non *Lactuca laciniata* Roth.

Lactuca laciniata Makino in Bot. Mag. Tokyo 17 (1903) 88, non Roth.

Lactuca brevirostris Champ. in Hook. Kew Journ. 4 (1852) 237.

Batan, Santo Domingo de Basco. *3674 Fénix.*

Northern India to Manchuria, Japan, Formosa, southern China and the Philippines.

CREPIS Linn.

Crepis japonica (Linn.) Benth.

Batan, Santo Domingo de Basco, *3187, 3146a Mearns.*

Widely distributed in the Philippines at medium and higher altitudes; Japan to southern China, India and Australia.

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By E. D. Merrill

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

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21. *No. 21, 1904, Biological Laboratory.*—Some Questions Relating to the Virulence of Micro-Organisms with Particular Reference to Their Immunizing Powers. By Richard P. Strong, M. D.

22. *No. 22, 1904, Bureau of Government Laboratories.*—I. A Description of the New Buildings of the Bureau of Government Laboratories. By Paul C. Freer, M. D., Ph. D. II. A Catalogue of the Library of the Bureau of Government Laboratories. By Mary Polk, Librarian.

* *No. 23, 1904, Biological Laboratory.*—Plague: Bacteriology, Morbid Anatomy, and Histopathology (Including a Consideration of Insects as Plague Carriers). By Maximilian Herzog, M. D.

24. *No. 24, 1904, Biological Laboratory.*—Glanders: Its Diagnosis and Prevention (Together with a Report on Two Cases of Human Glanders Occurring in Manila and Some Notes on the Bacteriology and Polymorphism of Bacterium Mallei). By William B. Wherry, M. D.

25. *No. 25, 1904.*—Birds from the Islands of Romblon, Sibuyan, and Cresta de Gallo. By Richard C. McGregor. (*For first four bulletins of the ornithological series, see Philippine Museum below.*)

26. *No. 26, 1904, Biological Laboratory.*—The Clinical and Pathological Significance of Balantidium Coli. By Richard P. Strong, M. D.

27. *No. 27, 1904.*—A Review of the Identification of the Species Described in Blanco's Flora de Filipinas. By Elmer D. Merrill, Botanist.

28. *No. 28, 1904.*—I. The Polypodiaceæ of the Philippine Islands. II. Edible Philippine Fungi. By Edwin B. Copeland, Ph. D.

29. *No. 29, 1904.*—I. New or Noteworthy Philippine Plants, III. II. The Source of Manila Elemi. By Elmer D. Merrill, Botanist.

30. *No. 30, 1905, Chemical Laboratory.*—I. Autocatalytic Decomposition of Silver Oxide. II. Hydration in Solution. By Gilbert N. Lewis, Ph. D.

31. *No. 31, 1905, Biological Laboratory.*—I. Notes on a Case of Hæmatochyluria (Together with Some Observations on the Morphology of the Embryo Nematode, Filaria Nocturna). By William B. Wherry, M. D., and John R. McDill, M. D., Manila, P. I. II. A Search into the Nitrate and Nitrite Content of Witte's "Peptone," with Special Reference to Its Influence on the Demonstration of the Indol and Cholera-Red Reactions. By William B. Wherry M. D.

32. *No. 32, 1905.—Biological Laboratory:* I. Intestinal Hæmorrhage as a Fatal Complication in Amœbic Dysentery and Its Association with Liver Abscess. By Richard P. Strong, M. D. II. The Action of Various Chemical Substances upon Cultures of Amœbæ. By J. B. Thomas, M. D., Bagnio, Benguet. *Biological and Serum Laboratories:* III. The Pathology of Intestinal Amœbiasis. By Paul G. Woolley, M. D., and W. E. Musgrave, M. D.

33. *No. 33, 1905, Biological Laboratory.*—Further Observations on Fibrin Thrombosis in the Glomerular and in Other Renal Vessels in Bubonic Plague. By Maximilian Herzog, M. D.

* *No. 34, 1905.*—I. Birds from Mindoro and Small Adjacent Islands. II. Notes on Three Rare Luzon Birds. By Richard C. McGregor.

35. *No. 35, 1905.*—I. New or Noteworthy Philippine Plants, IV. II. Notes on Cuming's Philippine Plants in the Herbarium of the Bureau of Government Laboratories. III. Hackel, "Notes on Philippine Grasses." IV. Ridley, "Scitamineæ Philippinenses. V. Clarke, "Philippine Acanthaceæ." By Elmer D. Merrill, Botanist.

36. *No. 36, 1905.*—A Hand-List of the Birds of the Philippine Islands. By Richard C. McGregor and Dean C. Worcester.

* Report of the Superintendent of Government Laboratories for the Year Ending August 31, 1902. (Appendix M of Third Annual Report of the Philippine Commission.)

* Report of the Superintendent of Government Laboratories in the Philippine Islands for the Year Ending September 1, 1903. (Appendix G of the Fourth Annual Report of the Philippine Commission.)

39. Third Annual Report of the Superintendent of the Bureau of Government Laboratories for the Year Ending August 31, 1904.

40. Fourth Annual Report of the Superintendent of the Bureau of Government Laboratories for the Year Ending August 31, 1905.

Bureau of Science—Publications.

101. Price and Exchange List of Philippine Bird Skins in the Collection of the Bureau of Science, Manila. P. I. (Effective January 1, 1908.)

102. *No. 1, 1909.*—A Check-List of Philippine Fishes. By David Starr Jordan and Robert Earl Richardson. *In press.*

103. *No. 2, 1909.*—A Manual of Philippine Birds. By Richard C. McGregor. Parts I and II. A systematic Index to the orders, families, and genera. Paper, P8 for the two parts.

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* Out of print.

(Concluded on third page of cover.)

A REVISION OF PHILIPPINE CONNARACEÆ.

By E. D. Merrill.

(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

This family is a small one so far as the Philippine flora is concerned, but like most groups of plants found in the Archipelago, has long been in need of revision. Our herbarium contained numerous unclassified specimens, and there was considerable doubt as to the proper specific name to use in the case of several identified species. Blanco's imperfect descriptions have always been the cause of more or less doubt as to the identity of his species, and F.-Villar's erroneous identifications of these have added to the confusion. In the case of extant herbarium material, no less than three specific names have been published by as many different authors, all based on a single number of Cuming's Philippine collection, *No. 851,* while *Cuming 1172* has had two specific names applied to it.

Blanco described the first Philippine representatives of the family, five species, all of which he placed under the genus *Cnestis.* Two of them are properly referable to this genus, although reducible to a single species, but the other three are referable to *Connarus* and *Rourea.*

F.-Villar, in the Novissima Appendix to the third edition of Blanco's Flora de Filipinas, enumerates twelve species in four genera, but only five of these actually occur in the Philippines, so far as the study of material now available shows. Most of Blanco's species were erroneously reduced to species that do not extend to the Philippines.

In the present paper five genera and seventeen species are recognized as occurring in the Philippines, but the list of both genera and species will undoubtedly be considerably increased as botanical exploration of the Archipelago progresses. With the exception of two, or possibly three species, all of those enumerated below are endemic in the Philippines. There are apparently also two or three additional species of *Connarus,* probably undescribed, but so far represented in our herbarium by imperfect material, so that it is not deemed advisable to consider them at the present time.

Table of distribution of Indo-Malayan, Philippine and Chinese Connaraceæ.

Genera.	India.[1]	Malay Peninsula.[2]	Malay Archipelago.[3]	China.[4]	Philippines.
Agelaea	2	4	2	0	2
Connarus	13	9	17	0	10
Cnestis	1	1	1	0	1
Ellipanthus	5	5	2	0	2
Rourea	12	9	14	2	2
Rourcopsis	1	2	1	0	0
Taeniochlaena	1	1	2	0	0
Troostwyckia	0	0	1	0	0
Total	35	31	40	2	17

KEY TO THE GENERA.

1. Pistils solitary; follicles with a distinct stipe.
   2. Leaves pinnate, the leaflets 3 to 7; scandent shrubs ..... 1. *Connarus*
   2. Leaflet solitary; small trees ..... 2. *Ellipanthus*
1. Pistils 2 to 7; follicles sessile.
   2. Pistils 5, but usually only 1 perfect; follicle not rugose; seeds exalbuminous; leaves pinnate ..... 3. *Rourea*
   2. Pistils 2 to 5, perfect; follicles rugose or tubercled; seeds exalbuminous; leaves trifoliolate ..... 4. *Agelaea*
   2. Pistils 5 to 7; follicles densely pubescent; seeds albuminous, the aril thin. 5. *Cnestis*

1. CONNARUS Linn.

1. Leaflets 3; follicles large, woody, horned ..... 1. *C. trifoliatus*
1. Leaflets usually more than three, or if three, the follicles coriaceous, not horned.
   2. Indumentum stellate-plumose ..... 2. *C. stellatus*
   2. Indumentum not stellate.
      3. Bracts and bracteoles linear-cylindric, the former frequently 1 cm long and exceeding the flowers ..... 3. *C. bracteatus*
      3. Bracts and bracteoles not prominent.
         4. Leaflets glabrous; follicles small, coriaceous or subcoriaceous.
            5. Leaflets rounded, acute, or only broadly and obscurely acuminate, not prominently glandular-punctate beneath.
               6. Margins of the petals adherent above the ovary, forming a short tube above the inflated base; follicles glabrous inside. 4. *C. culionensis*
               6. Petals free throughout; follicles more or less pubescent inside.
                  7. Base of the leaflets broad, rounded or subcordate, the apex broad, rounded, entire ..... 5. *C. obtusifolius*
                  7. Base of the leaflets narrowed, acute or obtuse, the apex usually shortly and obscurely acuminate, slightly retuse. 6. *C. neurocalyx*
            5. Leaflets strongly acuminate, usually prominently glandular-punctate beneath.

[1] Hooker f. Fl. Brit. Ind. **2** (1876) 46–56.
[2] King in Journ. As. Soc. Beng. **66**[2] (1897) 1–21.
[3] Boerlage Handl. Fl. Ned. Ind. **1** (1890) 313–321.
[4] Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1886) 149–150.

6. Follicles subcylindric, usually straight, not or but slightly inflated, about 4 cm long ..... 7. *C. hallieri*
6. Follicles inflated, 2.5 cm long or less.
7. Petals free throughout ..... 8. *C. mindanaensis*
7. Petals free below, inflated, but above the ovary their margins adherent, forming a narrow short tube ..... 9. *C. whitfordii*
4. Leaflets more or less ferruginous-pubescent beneath; follicles large, woody, 5 cm long ..... 10. *C. subinacquifolius*

1. **Connarus trifoliatus** (Turcz.) Rolfe in Journ. Bot. 23 (1885) 212 (*trifoliolatus*); Vidal Rev. Pl. Vasc. Filip. (1886) 103; Ceron Cat. Pl. Herb. (Manila) (1892) 59.

Anisostemon trifoliatus Turcz. in Bull. Soc. Nat. Mosc. 20[1] (1847) 152.

Connarus polyanthus Planch. in Linnaea 23 (1850) 428; Miq. Fl. Ind. Bat. 1[2] (1859) 665; Walp. Ann. 2 (1851) 300.

Connarus rolfei Vidal Phan. Cuming. Philip. (1885) 106.

Luzon, Province of Albay, *Cuming 851*, type collection of *Anisostemon trifoliatus*, *Connarus polyanthus*, and *C. rolfei*. Negros, Gimugaan River, *For. Bur. 4299 Everett*. Mindanao, Province of Surigao, *Bolster 316;* Lake Lanao, Camp Keithley, *Mrs. Clemens 332*.

This species has received three distinct specific names, all based on the same number of Cuming's Philippine collection, the oldest being *Anisostemon trifoliatus* Turcz., which is here retained. Vidal[5] erroneously refers to *Connarus polyanthus* Planch. *Cuming 1465*, and this species is so written up in the Kew Herbarium. The specimen is however not at all like Planchon's species, nor is it cited by that author.

Endemic.

2. **Connarus stellatus** sp. nov.

Frutex scandens, ramulis, foliis junioribus, paniculisque densissime pubescentia stellato-plumosa obtectis; foliis circiter 20 cm longis, imparipinnatis, foliolis 7, lanceolatis, subcoriaceis, nitidis, basi acutis, apice acuminatis; paniculis terminalibus, folia aequantibus, pyramidatis; sepalis densissime stellato-tomentosis; petalis obtusis, plus minus punctatis, extus puberulis; staminibus 10, inaequalibus; carpellis dense pubescentibus; stylo 4 mm longo.

A scandent shrub, the young branches, leaves, and the inflorescence densely covered with brown-stellate-plumose indumentum, the leaflets ultimately glabrous or nearly so. Branches light-yellowish-gray, lenticellate, glabrous. Leaves about 20 cm long, the rachis and petiolules densely brown-stellate-plumose; leaflets 7, the lower ones alternate, the upper opposite, lanceolate, subcoriaceous, brown, shining, in age glabrous or nearly so, 6 to 10 cm long, 2 to 3 cm wide, base acute, apex slightly acuminate, acumen blunt; nerves 6 or 7 on each side of the midrib, not prominent, ascending, the reticulations rather close; petiolules 2 to 3 mm long. Panicle terminal, pyramidal, about as long as the leaves, very densely covered with brown stellate-tomentose indumentum. Sepals lanceolate, acuminate, about 3 mm long, densely stellate-pubescent. Petals

[5] Phan. Cuming. Philip. (1885) 106, Rev. Pl. Vasc. (1886) 103.

narrowly oblong, obtuse, about 5 mm long, 1.5 mm wide, glandular-punctate, puberulous on the back. Stamens 10, unequal, the longer 5 filaments puberulous, 2.5 mm long, the shorter 5 glabrous, 1 mm long. Carpel 1, obliquely ovoid, densely pubescent; style 4 mm long, slightly puberulent.

Balabac, *Bur. Sci. 520 Mangubat*, March–April, 1906.

A species at once recognizable by its dense brown-stellate-plumose indumentum.

3. **Connarus bracteatus** sp. nov.

Frutex scandens, foliis junioribus paniculisque plus minus ferrugineo-tomentosis; foliis alternis, imparipinnatis, circiter 15 cm longis, foliolis 5 vel 7, oblongis, submembranaceis, breviter acuminatis; paniculis terminalibus, foliis multo longioribus, usque ad 40 cm longis, pubescentibus; floribus in ramulis densissime racemoso-dispositis; bracteis linearibus, usque ad 1 cm longis; petalis utrinque pubescentibus; staminibus 10, inaequalibus; carpellis densissime pubescentibus.

A scandent shrub, the young branches, leaves and the inflorescence more or less ferruginous-tomentose. Branches brown, somewhat lenticellate, terete. Leaves alternate, odd-pinnate, about 15 cm long; leaflets 5 or 7, oblong, 6 to 10 cm long, 2 to 3.5 cm wide, submembranaceous, slightly tomentose when young, base acute, apex shortly acuminate, shining, brown; nerves 5 or 6 on each side of the midrib, distinct, faintly anastomosing, the reticulations rather dense; petiolules densely pubescent, 5 to 8 mm long. Panicles terminal, very large, at least 40 cm long, ferruginous-pubescent, pyramidal, the lower branches sometimes 20 cm in length. Flowers densely racemosely disposed on the ultimate branchlets, each subtended by a narrow, linear, cylindric, pubescent bract, and by one or two similar but shorter bracteoles. Pedicels 2 to 3 mm long, the bracteoles 2, about the same length, the bracts frequently 1 cm in length and exceeding the flowers. Sepals ovate-lanceolate, acuminate, 3.5 to 4 mm long, glandular-punctate, densely pubescent outside, slightly so within. Petals oblong-lanceolate, obtuse, strongly glandular-punctate, slightly puberulent on both surfaces, 6 mm long, 2 mm wide. Stamens 10, unequal, the five longer filaments slightly glandular-puberulent, 3 mm long, the five shorter glabrous, 1 mm long. Carpel 1, ovoid, densely pubescent; style pubescent, 1.5 mm long. Follicle unknown.

Luzon, Province of Cagayan, San Vicente, *For. Bur. 11308 Klemme*, April, 1908, in dense level forests at about 5 m altitude.

A species at once recognizable by its large panicles and prominent bracts and bracteoles. Allied to *Connarus neurocalyx* Planch.

4. **Connarus culionensis** sp. nov.

Frutex erectus vel scandens, ramulis, petiolis, paniculisque densissime ferrugineo-tomentosis; foliis brevibus, circiter 10 cm longis, imparipinnatis, foliolis 5 vel 7, oblongis, subcoriaceis, acutis vel obscure acuminatis;

paniculis terminalibus, diffusis, 20 cm longis; sepalis coriaceis, carinatis; petalis supra glanduloso-punctatis, extus pubescentibus, basi angustatis; staminibus 10, inaequalibus; carpellis globosis, dense pubescentibus; folliculis 2.5 cm longis, compressis, apice rotundatis, extus pubescentibus striatisque, intus glabris.

An erect, or in favorable habitat probably a scandent shrub. Branches brown, terete, glabrous or nearly so, the young branchlets very densely ferruginous-tomentose. Leaves alternate, about 10 cm long, the petiole, rachis and petiolules densely ferruginous-tomentose; leaflets 5 or 7, oblong, subcoriaceous, brown, shining, glabrous, or when young with few hairs, especially at the base, 4 to 7 cm long, 1 to 2.5 cm wide, base usually rounded, apex acute or obscurely acuminate; nerves about 5 on each side of the midrib, curved-ascending, anastomosing, distinct, the reticulations lax; petiolules about 2 mm long. Panicles terminal, ample, pyramidal, 20 cm long, densely ferruginous-tomentose. Sepals coriaceous, 3.5 mm long, 1.5 mm wide, densely pubescent, keeled, the margins thinner than the median portion. Petals 7 mm long, 1 mm wide, densely pubescent outside in the upper portion and glandular-punctate; base narrowed, the lower portions free, but above the ovary adherent, forming a narrow tube, the upper portion entirely free. Stamens 10, unequal, the longer five glandular-puberulous, 4 to 4.5 mm long, the shorter five glabrous, 1.2 mm long. Carpel 1, globose, densely pubescent; style 2 mm long, somewhat pubescent. Follicle oblong-ovoid, 2.5 cm long, somewhat compressed, apex rounded, base narrowed into the short stipe, coriaceous, inside glabrous, outside pubescent when young, diagonally striate.

CULION, *Merrill 450*, December, 1902, on dry open grassy hillsides.

The alliance of this species is with *Connarus neurocalyx* Planch., but it is readily distinguished by its much denser indumentum, short leaves, relatively much longer panicle, its petals adherent by their margins above the ovary, and its follicles glabrous within.

5. **Connarus obtusifolius** Planch. in Linnaea 23 (1850) 428; Walp. Ann. 2 (1851) 301; Miq. Fl. Ind. Bat. 1² (1859) 665; Vid. Phan. Cuming. Philip. (1885) 106, Rev. Pl. Vasc. Filip. (1886) 103; F.-Vill. Nov. App. (1883) 57.

The type of this species is *Cuming* 959, from the Province of Pampanga, Luzon. It appears to me, from the description, and the fragment of Cuming's specimen before me, to be very closely allied to and perhaps not distinct from *C. neurocalyx* Planch. *For. Bur. 5446 Curran*, from the Province of Bataan, Luzon, may be referable to it.

Endemic.

6. **Connarus neurocalyx** Planch. Linnaea 23 (1850) 248; Walp. Ann. 2 (1851) 300; Miq. Fl. Ind. Bat. 1² (1859) 665; F.-Vill. Nov. App. (1883) 56; Vid. Sinopsis Atlas (1883) *t. 39, f. E.*, Phan. Cuming. Philip. (1885) 106, Rev. Pl. Vasc. Filip. (1886) 103; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 61.

LUZON, without locality, *Loher 2096:* Province of Bataan, *For. Bur. 2030 Borden, Williams 562, Bur. Sci. 1576 Forworthy:* Province of Rizal, *Bur. Sci. 38 Foxworthy, Merrill 1705, 1884, Bur. Sci. 2685 Ramos, For. Bur. 391 Ahern's collector:* Province of Pampanga, *Merrill 1388:* Province of Laguna, *Elmer 8309,*

For. Bur. 8868 Curran: Province of Bulacan, *For. Bur. 7200 Curran:* Province of Camarines Sur, *Ahern 218.* Negros, *For. Bur. 7309 Everett.*

The type of this species is *Cuming 1762*, from the island of Cebu. F.-Villar erroneously reduces to it *Cnestis volubilis* Blanco, which appears to me to be referable to *Rourea*, rather than to *Connarus*.

Endemic.

7. **Connarus hallieri** sp. nov.

Frutex scandens inflorescentiis exceptis glaber; foliis imparipinnatis, 12 ad 20 cm longis, foliolis 5, oblongo-ovatis vel elliptico-ovatis, subcoriaceis, nitidis, basi acutis vel subrotundatis, apice subcaudato-acuminatis, utrinque plus minus glanduloso-punctatis, nervis utroque latere 5 ad 7, subtus prominentibus, ascendentibus; sepalis petalisque pubescentibus; staminibus 10, inaequalibus, filamentis pubescentibus; carpellis ellipsoideis, pubescentibus, stylo 4 mm longo; folliculis anguste cylindraceis, leviter falcatis vel rectis, basi angustatis, apice acutis, extus glabris, leviter longitudinaliter striatis, intus villosis, circiter 4 cm longis.

A scandent shrub, glabrous except the inflorescence. Branches brown, lenticellate. Leaves odd-pinnate, alternate, 12 to 20 cm long, the leaflets 5, oblong-ovate to elliptic-ovate, subcoriaceous, base rounded or acute, apex subcaudate-acuminate, acumen obtuse, 6 to 10 cm long, 3 to 4 cm wide, shining, both surfaces rather prominently and densely glandular-punctate; nerves 5 to 7 on each side of the midrib, rather distinct beneath, ascending, curved, obscurely anastomosing, the reticulations rather fine and dense; petiolules 2 to 3 mm long. Panicles terminal and axillary, pubescent, somewhat diffuse, many flowered, about 10 cm long, the peduncle and rachis stout. Sepals ovate-lanceolate, pubescent. Petals narrowly oblong, about 6 mm long, 1.5 to 2 mm wide, pubescent, glandular-dotted. Stamens 10, alternating long and short, the filaments slightly pubescent. Carpel 1, pubescent; style stout, pubescent, 4 mm long. Follicle narrowly cylindric, slightly falcate or straight, base narrowed, apex acute, about 4 cm long, less than 1 cm thick, coriaceous, outside glabrous and, at least when young, slightly longitudinally striate, villous inside. Seed immature, arillate.

Basilan, *Hallier s. n.*, January, 1904.

A species closely allied to *Connarus monocarpus* Linn., but distinct. *Elmer 7268* is very closely allied if not identical.

8. **Connarus mindanaensis** sp. nov.

Scandens, inflorescentiis exceptis glaber; foliis imparipinnatis, usque ad 25 cm longis, foliolis 5, ovato-ellipticis vel oblongo-ellipticis, subcoriaceis, nitidis, basi acutis vel subacutis, rariter subrotundatis, apice valde acuminatis, nervis utrinque 4 vel 5, ascendentibus, subtus prominentibus; paniculis axillaribus terminalibusque, ferrugineo-pubescentibus, folia subaequantibus, multifloris; sepalis petalisque glanduloso-punctatis, subaequalibus; staminibus 10; carpellis anguste ovoideis, dense pubescentibus; folliculis aurantiacis, 2.5 cm longis, firmiter coriaceis, nitidis, inflatis, extus glabris, vix striatis, intus tomentosis.

A scandent shrub, glabrous except the inflorescence. Branches dark-brown or grayish, somewhat lenticellate. Leaves alternate, odd-pinnate, 15 to 25 cm long, the rachis swollen at the base; leaflets 5, the lateral ones opposite and smaller than the terminal one, subcoriaceous, glabrous, shining, ovate-elliptic or oblong-elliptic, 6 to 11 cm long, 2.5 to 5 cm wide, base acute or subacute, rarely somewhat rounded, margins entire, sometimes recurved, apex strongly acuminate, the acumen blunt; nerves 4 or 5 on each side of the midrib, ascending, curved, laxly anastomosing, prominent beneath, the reticulations very lax, the finer ones obsolete; petiolules about 4 mm long. Panicles terminal and axillary, as long as the leaves, densely ferruginous-pubescent, many-flowered. Sepals free, oblong, obtuse or acute, pubescent, distinctly glandular-punctate, 4 to 5 mm long. Petals about the same length as the sepals, glabrous or subglabrous, glandular-punctate, elliptic-ovate, obtuse. Stamens 10, alternating long and short, glabrous, the longer filaments 1.5 mm in length. Carpels 1, narrowly ovoid, densely pubescent; style very short, 0.5 mm long, glabrous or nearly so. Follicles orange-yellow, somewhat obovoid, 2.5 cm long, inflated, firmly coriaceous, obtuse, the stipe short, outside shining, glabrous, not striate, inside somewhat tomentose.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 754*, September–October, 1906, and without number (type), March, 1907.

9. **Connarus whitfordii** sp. nov.

Frutex scandens, inflorescentiis exceptis glaber; foliis imparipinnatis, 10 ad 15 cm longis, foliolis 5, lateralibus suboppositis vel alternis, oblongo-ellipticis vel oblongo-ovatis, firmiter membranaceis, nitidis, apice sensim acuminatis, obtusis, basi subrotundatis, nervis utrinque 3 ad 5; paniculis axillaribus terminalibusque, folia aequantibus vel multo longioribus, dense brunneo-pubescentibus; sepalis coriaceis, arcuatis, dense pubescentibus; petalis oblongo-lincaribus, utrinque plus minus pubescentibus, glanduloso-punctatis; staminibus 10, inaequalibus, filamentis pubescentibus; carpellis ovoideis, pubescentibus; folliculis 2.5 cm longis, inflatis, ellipsoideis, extus glabris, obscure reticulato-striatis, intus pubescentibus.

A scandent shrub, glabrous except the inflorescence. Branches grayish-brown, terete, lenticellate. Leaves alternate, 10 to 15 cm long, the leaflets 5, the lateral ones subopposite or alternate, oblong-elliptic or oblong-ovate, firmly membranaceous, shining, 4 to 7 cm long, 2 to 3 cm wide, base usually rounded, apex gradually and prominently acuminate, acumen obtuse, margins entire, recurved; nerves 3 to 5 on each side of the midrib, rather distinct beneath, the reticulations faint; petiolules about 2 mm long. Panicles axillary and terminal, equaling or much exceeding the leaves, densely brown-pubescent, the buds densely congested on the ultimate branchlets. Sepals coriaceous, arched, oblong, 3 mm long, pubescent, opaque. Petals linear-oblong, obtuse, somewhat pubescent on both surfaces, glandular-punctate, 5.5 to 6 mm long, 1.2 mm wide, the

basal portion inflated, the margins just above the carpels adherent into a narrow tube, above entirely free. Stamens 10, alternating long and short, the filaments somewhat pubescent, the longer ones 4 mm, the shorter 1 mm in length. Carpels 1, ovoid, pubescent; style 1.5 mm long, slightly pubescent. Follicle firmly coriaceous, ellipsoid, inflated, 2.5 cm long, outside glabrous, shining, faintly diagonally reticulate-striate, inside pubescent, the stipe very short.

Mindanao, District of Zamboanga, Port Banga, *For. Bur. 9185 Whitford & Hutchinson*, January, 1908, in dipterocarp forests at an altitude of about 20 m.

10. **Connarus subinaequifolius** Elm. Leafl. Philip. Bot. 1 (1908) 297.

Scandens; foliis usque ad 35 cm longis, imparipinnatis, foliolis 7, circiter 12 cm longis, 4.5 cm latis, oblongis, breviter abrupte acuminatis, basi rotundatis, firmiter membranaceis vel subcoriaceis, supra glabris, nitidis, subtus plus minus ferrugineo-pubescentibus, nervis utrinque 4 ad 6, prominentibus. Folliculis sublignosis, obovoideis, compressis, 5 cm longis, 3.5 cm latis, circiter 2.5 cm crassis, extus plus minus ferrugineo-tomentosis, subglabrescentibus, vix striatis, intus ferrugineo-tomentosis; seminibus oblongis, basi arillatis.

The type of this species is *Elmer 9422* from Mount Banajao, Province of Tayabas, Luzon, which I have not seen. *Elmer 9341* from the same locality is referable here, and also *Elmer 6208* from Sablan, Province of Benguet, Luzon, the latter being mentioned in the original description but without citation of the number. The flowers are unknown.

Endemic.

2. ELLIPANTHUS Hook. f.

1. Petioles 10 to 15 mm long, the leaf-base subacute, not peltate.... 1. *E. luzoniensis*
1. Petioles 3 to 4 mm long, the leaf-base broad, rounded or subcordate, minutely peltate ..... 2. *E. mindanaensis*

1. **Ellipanthus luzoniensis** Vid. Rev. Pl. Vasc. Filip. (1886) 104; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 61.

E. helferi Vid. Sinopsis Atlas (1883) *t. 39, f. B*, non Hook. f.

E. calophyllus F.-Vill. Nov. App. (1883) 351 (probably), non Kurz.

E. tomentosus F.-Vill. l. c., non Kurz.

Luzon, Province of Rizal, *For. Bur. 1998, 2900, 2141 Ahern's collector:* Province of Bulacan, *For. Bur. 7446 Curran, For. Bur. 12305 Maule:* Province of Bataan, *For. Bur. 2200, 2239 Meyer, Whitford 1051, For. Bur. 6407 Curran, For. Bur. 1426, 1505 Ahern's collector, Elmer 6692, 6883, 6889, For. Bur. 812, 1742, 1909, 2074, 2107, 2926 Borden.* Leyte, *Elmer 7164.*

Endemic.

2. **Ellipanthus mindanaensis** sp. nov.

Arbor parva, ramulis junioribus fructibusque ferrugineo-pubescentibus; foliis oblongo-ellipticis vel ovato-ellipticis, subcoriaceis, usque ad 14 cm longis, apice acuminatis, basi late rotundatis vel leviter cordatis, levissime peltatis, integris, nitidis, supra glabris vel ad nervos minute pubescentibus, subtus ad costam nervosque pubescentibus, nervis 7 vel 8 utrinque; folliculis solitariis, longe pedicellatis, compressis, 3 cm longis, subfalcatis, acuminato-rostratis.

A small tree, the trunk about 4 cm in diameter. Branches reddish-brown, glabrous, the branchlets, especially the growing shoots, densely ferruginous-pubescent. Leaves oblong-elliptic or ovate-elliptic, subcoriaceous, 10 to 14 cm long, 5 to 6 cm wide, entire, the apex acuminate, the base broad, rounded or subcordate, very minutely subpeltate, shining, the upper surface glabrous, or the midrib and nerves minutely pubescent, beneath pubescent on the midrib and lateral nerves; nerves 7 or 8 on each side of the midrib, prominent, distant, curved, anastomosing, the reticulations lax, distinct; petioles pubescent, 3 to 4 mm long, jointed with the leaflet. Follicle densely ferruginous-pubescent, 3 cm long, 2 cm wide, compressed, subfalcate, base acute, apex acuminate-rostrate, the stalk 1.5 cm long. Seed subellipsoid, somewhat compressed, dark-colored, shining, 2.3 cm long, the aril very short.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9276 Whitford & Hutchinson*, January, 1908.

A species allied to *Ellipanthus luzoniensis* Vid. but readily distinguished by its very short petioles, subpeltate, broad, rounded or cordate leaf-base, prominent reticulations, and larger follicles.

3. ROUREA Aubl.

1. Leaflets 1 to 5 ..... 1. *R. volubilis*
1. Leaflets 11 to 15 ..... 2. *R. erecta*

1. **Rourea volubilis** (Blanco) Merr. in Govt. Lab. Publ. (Philip.) **27** (1905) 36; Philip. Journ. Sci. **1** (1906) Suppl. 61.

Cnestis volubilis Blanco Fl. Filip. (1837) 385.

Cnestis trifolia Blanco l. c. ed. 2 (1845) 270, ed. 3, **2**: 136, non Lam.

Rourea heterophylla Planch. in Linnaea **23** (1850) 419; Walp. Ann. **2** (1851) 297; Miq. Fl. Ind. Bat. 1² (1859) 658; Vid. Phan. Cuming. Philip. (1885) 106, Rev. Pl. Vasc. Filip. (1886) 103.

LUZON, Province of Benguet, *For. Bur. 14129 Merritt & Darling:* Province of Tayabas, *Cuming 752*, type collection of *Rourea heterophylla* Planch.: Province of Zambales, *Bur. Sci. 5064 Ramos:* Province of Rizal, *Merrill 1678*, *Loher 5139*, *Bur. Sci. 2657 Ramos:* Province of Bataan, *For. Bur. 1967 Borden.* MINDORO, *For. Bur. 4118 Merritt.* BALABAC, *Bur. Sci. 450 Mangubat.* MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 280:* District of Zamboanga, *For. Bur. 9307 Whitford & Hutchinson.*

In vegetative characters this species is exceedingly variable, the leaflets varying from one to seven, and on some specimens the same branches bearing 1–3- and 5-foliolate leaves. The flower and fruit characters appear to be rather constant.

This species has been reported from the Feejee Islands by A. Gray,[6] but possibly on an erroneous identification, or on a wrongly localized plant. Otherwise not reported from outside the Philippines.

2. **Rourea erecta** (Blanco) comb. nov.

Cnestis erecta Blanco Fl. Filip. (1837) 387.

Omphalobium pictum Blanco l. c. ed. 2 (1845) 271; ed. 3, **2**: 139.

Cnestis glabra Blanco l. cc. 387, 271, 138, non Lam.

Rourea multiflora Planch. in Linnaea **23** (1850) 418; Walp. Ann. **2** (1851) 297; Miq. Fl. Ind. Bat. 1² (1859) 658; F.-Vill. Nov. App. (1883) 56; Naves in

[6] Bot. Wilkes' U. S. Explor. Exped. (1854) 375.

Blanco Fl. Filip. ed. 3, *t. 140;* Vid. Sinopsis Atlas (1883) *t. 39, f. A*, Phan. Cuming. Philip. (1885) 106, Rev. Pl. Vasc. Filip. (1886) 102; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 61.

Omphalobium obliquum Presl Epim. Bot. (1851) 207.

Connarus obliquus Walp. Ann. 3 (1851) 844; Vid. Phan. Cuming. Philip. (1885) 106.

Connarus paniculatus F.-Vill. Nov. App. (1883) 57, ex syn. Blanco, non Roxb.

C. monocarpus F.-Vill. l. c. 57, ex syn. Blanco, non Linn.

Luzon, Province of Abra, *Bur. Sci. 7088 Ramos:* Province of Ilocos Norte, *For. Bur. 13801, 13828 Merritt & Darling:* Province of Pangasinan, *Cuming 949:* Province of Ilocos Sur, *Cuming 1172:* Province of Rizal, *Merrill 1859, 2645, 2723, 2828, Topping 751, For. Bur. 2655 Ahern's collector, Guerrero 42:* Province of Bataan, *Leiberg 6017, Merrill 2520, Whitford 323:* Province of Laguna, *Elmer.* Lubang, *Merrill 974.* Leyte, *For. Bur. 12424 Danao.* Bantayan, *Bur. Sci. 1697 McGregor.*

Blanco's description of *Cnestis erecta* applies exactly to the specimens above cited, and accordingly his specific name is here adopted, being the earliest valid one for the species. The name *erecta* is not particularly applicable, as only comparatively young plants are erect, mature ones being more or less procumbent or subscandent. However, the description can apply to no other Philippine species, as the five carpels mentioned by Blanco and the aril entirely covering the seed are characteristic of *Rourea*, and not of *Connarus*. Presl's *Omphalobium obliquum* has also been a somewhat doubtful species, it having been based on a specimen collected in Luzon by Haenke, and "Cuming 1171." The latter is undoubtedly an error for Cuming 1172, for 1171 in all herbaria that I have examined is *Mallotus muricatus* Muell. Arg., while Cuming 1172, specimens of which are before me, answers Presl's description perfectly. The date of Presl's "Epimeliae botanicae" is given on the title page as 1849, but it seems quite evident that the work did not appear until 1851 or 1852. Hooker[7] states regarding the work in question "although it bears on the title-page the date of 1849, it does not appear to have been in the hands of booksellers till the commencement of 1852." This is confirmed by the fact that it was not reviewed in the Botanische Zeitung until September, 1852. As Blanco's specific name for the plant under discussion is undoubtedly the oldest one, the question of actual date of publication of Presl's work is of no importance in the present case, but if Blanco's name be not accepted, there would be some doubt as to whether Presl's or Planchon's name had priority.

A common and widely distributed endemic species.

4. AGELAEA Soland.

1. Glabrous except the inflorescence, the follicles not or but very slightly rugose, scarcely beaked ..... 1. *A. wallichii*
1. All parts more or less pubescent, the follicles strongly tuberculate-rugose, prominently beaked ..... 2. *A. everettii*

1. Agelaea wallichii Hook. f. Fl. Brit. Ind. 2 (1876) 47; King in Journ. As. Soc. Beng. 66[2] (1897) 18; Merr. in Govt. Lab. Publ. (Philip.) 35 (1905) 19; Philip. Journ. Sci. 1 (1906) Suppl. 61.

A. vestita Vid. Sinopsis Atlas (1883) *t. 39, f. D*, non Hook.

Luzon, Province of Tayabas, *Merrill 2895:* Province of Bataan, *Leiberg 6004, For. Bur. 3025 Meyer, Whitford 29, For. Bur. 3043 Borden.*

Malay Peninsula to Singapore and Sumatra.

[7] Journ. Bot. & Kew Miscel. 4 (1852) 286.

2. **Agelaea everettii** sp. nov.

Frutex scandens, ramulis, petiolis, foliolis subtus, inflorescentiisque plus minus ferrugineo-pubescentibus; foliis alternis, trifoliolatis, racemis axillaribus vel extra-axillaribus, fasciculatis, circiter 2 cm longis; staminibus 10; folliculis solitariis, oblongis, 1.5 ad 2 cm longis, valde rostratis, extus tuberculato-rugosis, pubescentibus.

A scandent shrub more or less pubescent. Branches and branchlets terete, brownish, ferruginous-pubescent. Leaves alternate, trifoliolate, 15 to 20 cm long, the petiole pubescent, 5 to 6 cm long; leaflets chartaceous, the upper surface glabrous except the somewhat pubescent midrib and nerves, the lower surface paler, ferruginous-pubescent, ultimately subglabrous, the lateral ones inequilateral at the base, the terminal one equilateral, 7 to 15 cm long, 2.5 to 7 cm wide, entire, apex acuminate, acumen blunt; nerves 4 or 5 on each side of the midrib, prominent, ascending, anastomosing, the reticulations rather lax, distinct; petiolules densely pubescent, about 3 mm long. Racemes axillary or extra-axillary, about 2 cm long, fascicled, densely pubescent, the pedicels slender, pubescent, 1 to 2 mm long, the bracteoles densely pubescent, 1 to 1.5 mm long. Sepals oblong-lanceolate, pubescent, 3 mm long. Petals glabrous, linear-lanceolate, acuminate, 5 mm long, 1 mm wide. Carpels usually 5, narrowly lanceolate, pilose, 3 to 3.5 mm long including the styles. Stamens usually 10, sometimes fewer, unequal, 1 to 1.5 mm long. Follicles solitary, oblong, 1.5 to 2 cm long, apex strongly rostrate, the outside strongly tuberculate-rugose, densely ferruginous-pubescent; seed ellipsoid or narrowly obovoid, black, about 1 cm long.

Type specimen collected by *H. D. Everett, For. Bur. 4300*, Negros, June, 1906; also represented by *For. Bur. 4286, 5570 Everett*, May and June, 1906, the former from the Guimagaan River, the latter from Cadiz, Negros. Material collected by Cuming, no. 907, from the Province of Albay, Luzon, is probably the same, but no specimen is available here, although the one in the Kew Herbarium has been examined by me.

Agelaea everettii is apparently closely allied to **Agelaea borneensis** (Hook. f.) (*Hemiandrina borneensis* Hook. f., *Agelaea vestita* Hook. f.) of the Malay Peninsula and Borneo, but is distinguished by its 10 stamens, and less dense pubescence, although in the latter character the species seems to vary considerably, if all our Singapore specimens are correctly named. In regard to *A. borneensis*, Hooker's specific name under *Hemiandrina* is the oldest, and hence must be accepted, for the Wallichian name *Cnestis vestita* was not published until 1876, and then only as a synonym. Gilg and Boerlage maintain *Troostwyckia* Miq., as a distinct genus, although Hooker f. reduced *T. singularis* Miq., on which the genus was based, to *Aeglaea vestita* Hook. f.

5. CNESTIS Juss.

1. **Cnestis diffusa** Blanco Fl. Filip. (1837) 386.

Cnestis polyphylla Blanco l. c. ed. 2 (1845) 270; ed. 3, 2: 137, non Lam.

Cnestis corniculata Blanco Fl. Filip. (1837) 386, ed. 2 (1845) 270, ed. 3, 2: 138, non Lam.

Cnestis ramiflora Griff. Not. 4 (1854) 432; Kurz in Journ. As. Soc. Beng. 45[2] (1876) 216; Hook. f. Fl. Brit. Ind. 2 (1876) 54; Vid. Sinopsis Atlas (1883)

t. 39, f. C; Phan. Cuming. Philip. (1885) 106; Rev. Pl. Vasc. Filip. (1886) 103; F.-Vill. Nov. App. (1883) 57; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 61; King in Journ. As. Soc. Beng. 66^2 (1897) 21.

Rourea dasyphylla Miq. Fl. Ind. Bat. Suppl. (1861) 528.

Connarus foliosus Jack in Wall. Cat. (1828) no. 8529, *nomen.*

Connarus igneus Wall. l. c. no. 8528, *nomen.*

Rourea rugosa F.-Vill. Nov. App. (1883) 56, non Planch.

Connarus ferrugineus F.-Vill. l. c. 57, non Jack.

LUZON, Province of Ilocos Sur, Tagudin, *Guerrero s. n.:* Province of Union, *Elmer 5544:* Province of Pangasinan, *Cuming 951:* Province of Bataan. *Topping 529, For. Bur. 2592 Meyer, For. Bur. 2567 Borden:* Province of Rizal, *Merrill 1327, 2341, For. Bur. 2656 Ahern's collector:* Province of Laguna, *Elmer.* LUBANG, *Merrill 965.* BURIAS, *For. Bur. 1726 Clark.*

Burma to the Malay Peninsula and Sumatra.

Blanco's name for this species is the oldest valid one that I have been able to find, and it is here accordingly adopted. He describes the fruits as "without hairs" which hardly applies to the above species, but in spite of this discrepancy I am of the opinion that the plant he had in mind was really the above, as in other characters his description applies perfectly, and does not at all apply to any other species of *Connaraceae* known to me. The species is moreover common in the regions from which Blanco received most of his material, and would hardly have been overlooked by him. F.-Villar erroneously reduced *Cnestis diffusa* Blanco to *Rourea rugosa* Planch., a species that does not extend to the Philippines, and one to which Blanco's description does not at all apply. *Cnestis cornieulata* Blanco, non Lam., is certainly referable here. I had suspected this from Blanco's description, and to verify it, Dr. Leon Ma. Guerrero kindly secured for me from Blanco's type locality, Tagudin, specimens of the plant known there as *Sal-laday;* these specimens prove to be the same as *C. diffusa* Blanco. *C. cornieulata* Blanco was erroneously reduced by F.-Villar to *Connarus ferrugineus* Jack, a species that does not extend to the Philippines.

EXCLUDED SPECIES.

ROUREA SANTALOIDES W. & A.; F.-Vill. Nov. App. (1883) 56.

ROUREA COMMUTATA Planch.; F.-Vill. l. c.

The above two species were credited to the Philippines by F.-Villar, but probably do not extend to the Archipelago.

A REVISION OF PHILIPPINE LORANTHACEÆ.

By E. D. Merrill.

(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

The greatest difficulty in dealing with this family is in connection with the generic limits of *Loranthus,* to determine whether or not to follow Bentham and refer all the forms to one great genus with numerous sections, or to follow Van Tieghem, recognizing a great number of small, more or less closely allied genera, or to follow Engler, who chooses a middle course, recognizing a few genera, several of them large and with numerous subgenera. After considerable preliminary work on the group, I decided to follow Bentham, excluding, however, the species with versatile anthers, of which we have a single representative in the Philippines, as his arrangement on the whole seemed to me to be the most logical and simple one. The difficulty with Van Tieghem's system is that his work is not sufficiently amplified, his generic and specific descriptions being too short, and frequently almost wanting, so that it is quite difficult, if not impossible, to follow him closely, unless one has access to the specimens cited by him. After a careful study of the material available here, I am now rather firmly convinced that there is no middle ground to be taken in the matter, and that one must refer most of the species to a single, or at most two or three large and small genera, or one must follow Van Tieghem, and recognize numerous small and more or less closely allied genera, only in the latter case it will be necessary to establish a considerable number of new genera to accommodate numerous Philippine and Malayan species that can not be fitted into any of those proposed by him.

It is fortunate that there is in the herbarium of this Bureau a nearly complete set of Cuming's Philippine *Loranthaceæ,* so that it has been possible for me accurately to identify most of the species established by Van Tieghem based on this collection; without these specimens it is quite impossible to identify the species on account of the short descriptions. The other material cited is entirely of recent collection.

Six genera have been recognized, of which the largest is *Loranthus,* with forty-three species, although specimens not in proper condition for complete descriptions, at present in our herbarium, would bring this list up to about fifty. When material available has not allowed me to place the species in its proper section, I have refrained from describing such plants, and a number of these, at present represented by incomplete

material, will have to be considered at a later date, when more complete specimens are available. *Phrygilanthus,* included by Bentham in *Loranthus,* but distinguished primarily by its versatile anthers, is here retained as a genus, and is represented in the Archipelago by a single species, which must be considered as an Australian type. *Cleistoloranthus,* remarkable for its cylindric corolla-tube entirely closed at the apex by the inward projecting and connate basal portions of the lobes, and by its very short, spreading, irregularly toothed, external portions of the lobes which are broader than long, is described as a new genus. *Viscum* is represented by four species, all of wide distribution; *Notothixos* by three endemic species, and *Ginalloa* by a single endemic species. The table below gives some idea of the distribution in this part of the world of the genera and species, the latter being much more strongly developed in the Malay region than to the north and south. *Arceuthobium,* with one species in the Himalayan region, and *Nuytsia* and *Atkinsonia* (*Gaiadendron*) with one species each in Australia, are not included in the table.

Genera.	India, including the Malay Peninsula.[1]	Malay Archipelago and Peninsula.[2]	China.[3]	Australia.[4]	Philippines.
Loranthus	69[a]	96	16	16	43
Cleistoloranthus	0	0	0	0	1
Phrygilanthus	0	0	0	3[b]	1
Viscum	11	6	4	3	4
Notothixos	2	1	0	3	3
Ginalloa	3	4	0	0	1
Total	85	107	20	25	53

[a] Including additional species described by King in Journ. As. Soc. Beng. **56**[2] (1888) 89–100.

[b] Included in *Loranthus*.

KEY TO THE PHILIPPINE GENERA OF LORANTHACEÆ.

1. Flowers 2-sexual.
   2. Anthers basifixed.
      3. Corolla-tube open, variously cleft or divided, the lobes often entirely free, linear, reflexed or erect ..... 1. *Loranthus*
      3. Corolla-tube cylindric, closed at the top by inward projecting processes of the four very short broad, spreading lobes, the flowers cleistogamous. ..... 2. *Cleistoloranthus*
   2. Anthers versatile ..... 3. *Phrygilanthus*
1. Flowers 1-sexual.
   2. Anthers adnate to the petals, opening by pores; plants glabrous.... 4. *Viscum*
   2. Anthers at the base of the petals, many-celled; plants, or at least the young parts, densely yellowish- or grayish-puberulent, often mealy-glandular. ..... 5. *Notothixos*
   2. Anthers at the base of the petals, 2-celled; plants glabrous..... 6. *Ginalloa*

[1] Hook. f. Fl. Brit. Ind. **5** (1886) 203–228.

[2] Boerlage Handl. Fl. Nederl. Ind. **3**[1] (1900) 162–167.

[3] Hemsley in Journ. Linn. Soc. Bot. **26** (1894) 405–408.

[4] Bentham Fl. Austral. **3** (1866) 387–397.

1. LORANTHUS Linn.

1. Petals entirely free; flowers subtended by a single bract.
   2. Flowers small, less than 1 cm long, 5-merous, arranged in axillary spikes or racemes; buds strongly constricted in the median portion, base and apex inflated. § PHOENICANTHEMUM.
      3. Flowers racemose ..... 1. *L. pentapetalus*
      3. Flowers spicate ..... 2. *L. sessiliflorus*
   2. Flowers medium, 1 to 4 cm long, rarely smaller, 4- to 6-merous, arranged in axillary fascicles, cymes or racemes; buds not constricted in the median portion. § HETERANTHUS.
      3. Leaves whorled.
         4. Flowers 5-merous.
            5. Leaves petioled.
               6. Leaves oblong-ovate to elliptic-ovate, apex blunt-acuminate or acute, 8 cm long or more ..... 3. *L. basilanensis*
               6. Leaves narrowly obovate-elliptic, rounded at the apex, 7 cm long or less ..... 4. *L. merrittii*
            5. Leaves sessile ..... 5. *L. benguetensis*
         4. Flowers 4-merous.
            5. Leaves sessile ..... 6. *L. luzonensis*
            5. Leaves petioled.
               6. Inflorescences scattered along the branches ..... 7. *L. mirabilis*
               6. Inflorescences at the nodes only ..... 8. *L. acutus*
      3. Leaves opposite, subopposite or alternate.
         4. Flowers 4-merous.
            5. Flowers less than 1 cm long; leaves lanceolate ..... 9. *L. tenuis*
            5. Flowers nearly 2.5 cm long; leaves elliptic-ovate to elliptic-obovate. 10. *L. mearnsii*
         4. Flowers 5-merous.
            5. Leaves all petioled.
               6. Leaves acute or acuminate at the apex.
                  7. Flowers all sessile, arranged in groups of threes along one side of the branches ..... 11. *L. cauliflorus*
                  7. Flowers all pedicelled, arranged in slender, few-flowered cymes.
                     8. Leaves about 20 cm long, prominently acuminate; flowers 3.5 cm long ..... 12. *L. lanaensis*
                     8. Leaves 14 cm long or less, blunt, acute, or only slightly acuminate; flowers 3 cm long ..... 13. *L. bicoloratus*
                  7. Flowers in triads, all sessile, two triads on a short common peduncle ..... 14. *L. hexanthus*
               6. Leaves broad and rounded at their apices; flowers in pairs, which are fasciculate at the nodes ..... 15. *L. hutchinsonii*
            5. Leaves sessile ..... 16. *L. cuernosensis*

1. Corolla-lobes more or less united, forming a short or long tube.
   2. Flowers 4-merous, small or medium, each subtended by a single small bract; corolla straight or curved, outside very densely tomentose or farinose. § CICHLANTHUS.
      3. Leaves usually less than 2 cm in width.
         4. Fruit ellipsoid, not at all narrowed at the base ..... 17. *L. cstipitatus*
         4. Fruit narrowly obovoid, gradually narrowed to the base. 18. *L. sphenoideus*

3. Leaves 2 to 5 cm wide.
4. Flowers, young leaves and branches densely covered with a rather pale, yellowish-brown tomentum ..... 19. *L. philippensis*
4. Tomentum dark-rusty-brown ..... 20. *L. ferrugineus*

2. Flowers 4- to 6-merous, usually 5-merous, each subtended by a single small bract, arranged in fascicles, cymes, or racemes; corolla straight or curved, glabrous or only slightly pubescent. § Dendrophithoë.
3. Inflorescence of axillary, solitary or fascicled, often very short, simple racemes.
4. Leaves sessile and strongly cordate at the base..... 21. *L. hallieri*
4. Leaves distinctly petioled, acute or acuminate at the base.
5. Flowers more or less curved, 3 to 4 cm long.
6. Leaves prominently 5-plinerved, obtuse; racemes very short, fascicled ..... 22. *L. clementis*
6. Leaves not 5-plinerved; racemes solitary, in pairs, or fasciculate, elongated.
7. Leaves lanceolate, about 15 cm long; racemes fascicled. 23. *L. copelandii*
7. Leaves elliptic-ovate to elliptic-oblong, less than 10 cm long; racemes solitary or in pairs..... 24. *L. loheri*
5. Flowers straight, about 1.5 cm long..... 25. *L. pentandrus*
3. Inflorescence of racemosely disposed triads.
4. Flowers all sessile.
5. Petioles 1 to 1.5 cm long.
6. Corolla about 1.5 cm long, somewhat inflated.. 26. *L. subalternifolius*
6. Corolla 2 cm long, very slender, not at all inflated.. 27. *L. boholensis*
5. Petioles 3 mm long or less or the leaves sessile.
6. Leaves lanceolate to ovate, sessile, the lateral nerves 6 to 8, obscure; corolla about 2 cm long..... 28. *L. secundiflorus*
6. Leaves ovate to elliptic-ovate, short-petioled, the lateral nerves 3 or 4, rather distinct, the reticulations lax; corolla 1.5 cm long. 29. *L. mindanaensis*
4. Central flower of each triad sessile, the two lateral ones short- or long-pedicelled.
5. Leaves rounded or acute at the base, the petioles elongated.
6. Inflorescence cauline; pedicels of the lateral flowers very short, 1 mm long or less..... 30. *L. revolutus*
6. Inflorescence axillary and terminal, lax; pedicels of the lateral flowers elongated.
7. Inflorescence lepidote; leaves acute or slightly acuminate. 31. *L. ahernianus*
7. Inflorescence glabrous; leaves strongly caudate-acuminate. 32. *L. acuminatissimus*
5. Leaves strongly cordate at the base, short-petioled; pedicels of the lateral flowers short..... 33. *L. ovatifolius*
3. Inflorescence of umbellately disposed triads.
4. Leaves whorled ..... 34. *L. halconensis*
4. Leaves opposite or alternate.
5. Flowers 5- and 6-merous in the same umbels..... 35. *L. haenkeanus*
5. Flowers 4-merous ..... 36. *L. curranii*
3. Inflorescence of terminal and axillary cymes; flowers 6-merous. 37. *L. viridis*
3. Inflorescence of sessile fascicled flowers, axillary or at the nodes.
4. Leaves sessile; flowers 5-merous ..... 16. *L. cuernosensis*

4. Leaves petioled; flowers 6-merous..... 38. *L. banahaensis*

2. Each flower subtended by a bract, and by an additional pair of similar, usually smaller bracteoles, these bracteoles free or united into a single retuse one. § MACROSOLEN.

3. Flowers in simple racemes, each flower subtended by a small bract and two smaller, free bracteoles..... 39. *L. ampullaceus*

3. Flowers in triads, each peduncle bearing two triads, the flowers 5-merous, all sessile ..... 40. *L. macgregorii*

3. Flowers in pairs, each peduncle bearing two sessile, 6-merous flowers. 41. *M. geminatus*

2. Flowers in axillary, sessile fascicles, which are surrounded by large, ovate to elliptic, imbricated, deciduous bracts, entirely inclosing the young inflorescence. § LEPIOSTEGERES.

3. Flowers about 30 in each head..... 42. *L. congestiflorus*

3. Flowers 4 in each head..... 43. *L. williamsii*

§ PHOENICANTHEMUM.

1. **Loranthus pentapetalus** Roxb. Fl. Ind. 1 (1820) 190; DC. Prodr. 4 (1830) 295; Blume Fl. Jav. Loranth. (1828) 39, *t. 14, 23A;* Hook. f. Fl. Brit. Ind. 5 (1886) 206; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1894) 406; Rolfe in Journ. Bot. 23 (1885) 215; Vid. Phan. Cuming. Philip. (1885) 140, Rev. Pl. Vasc. Filip. (1886) 231; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 50.

Lanthorus spicifer Presl Epim. Bot. (1851) 257; Walp. Ann. 2: 727; Van Tiegh. in Bull. Soc. Bot. France 41 (1894) 487.

Phocnicanthemum pentapetalum Miq. Fl. Ind. Bat. 1[1] (1856) 823.

Dendrophthoë pentapetala G. Don Gen. Hist. 3 (1832) 419.

Loranthus spicifer F.-Vill. Nov. App. (1883) 183; Vid. Rev. Pl. Vasc. Filip. (1886) 231.

Lanthorus blumeanus Van Tiegh. in Bull. Soc. Bot. France 41 (1894) 488.

Lanthorus pentascpalus Van Tiegh. in Bull. Soc. Bot. France 41 (1894) 488.

Lanthorus cumingii Van Tiegh. l. c.

Loranthus cumingii Engl. Nat. Pflanzenfam. Nachtr. 1 (1897) 128.

Loranthus blumeanus Engl. l. c.

PHILIPPINES, without locality, *Cuming 1949*, type number of the genus *Lanthorus* Presl; *Cuming 1975*, type number of *Lanthorus cumingii* Van Tiegh. BABUYANES Islands, Camiguin, *Bur. Sci. 4111 Fénix.* LUZON, Province of Benguet, Ambuklao to Daklan, *Merrill 4402;* Baguio, *For. Bur. 4901 Curran, Elmer 8493;* Kias Hill, *Williams 932:* Province of Pampanga, Mount Abu, *Bur. Sci. 1993 Foxworthy:* Province of Bataan, Lamao River, *Whitford 1219, For. Bur. 2243 Meyer, Elmer 6891, For. Bur. 80 Barnes:* Province of Rizal, Bosoboso, *Merrill 1832, For. Bur. 2134 Ahern's collector, Bur. Sci. 1499 Ramos:* Province of Tayabas, *Elmer 9174:* Province of Camarines, *For. Bur. 12291 Curran.*

Nepal to Burma and southern China, the Malay Peninsula, Sumatra, Java, and Borneo.

A widely distributed species, with rather constant characters, considering its range. I am unable to distinguish any constant characters by which the four species recognized by Van Tieghem, *Lanthorus pentapetalus, L. spicifer, L. cumingii,* and *L. blumeanus,* can be separated from *Loranthus pentapetalus* Roxb.

2. **Loranthus sessiliflorus** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 188.

LUZON, Province of Benguet, Baguio, *Elmer 6057:* Province of Bataan, Lamao River, *Whitford 1171:* Province of Tayabas, Lucban, *Elmer 7845.* MINDORO, Baco, *Merrill 1242, 4041, McGregor 125;* Aglubang River, *For. Bur. 11499 Merritt.*

Endemic.

§ Heteranthus.

3. **Loranthus basilanensis** sp. nov.

Glaber; foliis verticillatis, coriaceis, elliptico-ovatis vel oblongo-ovatis, usque ad 11 cm longis, utrinque acutis, vel apice leviter acuminatis, basi interdum rotundatis, petiolatis, nervis utrinque 3 vel 4, subobsoletis; floribus 5-meris, in cymis brevibus axillaribus solitariis binis vel fasciculatis dispositis; petalis liberis, circiter 1.5 cm longis.

Glabrous throughout. Branches terete, grayish or brownish, smooth, Leaves three or four at each node, verticillate, elliptic-ovate to oblong-ovate, 6 to 11 cm long, 2.5 to 5 cm wide, brown when dry, dull, acute at both ends, or the apex sometimes slightly acuminate and the base rounded; nerves 3 or 4 on each side of the midrib, very obscure, the reticulations obsolete; petioles 5 to 10 mm long. Cymes axillary, solitary, in pairs, or fascicled at the nodes, the rachis less than 1 cm long. Flowers yellow, pedicelled, each subtended by a single small bracteole. Calyx cup-shaped, 3 mm long, the limb produced, truncate. Petals 5, about 15 cm long, 1 mm wide, free, the portion above the insertion of the stamens reflexed; filaments 2 mm long; anthers continuous, 3 mm long.

Basilan, Matangal Point, *For. Bur. 3447 Hutchinson*, December, 1907. An unnumbered specimen collected on Basilan by *Hallier*, in January, 1904, is probably referable here, as well as *Copeland 376*, from Davao, Mindanao.

4. **Loranthus merrittii** nom. nov.

Loranthus nodosus Engl. Nat. Pflanzenfam. Nachtr. 1 (1897) 128, non Desr.

Stemmatophyllum nodosum Van Tiegh. in Bull. Soc. Bot. France 41 (1894) 506.

Philippines, without locality, *Cuming 1952, 1958*, the former the type number. Luzon, near Manila, *Merrill 3494, Loher 4463:* Province of Pangasinan, *For. Bur. 8348 Curran & Merritt:* Province of Bataan, near Bagac, *For. Bur. 5977 Curran.* Lubang, *Merrill 960.* Mindoro, Cauayan, *For. Bur. 9893 Merritt.*

Endemic.

5. **Loranthus benguetensis** sp. nov.

Glaber; foliis verticillatis, ternis vel quaternis, oblongo-ellipticis vel lanceolato-ellipticis, obtusis, sessilibus, crasse coriaceis, nitidis, usque ad 4 cm longis; floribus 5-meris, glabris, in triadibus dispositis, omnibus breviter pedicellatis; triadibus umbellatim dispositis, pedunculis axillaribus, solitariis.

Glabrous throughout. Branches stout, terete, dark-colored and almost black when dry, somewhat shining. Leaves verticillate, three or four at each node, sessile, oblong-elliptic to lanceolate-elliptic, obtuse, the base acute, thickly coriaceous, shining, 3 to 4 cm long, 1 to 1.3 cm wide, the midrib faint, the lateral nerves and reticulations obsolete. Inflorescence axillary, solitary, the peduncles slender, about 1 cm long, each with about four short branches umbellately disposed at the apex, these branches about

4 mm long and each in turn bearing a single triad of flowers, all the flowers shortly pedicelled, the pedicels 1 to 1.5 mm long. Calyx narrowly funnel-shaped, 3 mm long, the limb produced, truncate or minutely toothed, each subtended by a small bract. Petals 5, free, glabrous, about 2.2 cm long, 1.5 mm wide, the reflexed portion 5 to 6 mm long. Filaments 1 to 2 mm long; anthers continuous, obtuse, 3 mm long.

Luzon, Province of Benguet, Mount Pulog, *For. Bur. 16064 Curran, Merritt, & Zschokke*, January, 1909, parasitic on *Pinus insularis*, altitude about 1,200 m. Apparently also represented by immature specimens from the same province, *Bur. Sci. 2712 Mearns*, April, 1907.

Manifestly closely allied to *Loranthus luzonensis*, but with smaller, shining leaves, and 5-merous, quite glabrous flowers.

6. **Loranthus luzonensis** Presl ex Schultes f. Syst. Veg. 7 (1829) 104; Vid. Phan. Cuming. Philip. (1885) 140, Rev. Pl. Vasc. Philip. (1886) 232; F.-Vill. Nov. App. (1883) 183.

Dendrophthoë luzonensis G. Don Gen. Hist. 3 (1834) 421; Miq. Fl. Ind. Bat. 1[1] (1857) 818.

Stemmatophyllum luzonense Van Tiegh. in Bull. Soc. Bot. France 41 (1894) 505.

Loranthus forsterianus Llanos in Mem. Ac. Cienc. Madr. 4 (1858) 501; Blanco Fl. Filip. ed. 3, 4: 102, non Schultes, fide F.-Villar.

Philippines, without locality, *Cuming 1964:* Province of Union, Bauang, *Elmer 5693:* Province of Abra, *Bur. Sci. 7250 Ramos:* Province of Benguet, *For. Bur. 10922 Curran, For. Bur. 15893 Bacani:* Province of Zambales, *For. Bur. 5927 Curran, For. Bur. 11050 Zschokke.*

Endemic.

From the meager description given by Van Tieghem, and the fragment of *Cuming 1956* before me, on which *Stemmatophyllum sessilifolium* Van Tiegh. (*Loranthus sessilifolius* Engl.) was based, I can not distinguish the species from the above.

7. **Loranthus mirabilis** Van Huerck & Muell. Arg. in Act. Soc. Helv. Sci. Nat. 55 (1872) 47; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 187.

Stemmatophyllum cumingii Van Tiegh. in Bull. Soc. Bot. France 41 (1894) 505.

Loranthus cumingianus Engl. Nat. Pflanzenfam. Nachtr. 1 (1897) 128, non *L. cumingii* Engl. l. c.

Philippines, without locality, *Cuming 1966*, type number: Luzon, Province of Bataan, Mount Mariveles, *Copeland s. n.*, April, 1906.

In my previous consideration of *Loranthus mirabilis*[5] the specimens cited, other than *Cuming 1966*, do not belong to this species.

Endemic.

8. **Loranthus acutus** (Van Tiegh.) Engl. Nat. Pflanzenfam. Nachtr. 1 (1897) 128.

Stemmatophyllum acutum Van Tiegh. in Bull. Soc. Bot. France 41 (1894) 546.

Philippines, without locality, *Cuming 1973*, type number. Luzon, Province of Benguet, *Williams 1021, 1319, Elmer 5809, Merrill 4377, For. Bur. 15982 Bacani.*

Endemic.

[5] *This Journal* 1 (1906) *Suppl.* 187.

9. **Loranthus tenuis** sp. nov.

Glaber, ramulis juvenilibus inflorescentiisque exceptis; ramis ramulisque tenuibus, griseo-brunneis, teretibus, lenticellatis; foliis oppositis, suboppositis vel alternis, lanceolatis, usque ad 6 cm longis, utrinque angustatis, apice acuminatis, petiolatis, nervis utrinque circiter 5, subobsoletis; cymis axillaribus, solitariis, vix 1.5 cm longis, 3-floris; floribus leviter ferrugineo-puberulis, 4-meris; petalis liberis, 5 mm longis.

Glabrous except the young branchlets and inflorescence. Branches slender, brownish-gray, terete, lenticellate, glabrous, the young branchlets slightly ferruginous-puberulent. Leaves opposite, subopposite or alternate, coriaceous, glabrous, dull, lanceolate, 3.5 to 6 cm long, 0.8 to 1.8 cm wide, narrowed at both ends, the apex acuminate, acumen blunt, base acute or acuminate; nerves 4 or 5 on each side of the midrib, very obscure, the reticulations obsolete; petioles slender, 5 mm long or less. Cymes axillary, solitary, less than 1.5 cm long, 3-flowered, each therefore a simple triad with pedicelled flowers, the pedicels about 2 mm long. Calyx cup-shaped, 1.8 to 2 mm long, obscurely 4-toothed or subtruncate, the limb slightly produced, ferruginous-puberulent, subtended by a single, ovate, obtuse bract about 1 mm long. Petals 4, free, linear or oblong-linear, ferruginous-puberulent outside, obtuse, about 5 mm long, 0.5 to 0.7 mm wide. Anthers erect, continuous. Style 6 mm long; stigma capitate.

Luzon, Province of Bataan, Lamao River, Mount Mariveles, parasitic on *Diospyros pilosanthera* Blanco in forests at an altitude of about 800 m. *For. Bur. 6287 Curran*, February, 1907.

A species well characterized by its slender branches, narrow, lanceolate leaves, and simple, solitary triads.

10. **Loranthus mearnsii** Merr. in Philip. Journ. Sci. 2 (1907) Bot. 271.

Mindoro, Mount Halcon, *Merrill 5733*, November, 1906.

Endemic.

11. **Loranthus cauliflorus** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 185.

Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 55*, and two sheets without number, January, March, May, 1906.

Endemic.

12. **Loranthus lanaensis** sp. nov.

Glaber; foliis suboppositis, coriaceis, lanceolatis vel late lanceolatis, in sicco brunneis, opacis, circiter 20 cm longis, basi acutis, apice valde acute acuminatis, petiolatis, nervis utrinque circiter 7, obscuris; cymis ad nodos solitariis vel fasciculatis, trichotomis, 9-floris; floribus omnibus pedicellatis, 5-meris; petalis liberis, 3 ad 3.5 cm longis.

Glabrous throughout. Branches stout, terete, gray or brown. Leaves subopposite, lanceolate or broadly lanceolate, 18 to 20 cm long, 4.5 to 6 cm wide, thickly coriaceous, brown when dry, dull, the base acute, the apex strongly and sharply acuminate, often somewhat falcate; nerves

about 8 on each side of the midrib, obscure; petioles stout, 2 to 3 cm long. Cymes solitary or few at the nodes, rarely additional ones scattered along the branches, the rachis less than 1 cm long, bearing at its apex three short branches, each branch in turn bearing three pedicelled yellow flowers, so that the cyme is made up of three triads. Pedicels 2 to 3 mm long, slender. Calyx 4.5 mm long, narrowed below, the limb produced, truncate, each subtended by a single, ovate, 1.2 mm long bract. Petals 5, free, 3 to 3.5 cm long, about 1.7 mm wide. Filaments 2 mm long; anthers continuous, 5 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens* 777, November, 1906, on trees overhanging the lake.

A species closely allied to *Loranthus bicoloratus* Elmer, but with much larger, differently shaped leaves, longer flowers and anthers.

13. **Loranthus bicoloratus** Elmer Leafl. Philip. Bot. 2 (1908) 470.

Glaber; foliis coriaceis, in sicco brunneis, opacis, oblongis vel late oblongo-lanceolatis, oppositis, petiolatis, 7 ad 14 cm longis, circiter 5 cm latis, basi acutis vel obtusis, apice acutis, obtusis, vel leviter acuminatis, nervis utrinque 3 ad 5, obscuris; cymis ad nodos solitariis vel 2 vel 3 fasciculatis; floribus omnibus pedicellatis, in triadibus 3 vel 4 dispositis; petalis 5, liberis, circiter 3 cm longis.

NEGROS, Cuernos Mountains, near Dumaguete, *Elmer 9950*, type number, collected on *Leucosyke*, in densely thicketed ravines at an altitude of about 760 m.

From the original description of the species, one would infer that it belongs in the section *Dendrophthoë*, but examination of type material shows that the petals are entirely free.

Endemic.

14. **Loranthus hexanthus** sp. nov.

Glaber; foliis oppositis, petiolatis, opacis, oblongo-ovatis, usque ad 10 cm longis, basi acutis vel acuminatis, apice obtusis, acutis vel acuminatis, rectis vel leviter falcatis, nervis utrinque circiter 3, obscuris, subobsoletis; pedunculis axillaribus, brevibus, 6-floris, floribus omnibus sessilibus, in triadibus 2 dispositis; petalis liberis, circiter 1.7 mm longis.

Glabrous throughout. Branches grayish-brown or dark-colored, terete. Leaves opposite, oblong-ovate, straight or slightly falcate, 8 to 10 cm long, 3 to 5 cm wide, thickly-coriaceous, brittle and dull when dry, brown, base acute or acuminate, apex obtuse, acute, or acuminate; nerves about 3 on each side of the midrib, very obscure, the reticulations often obsolete; petioles 1 cm long or less. Inflorescence axillary and at the nodes, the peduncles solitary or few at each node, 8 mm long or less, each peduncle bearing at its apex six sessile flowers, arranged in two triads, each flower subtended by a broadly ovate, obtuse bract about 2.5 mm long. Calyx 4 mm long, the limb produced, truncate or irregularly and obscurely toothed. Petals 5, free, about 1.7 cm long, the buds slightly angled, and a little enlarged at the apex, the portion

of the petals above the insertion of the stamens about 6 mm long. Anther 2.5 mm long, continuous; filament short.

Mindanao. Lake Lanao, Vickers' Landing, *Mrs. Clemens s. n.*, September–October, 1906: District of Davao, Mount Apo, *Williams 2565*, April, 1905.

A species well characterized by its 6-flowered peduncles, the flowers all sessile and arranged in two triads at the apex of the peduncle.

15. **Loranthus hutchinsonii** sp. nov.

Glaber; foliis coriaceis, nitidis, brunneis, elliptico-ovatis, basi acutis, apice late rotundatis, oppositis vel subverticillatis, usque ad 8 cm longis, petiolatis, nervis utrinque 2 vel 3, subobsoletis; floribus ad nodos fasciculatis, breviter pedicellatis, 5-meris; petalis liberis, circiter 2 cm longis.

Glabrous throughout. Branches stout, terete, smooth, dark-reddish-brown, the internodes 3 to 5 cm long. Leaves opposite or subverticillate, thickly coriaceous, brown and somewhat shining when dry, elliptic-ovate, 5 to 8 cm long, 3.5 to 6 cm wide, the base acute, the apex broad, rounded, margins somewhat revolute; nerves two or three on each side of the midrib, indistinct, the reticulations obsolete, the midrib prominent; petioles 1 to 1.5 cm long. Flowers red, 2.2 cm long, the buds cylindric, fasciculate in the axils and at the nodes, three to ten or more flowers at each node, pedicellate, the pedicels about 2 mm long. Calyx about 4 mm long, cylindric, the limb produced, truncate, each subtended by a single, orbicular-ovate, obtuse, 1.5 mm long bracteole. Petals 5, free, linear, about 2 cm long, 2 mm wide, the portion above the insertion of the stamens 6 mm long. Stamens 6 mm long, the antheriferous portion continuous, 3 mm long.

Mindanao, Province of Misamis, Mount Malindang, *For. Bur. 4554 Mearns & Hutchinson*, May, 1906, on trees in forests at an altitude of about 1,100 m.

16. **Loranthus cuernosensis** Elmer Leafl. Philip. Bot. 2 (1908) 469.

Glaber; foliis oppositis, sessilibus, coriaceis, usque ad 15 cm longis, 5 cm latis, in sicco brunneis, opacis, ovato-lanceolatis vel oblongis, basi late rotundatis vel obtusis, interdum inaequilateralibus, supra sensim angustatis, apice acutis vel acuminatis, nervis utrinque 3 ad 5, obscuris, reticulis obsoletis; floribus axillaribus; fasciculatis, 5-meris, circiter 2 cm longis.

Negros, Cuernos Mountains, near Dumaguete, *Elmer 9525*, March, 1908, in forests at an altitude of about 1,060 m.

The relationships of this species are not clear to me, as it is impossible to determine from the original description to which section the plant really belongs, while the material of the type collection before me shows neither the attachment of the inflorescence nor flowers. I found, however, a single petal, which appears to me to have been free, and have accordingly placed the species in the section *Heteranthus;* for the sake of convenience I have included it in the key, also in the section *Dendrophthoë*.

In vegetative characters the type collection is rather closely matched by a specimen from Zamboanga, Mindanao, *Ahern 579*, with very immature flowers, and one from Mount Mayon, Luzon, *Bur. Sci. 6482 Robinson*, with fruit only.

Both of these have opposite sessile leaves similar in size, shape, and texture to *Elmer 9525*, but on both the inflorescence is composed of very shortly peduncled, fascicled triads, while Mr. Elmer distinctly states that the flowers on his species are in small, axillary, sessile clusters.

Endemic.

§ CICHLANTHUS.

17. **Loranthus estipitatus** Stapf in Trans. Linn. Soc. Bot. II 4 (1894) 221; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1894) 405.

PHILIPPINES, without locality, *Cuming 1970*. LUZON, Province of Tayabas, *Elmer 7911:* Province of Rizal, Bosoboso, *Merrill 1826*.

Southern China to Tonkin, Perak, and Borneo.

18. **Loranthus sphenoideus** Blume Fl. Jav. Loranth. (1828) 23, *t. 4;* Vid. Phan. Cuming. Philip. (1885) 140, Rev. Pl. Vasc. Filip. (1886) 231; F.-Vill. Nov. App. (1883) 184.

PHILIPPINES, without locality, *Cuming 490*. LUZON, Province of Benguet, *For. Bur. 4880, 10903 Curran, Williams 984:* Province of Zambales, *For. Bur. 5928 Curran:* Province of Bulacan, *Yoder 201:* Province of Rizal, *Bur. Sci. 110 Foxworthy*. MINDORO, *For. Bur. 8792 Merritt*. GUIMARAS, *For. Bur. 249 Gammill*. MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 459*.

A form in many respects resembling *Loranthus fuscus* Blume, differing chiefly from the above specimens by its narrower leaves and paler pubescence, but which I am not disposed to consider specifically distinct from *Loranthus sphenoideus* Blume, is represented by the following specimens: PHILIPPINES, without locality, *Cuming 1959*. LUZON, Province of Union, Bauang, *Elmer 5711:* Province of Tarlac, *Merrill s. n.:* Province of Pangasinan, *Bur. Sci. 4977 Ramos; Alberto 35*.

Miquel has reduced *Loranthus sphenoideus* Blume to *L. repandus* Blume, as a variety, to which it is undoubtedly allied. The type of *L. sphenoideus* was from Celebes, and Blume reports the species from Java; I am not sure of its other distribution, but it is probably more or less widely distributed in the Malay region.

19. **Loranthus philippensis** Cham. & Schlecht. in Linnaea 3 (1828) 204; Blanco Fl. Filip. ed. 2 (1845) 164; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 741; Vid. Phan. Cuming. Philip. (1885) 140, Rev. Pl. Vasc. Filip. (1886) 231; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 84; F.-Vill. Nov. App. (1883) 183.

Scurrula philippensis G. Don Gen. Hist. 3 (1834) 423.

Dendrophthoë philippensis Miq. Fl. Ind. Bat. 1[1] (1856) 817; Vid. Cat. Pl. Prov. Manila (1880) 40.

Lonicera symphoricarpos Blanco Fl. Filip. (1837) 161.

Cichlanthus philippensis Van Tiegh. in Bull. Soc. Bot. France 42 (1895) 243.

PHILIPPINES, without locality, *Cuming 491, 1977*. LUZON, Province of Benguet, *Elmer 5911, Williams 1379:* Province of Nueva Vizcaya, *For. Bur. 15783 Curran & Merritt:* Province of Rizal, *Bur. Sci. 128 Foxworthy, Merrill 1688, For. Bur. 3169 Ahern's collector:* Province of Bataan, *For. Bur. 5790 Curran, Merrill 1585:* Province of Laguna, *Bur. Sci. 6013 Robinson, Hallier s. n.:* Province of Bulacan, *Yoder 241:* Province of Pangasinan, *Bur. Sci. 4972 Ramos:* Province of Tayabas, *Whitford 590*. MINDORO, *For. Bur. 3684 Merritt, Whitford 1427*. TICAO, *For. Bur. 2532 Clark*. MINDANAO, *Mrs. Clemens s. n.*

A widely distributed endemic species, apparently the Philippine representative of *Loranthus scurrula* Linn., and certainly closely allied to it. Typical forms are very distinct from the preceding and the next, but it is frequently very difficult to distinguish some small forms from the former.

20. **Loranthus ferrugineus** Roxb. Fl. Ind. 2 (1824) 188; DC. Prodr. 4 (1830) 299; Hook. f. Fl. Brit. Ind. 5 (1886) 210; Usteri Beitr. Ken. Philip. Veg. (1905) 125.

Palawan, *Merrill 705; Bur. Sci. 203 Bermejos; Bur. Sci. 823 Foxworthy.*
Malay Peninsula to Java and Sumatra.

§ Dendrophthoë.

21. **Loranthus hallieri** sp. nov.

Glaber; foliis sessilibus, oppositis, ovatis, basi valde cordatis, apice acuminatis, usque ad 10 cm longis, coriaceis, 5- vel 7-plinerviis; floribus 5-meris, in racemis brevibus axillaribus fasciculatis dispositis.

Glabrous throughout, or the inflorescence very slightly pubescent. Branches terete, reddish-brown, not lenticellate. Leaves opposite, ovate, coriaceous, sessile, 7 to 10 cm long, 3 to 5.5 cm wide, dull and brown when dry, the base very strongly cordate and half surrounding the stems, the apex acuminate; nerves 5 to 7 from just above the base, ascending, curved, rather distinct, the reticulations obsolete or nearly so. Racemes fascicled, axillary, the rachis less than 1 cm long, the pedicels about 2 mm long. Calyx cylindric, 3 mm long, the limb slightly produced, truncate or obscurely toothed, each subtended by an ovate, concave, acute or acuminate, 1.5 mm long bracteole. Corolla somewhat curved, 3 to 3.5 cm long, in bud somewhat narrowed at both base and apex to a diameter of 1 mm, the median portion slightly inflated and 3 mm in diameter, the tube 1.5 to 1.8 mm long, the lobes 5, about 1.7 mm wide, the portions above the insertion of the stamens linear, 8 mm long, recurved. Filaments 4 mm long; anthers continuous, linear, 3 mm long.

Basilan, *Hallier s. n.*, February, 1904.
A species at once recognizable by its opposite, sessile, strongly cordate leaves, and short, axillary, fascicled racemes.

22. **Loranthus clementis** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 185.
Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, March, 1906.
Endemic.

23. **Loranthus copelandii** Merr. l. c. 186.
Luzon, Province of Benguet, Daklan to Kabayan, *Merrill 4407;* Mount Pulog, *For. Bur. 18176, 16232 Curran, Merritt, & Zschokke.*
Endemic.

24. **Loranthus loheri** sp. nov.
Loranthus curvatus Vid. Rev. Pl. Vasc. Filip. (1886) 230; Phan. Cuming. Philip. (1885) 141; F.-Vill. Nov. App. (1883) 184, non Blume.

Glaber, inflorescentiis exceptis; foliis alternis, petiolatis, coriaceis, oblongo-ellipticis vel anguste ovato-ellipticis, in sicco brunneis, opacis, basi acutis, apice obtusis vel late obtuse acuminatis, usque ad 10 cm longis, nervis utrinque 3, ascendentibus; floribus rubris, leviter curvatis, circiter 3 cm longis, 5-meris, in racemis simplicibus, solitariis, axillaribus dispositis.

Glabrous except the inflorescence. Branches terete, smooth, grayish- or reddish-brown. Leaves alternate, oblong-elliptic to narrowly ovate-elliptic, 4 to 10 cm long, 1.5 to 4.5 cm wide, the base acute or acuminate, the apex blunt or very obscurely blunt-acuminate, brown and dull when dry, thickly coriaceous, brittle; nerves three on each side of the midrib, ascending, the reticulations obsolete or nearly so; petioles about 1 cm long. Racemes axillary, solitary, simple, the rachis 3 cm long or less, the pedicels about 3 mm long. Calyx densely grayish-puberulent, 2.5 to 3 mm long, the limb produced, obscurely 5-toothed, each subtended by a broadly ovate, 2 mm long bracteole. Corolla red, somewhat curved, 3 to 3.3 cm long, in bud slightly inflated above the middle, the apex narrowed; lobes 5, linear, about 8 mm long and 1 mm wide. Filaments 4 mm long; anthers continuous, 2.5 mm long.

LUZON, Province of Rizal, San Francisco del Monte, *Loher 4481* (type): Province of Ilocos Norte, *Bur. Sci. 2288 Mearns:* without locality, *Cuming 1955, 1965,* and a sheet in the herbarium of this Bureau without number.

A species manifestly allied to *Loranthus curvatus* Blume, but with much smaller flowers.

25. **Loranthus pentandrus** Linn. Mant. (1767) 63; DC. Prodr. 4 (1830) 305; Blume Fl. Jav. Loranth. (1828) 33, *t. 10;* Hook. f. Fl. Brit. Ind. 5 (1886) 216; F.-Vill. Nov. App. (1883) 184.

PALAWAN, *Merrill 692, Bur. Sci. 283 Bermejos.*

India to the Malay Peninsula, Sumatra, Java, and Borneo.

26. **Loranthus subalternifolius** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 188, excl. syn. *Loranthus cumingii* Engl.

Amylotheca cumingii Van Tiegh. in Bull. Soc. Bot. France 41 (1894) 264.

Elytranthe cumingii Engl. Nat. Pflanzenfam. Nachtr. 1 (1897) 126.

PHILIPPINES, without locality, *Cuming 1969* (type number of *Amylotheca cumingii* Van Tiegh.). LUZON, Province of Benguet, *Elmer 6191.*

The original specific name is invalidated in *Loranthus* by *Loranthus cumingii* Engl. and *L. cumingianus* Engl.

Endemic.

27. **Loranthus boholensis** sp. nov.

Glaber; foliis oppositis, coriaceis, petiolatis, lanceolatis vel late lanceolatis, usque ad 15 cm longis, basi rotundatis vel abrupte decurrenti-acuminatis, apice gradatim acuminatis, nervis utrinque 3 vel 4, obscuris, curvato-ascendentibus; inflorescentiis axillaribus, solitariis vel fasciculatis, floribus omnibus sessilibus, tenuibus, 6-meris, falcatis, in triadibus breviter pedunculatis, racemose dispositis.

Glabrous throughout. Branches terete, grayish, lenticellate. Leaves opposite, lanceolate or broadly lanceolate, coriaceous, dark-colored or brown, and somewhat shining on the upper surface when dry, 11 to 15 cm long, 3 to 5 cm wide, broadest in the lower part, the base rounded or abruptly and slightly decurrent-acuminate, gradually narrowed upwards to the acuminate apex, which is straight or slightly falcate; nerves

3 or 4 on each side of the midrib, indistinct, curved-ascending; petioles 1 to 1.5 cm long. Inflorescence axillary, solitary or fascicled, rachis 2 cm long or less, the flowers all sessile, greenish-yellow, red at the base, secund, arranged in triads which are very shortly peduncled, the triads racemosely arranged, their peduncles 2 to 2.5 mm long. Calyx cylindric, 2 to 2.5 mm long, each subtended by an ovate, 1.4 mm long bract. Corolla very slender, 6-cleft, about 2.5 cm long, 1.5 mm in diameter, the tube 4 to 5 mm long. Filaments 3 mm long; anthers continuous, 3.5 mm long.

Bohol. Tagbilaran, parasitic on trees near the seashore, *Bur. Sci. 1277 McGregor*, July 12, 1906.

Allied to the preceding and to the next species, but characterized by its very slender and elongated flowers and its lanceolate, petioled leaves.

28. **Loranthus secundiflorus** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 187.

Mindanao, Province of Surigao, Surigao, *Bolster 237*, February, 1906, and without number, May–June, 1906: Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*, March, 1906: District of Davao, *Williams 2695*.

Endemic.

29. **Loranthus mindanaensis** Merr. l. c. 186.

Mindanao, District of Davao, *Copeland 341*, *DeVore & Hoover 285*, *Williams 2580*. Specimens from Guimaras, *For. Bur. 101 Gammill*, and from Negros, *Whitford 1489*, are probably referable here, differing from the type in some minor characters.

Endemic.

The above four species form a group of closely allied forms which are often difficult to distinguish. Additional material may lead to the reduction of some of them.

30. **Loranthus revolutus** sp. nov.

Glaber; foliis oppositis, ellipticis vel oblongo-ellipticis, coriaceis, in sicco nitidis, usque ad 7 cm longis, petiolatis, apice late rotundatis vel obtusis, basi decurrenti-acuminatis, margine revolutis, nervis utrinque 4 ad 6, vix distinctis; inflorescentiis in ramis vetustioribus, solitariis, floribus 5-meris, in triadibus racemose dispositis, floribus lateralibus brevissime pedicellatis, intermedio sessile.

Glabrous throughout. Branches stout, gray, terete, the branchlets brownish, obscurely angled. Leaves opposite, elliptic to oblong-elliptic, thickly coriaceous, brown and somewhat shining when dry, 5 to 7 cm long, 2 to 3.5 cm wide, the margins rather strongly recurved, the apex broad, rounded or obtuse, the base decurrent-acuminate; nerves 4 to 6 on each side of the midrib, not distinct; petioles nearly 1 cm long. Inflorescence from the larger branches below the leaves, solitary, the rachis 2 to 2.5 cm long, flower-bearing only above the middle, the flowers arranged in triads, the middle one of each triad sessile, the two lateral ones very shortly (1 mm) pedicelled, the triads in turn racemosely disposed, the peduncles 2 to 3 mm long. Calyx cylindric, about 4 mm long, obscurely toothed. Corolla yellow, red at the tip, 2.5 cm long, 5-cleft

nearly to the base, the tube about 1 mm long, the lobes 1.8 mm wide, the reflexed portion above the insertion of the anthers 7 mm long. Filaments 2 mm long; anthers continuous, 4 mm long.

LUZON, Province of Zambales, Mount Tapulao, *Bur. Sci. 4785 Ramos, For. Bur. 8252 Curran & Merritt*, December, 1907, altitude 2,100 m.

31. **Loranthus ahernianus** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 184.

LUZON, Province of Rizal, Bosoboso, *For. Bur. 2140 Ahern's collector:* Province of Zambales, *Bur. Sci. 5115 Ramos.*

Endemic.

32. **Loranthus acuminatissimus** sp. nov.

Glaber; foliis oppositis, petiolatis, elliptico-lanceolatis vel late lanceolatis, usque ad 13 cm longis, coriaceis, nitidis, in sicco pallidis, apice valde caudato-acuminatis, basi acutis; floribus 6-meris, 3.5 ad 4 cm longis, in triadibus dispositis, lateralibus longe pedicellatis, intermedio sessile; triadibus racemose dispositis, longe pedunculatis.

Glabrous throughout. Branches terete, grayish, lenticellate, rather slender. Leaves rather pale and shining when dry, opposite, elliptic-lanceolate to broadly lanceolate, 8 to 13 cm long, 2 to 4.5 cm wide, the base acute, the apex strongly caudate-acuminate, the acumen straight or slightly falcate, blunt or acute; nerves 7 or 8 on each side of the midrib, evident on both surfaces but scarcely more distinct than are the secondary ones and reticulations; petioles 5 to 8 mm long. Inflorescence axillary, glabrous, solitary, in the uppermost axils only, the rachis 5 to 6 cm long, each subtended by three or four broadly triangular-ovate, 2 to 3 mm long bracts. Flowers in triads, the middle one sessile, subtended by a broadly ovate, sharply and abruptly acuminate bract, 4 mm long, the lateral ones with pedicels 9 to 10 mm long; the triads racemosely disposed, their peduncles about 1 cm long. Calyx cylindric, 4.5 mm long, the limb produced about 1 mm, truncate or minutely denticulate. Corolla-tube short, slightly inflated, about 4 mm in diameter, 2 to 3.5 mm long, the lobes 2 mm wide at the base, the portion above the insertion of the anthers about 18 mm long. Filaments 11 mm long; anthers continuous, 7 mm long.

LUZON, Province of Benguet, Baguio, *Bur. Sci. 5700 Ramos*, December, 1908.

Manifestly closely allied to the preceding species, differing chiefly in its entirely glabrous inflorescence and very strongly caudate-acuminate leaves.

33. **Loranthus ovatifolius** Merr. in Philip. Journ. Sci. 3 (1908) Bot. 133.

MINDANAO, along the seashore, but with no definite locality, *Mrs. Clemens 1195*, September, 1907.

Endemic.

34. **Loranthus halconensis** Merr. in Philip. Journ. Sci. 2 (1907) Bot. 271.

MINDORO, Alag River, *Merrill 5664*, November, 1906, parasitic on *Ficus minahassae* Miq., altitude about 100 m. LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16230 Curran, Merritt & Zochokke.*

Endemic.

35. **Loranthus haenkeanus** Presl ex Schultes Syst. 7 (1829) 113; DC. Prodr. 4 (1830) 304; Vid. Rev. Pl. Vasc. Filip. (1886) 231, Phan. Cuming. Philip. (1885) 140; F.-Vill. Nov. App. (1883) 184.

Loranthus malifolius Presl l. c.; DC. l. c.; Vid. l. cc., Sinopsis Atlas (1883) *t. 81, f. B.;* F.-Vill. l. c.; Naves in Blanco Fl. Filip. ed. 3, *pl. 459.*

Scurrula haenkeana et *S. malifolia* G. Don Gen. Hist. 3 (1834) 423.

Dendrophthoë heankeana et *D. malifolia* Miq. Fl. Ind. Bat. 1[1] (1856) 822.

Candollina haenkeana et *C. malifolia* Van Tiegh. in Bull. Soc. Bot. France 42 (1895) 269.

Candollina barthei Van Tiegh. l. c. ?

Loranthus barthei Engl. Nat. Pflanzenfam. Nachtr. 1 (1897) 129?

PHILIPPINES, without locality, *Cuming 1947, 1957.* LUZON, Province of Ilocos Sur, *For. Bur. 5657 Klemme:* Province of Benguet, *For. Bur. 15892 Bacani:* Province of Union, *Elmer 5537:* Province of Pangasinan, *For. Bur. 18032 Merritt:* Province of Tarlac, *Hall s. n.:* Province of Nueva Ecija, *Bur. Sci. 5271 McGregor:* Province of Pampanga, *Bur. Sci. 1929 Foxworthy:* Province of Bulacan, *Yoder 251:* Manila, *Lyon s. n.:* Province of Bataan, *Bur. Sci. 1618, 1894 Foxworthy, For. Bur. 90 Barnes.* MINDANAO, Lake Lanao, *Mrs. Clemens s. n.*

A very characteristic, but rather variable species. I have not seen the types of the two species described by Presl, based on Heanke's Philippine material, but the two have been distinguished by later authors by the erect and terminal inflorescence of *L. haenkeanus,* and the lateral and refracted inflorescence of *L. malifolius,* but these characters do not appear to me to be constant, and I can detect no other specific differences either in the material before me or in the original descriptions of the two species. The only description given by Van Tieghem for the third species, *Candollina barthei,* is "ombelle terminale et réfractée," and I suspect that it, too, is only a form of *L. haenkeanus* Presl. On most of the specimens above cited, including both numbers of Cuming's collection, 5- and 6-merous flowers are to be found in the same umbel.

Endemic.

36. **Loranthus curranii** sp. nov.

Glaber, inflorescentiis exceptis; foliis alternis vel suboppositis, petiolatis, coriaceis, oblongo-lanceolatis, usque ad 15 cm longis, basi rotundatis vel acutis, apice acutis vel breviter acute acuminatis, nervis utrinque circiter 7, supra distinctis, subtus subobsoletis; floribus 4-meris, circiter 3 cm longis, in triadibus dispositis, lateralibus breviter pedicellatis, intermedio sessile, triadibus umbellatim dispositis, pedunculis reflexis vel patulis, in ramis vetustioribus.

Glabrous except the inflorescence. Branches terete, light-gray or brownish, stout. Leaves alternate or subopposite, coriaceous, brown when dry and somewhat shining, oblong-lanceolate, 11 to 15 cm long, 4 to 5 cm wide, the base rounded or acute, the apex acute or shortly and sharply acuminate; nerves about 7 on each side of the midrib, nearly obsolete on the lower surface, on the upper rather distinct, anastomosing, curved, the reticulations lax; petioles 1 to 1.5 cm long, stout. Umbels solitary, the peduncles, pedicels and calyces densely ferruginous-puberulent, the corolla slightly so, the peduncles spreading or recurved, about 1 cm long, from the larger branches below the leaves, the flowers 4-merous, in crowded triads which are umbellately arranged, their peduncles 3 to 4

mm long, the middle flower of each triad sessile, the lateral ones with pedicels about 1.5 mm long. Calyx densely ferruginous-puberulent, 5 mm long, narrowly funnel-shaped, 4-toothed, each subtended by a bracteole about 2 mm long. Corolla 2.5 cm long, slightly ferruginous-puberulent, red, split down one side, the tube 2.5 mm long, the lobes above the insertion of the stamens about 6 mm long, 1.5 mm wide, reflexed, acute. Filament 3 mm long; anther continuous, nearly 3 mm long.

Luzon, Province of Benguet, Mount Tonglon, *For. Bur. 5035 Curran*, August, 1906, parasitic on *Podocarpus* at an altitude of about 2,250 m, (type); Mount Pulog, *For. Bur. 18143 Curran, Merritt, & Zschokke.*

A species manifestly allied to the preceding, but distinguished by its constantly 4-merous flowers.

37. **Loranthus viridis** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 189.

Philippines, without locality, *Cuming 1953.* Luzon, Province of Bataan, *For. Bur. 816, 1814, 2938 Borden, For. Bur. 6318 Curran.*

Endemic.

38. **Loranthus banahaensis** Elmer Leafl. Philip. Bot. 1 (1908) 288.

Glaber; foliis oppositis vel suboppositis, petiolatis, crasse coriaceis, obovatis vel subellipticis, circiter 10 cm longis, 5 cm latis, apice obtusis vel rotundatis, basi acutis vel subcuneatis, in sicco supra olivaceis, nitidis, subtus brunneis, nervis utrinque 5 ad 7, obscuris, anastomosantibus; petiolo crasso, 1 ad 2 cm longo; floribus 6-meris, sessilibus, fasciculatis, axillaribus; circiter 1.7 cm longis; antheris sessilibus, basifixis.

Luzon, Province of Tayabas, Mount Banajao, altitude 750 m, *Elmer 9115*, May, 1907, type number.

There is considerable doubt as to its alliances, due to discrepancies between the original description and the material distributed under the type number. The specimen before me has 6-merous flowers, and sessile, basifixed, not versatile anthers, but in other respects agrees closely with Mr. Elmer's description, and it seems to be quite evident that he was in error in ascribing 4-merous flowers and versatile anthers to *Loranthus banahaensis*, unless the species was based on a mixture, which my specimen does not show, and accordingly I have emended the diagnosis above. It is barely possible that *Loranthus banahaensis* should be referred to the section *Lepiostegeres*, as the fascicles of flowers are described as being surrounded by involucral bracts, although no measurements are given, and the buds are said to be covered with a calyptrate hood which soon falls off. The specimen before me shows only a single inflorescence, with opened flowers, and the "involucral bracts" are represented only by the small bracteoles subtending the flowers. It is entirely different from the only other Philippine species of the section *Lepiostegeres* known to me.

Endemic.

§ Macrosolen.

39. **Loranthus ampullaceus** Roxb. Fl. Ind. 2 (1820) 189; DC. Prodr. 4 (1830) 296; Hook. f. Fl. Brit. Ind. 5 (1886) 220; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1894) 405; F.-Vill. Nov. App. (1883) 184; Vidal Phan. Cuming. Philip. (1885) 141.

Hillia longiflora Blanco Fl. Filip. (1837) 235; ed. 2 (1845) 165; ed. 3, 1: 297.

Loranthus tomentosus Naves in Blanco Fl. Filip. ed. 3, *pl. 444*, non Blanco.

Loranthus formosus F.-Vill. Nov. App. (1883) 164, non Blume.

Loranthus globosus Vid. Phan. Cuming. Philip. (1886) 230, non Roxb.

Elytranthe ampullacea Engl. Nat. Pflanzenfam. 3[1] (1889) 188; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 50.

PHILIPPINES, without locality, *Cuming 1951, 1963.* LUZON, Province of Nueva Ecija, *For. Bur. 8459 Curran:* Province of Zambales, *For. Bur. 6944 Curran:* Province of Bataan, *Whitford 86:* Province of Rizal, *Bur. Sci. 979 Ramos, For. Bur. 479 Ahern's collector.* PALAWAN, *For. Bur. 3581 Curran.*

India to southern China, and the Malay Peninsula, south to Celebes.

40. **Loranthus macgregorii** sp. nov.

Glaber; foliis oppositis, coriaceis, oblongis, rectis vel leviter falcatis, usque ad 10 cm longis, apice obtusis, basi acutis vel obtusis, sessilibus, nervis utrinque circiter 4, subobsoletis, ascendentibus; inflorescentiis axillaribus, solitariis vel binis; floribus sessilibus subcapitatis, 5-meris; corolla 16 mm longa.

Glabrous throughout. Branches gray or brown, terete, rather slender. Leaves opposite, sessile, oblong, 6 to 10 cm long, 2 to 3 cm wide, coriaceous, dull when dry, the apex blunt, the base acute or blunt; nerves about 4 on each side of the midrib, very slender and obscure, ascending. Flowers three to six at the apex of each peduncle, sessile, not in triads, subcapitately arranged, the peduncles about 5 mm long, solitary or two in each axil. Calyx cylindric, slightly enlarged upwards, 5 mm long, the limb slightly produced, truncate, each subtended by an ovate, obtuse, 2 mm long bract, and a wider bracteole of about the same length which is retuse, apparently formed of two connate bracteoles. Flowers 5-merous, yellow. Corolla 16 mm long, the buds angular, inflated below and slightly so at the apex, in anthesis about 5 mm in diameter below the middle, the tube about 5 mm long; lobes 4 mm wide at the base, narrowed to 1 mm in the median portion, the part above the insertion of the anthers reflexed, thick, fleshy, 5 mm long. Anthers sessile, 3.5 mm long. Style 14 mm long; stigma capitate.

BONOL, Guindulman, *Bur. Sci. 1266 McGregor,* June, 1906.

A species well characterized by its sessile subcapitate flowers which are congested and sessile at the ends of the short peduncles, each subtended by two bracts.

41. **Loranthus geminatus** sp. nov.

Glaber; foliis oppositis, petiolatis, coriaceis, anguste ovatis vel ovato-lanceolatis, usque ad 10 cm longis, acutis vel acuminatis, nervis utrinque 5 ad 7, tenuibus, obscuris; inflorescentiis axillaribus, solitariis vel fasciculatis, floribus 6-meris, sessilibus, geminatis; corolla 1.5 cm longa.

Glabrous throughout. Branches dark-colored, terete, not lenticellate, the branchlets slightly compressed. Leaves coriaceous, very dark-brown or nearly black and slightly shining when dry, opposite, narrowly lanceolate to ovate-lanceolate, 8 to 10 cm long, 3.5 to 5 cm wide, the base acute, the apex acute or acuminate; nerves 5 to 7 on each side of the midrib, slender, curved, obscure; petioles 5 mm long. Peduncles axil-

lary one to three in each axil, about 4 mm long, each bearing at its apex two sessile flowers. Calyx 6 mm long, cylindric, the limb produced about 1.5 mm, somewhat spreading, obscurely toothed, each subtended by one broadly ovate, obtuse, 2.5 to 3 mm long bract, and a second similar one as long, but wider, which is retuse at the apex, apparently formed of two connate bracteoles. Corolla 1.5 cm long, inflated below, angled, in anthesis about 6 mm in diameter, narrowed to 3.5 mm at the apex, the tube 3 to 4 mm long, the lobes 6, 4 mm wide below, narrowed to 2 mm above, the reflexed portion above the insertion of the stamens 5 to 6 mm long. Filament about 2 mm long; anthers continuous, 3 mm long.

MINDANAO, Province of Surigao, Catel, *Merrill 5444*, October 5, 1906, parasitic on various shrubs along the river slightly above the influence of tide-water.

A species well characterized by its short, 2-flowered peduncles, the flowers sessile, 6-merous, each subtended by two bracteoles.

§ LEPIOSTEGERES.

42. **Loranthus congestiflorus** sp. nov.

Glaber; foliis oppositis, petiolatis, crasse coriaceis, oblongo-ovatis vel ovato-ellipticis, usque ad 9 cm longis, apice acutis, leviter acuminatis, vel obtusis, basi acutis, nervis utrinque circiter 4, obscuris, vel obsoletis; capitulis axillaribus terminalibusque, sessilibus, circiter 30-floris, bracteis 6 ad 10 arcte imbricatis involucratis, interioribus circiter 2.5 cm longis, exterioribus minoribus, deciduis; floribus brevissime pedicellatis, 6-meris, 3 cm longis.

Glabrous throughout. Branches stout, terete, gray, the younger ones smooth, reddish-brown. Leaves opposite, oblong-ovate to ovate-elliptic, 5 to 9 cm long, 2 to 3.5 cm wide, thickly coriaceous, brown or olivaceous when dry, dull or very slightly shining, the apex acute, slightly acuminate or obtuse, the base acute; nerves about 4 on each side of the midrib, very obscure or entirely wanting; petioles 0.5 to 1.5 cm long, stout. Inflorescence of sessile, axillary and terminal, many-flowered, globose heads, before anthesis entirely inclosed by 6 to 10, coriaceous, imbricated bracts, the inner ones at the time of anthesis elliptic-ovate, 2.5 cm long, the outer ones suborbicular, smaller, all coriaceous, brown, shining, deciduous; in immature specimens the bracts are much smaller, and the heads are globose, but with the increase in size of the heads, the bracts also increase in size. Flowers about 30 in each head, very shortly pedicelled, racemosely arranged on a very stout, short rachis. Calyx about 4 mm long, somewhat angled. Corolla 2.6 to 2.8 cm long, greenish-white to greenish-yellow, the tube about 3 mm long, the lobes 2 mm wide below, gradually narrowed upwards, the reflexed portion above the insertion of the anthers 8 mm long. Filaments 2 mm long; anthers continuous, 5 mm long.

LUZON, Province of Benguet, Mount Tonglon, *For. Bur. 5037 Curran*, August, 1906 (type), *For. Bur. 10833 Curran*, December, 1908, *For. Bur. 11093 Whitford*,

For. Bur. 14183 Merritt; Mount Pulog, *For. Bur. 18045, 18084 Curran, Merritt, & Zschokke;* Mount Ugo, *Bur. Sci. 5780 Ramos;* without locality, *Loher 4459.* MINDORO, Mount Halcon, *For. Bur. 4434 Merritt.* MINDANAO, Mount Malindang, *For. Bur. 4769 Mearns & Hutchinson.*

43. **Loranthus williamsii** sp. nov.

Glaber; foliis oppositis, petiolatis, oblongis vel oblongo-lanceolatis, obtusis, basi acutis, usque ad 7 cm longis, nervis lateralibus tenuibus, obscuris, utrinque 5 vel 6; capitulis axillaribus, solitariis, 4-floris, in alabastro globosis, bracteis circiter 6 arcte imbricatis involucratis, interioribus circiter 1.4 cm longis, exterioribus minoribus, deciduis; floribus sessilibus, 5- vel 6-meris, 3 cm longis.

Glabrous throughout. Branches terete, grayish-brown, rather densely lenticellate. Leaves opposite, coriaceous, dull-green when dry, not or but slightly shining, oblong to oblong-lanceolate, the apex obtuse, base acute, 5 to 7 cm long, 1.5 to 2.5 cm wide; nerves 5 or 6 on each side of the midrib, very slender, obscure; petioles about 3 mm long. Heads axillary, when young globose, solitary, sessile, surrounded by about 6 strongly imbricated, brown, shining, coriaceous, elliptic to elliptic-ovate, rounded deciduous bracts, the inner ones about 1.4 cm long, the outer gradually smaller, the outermost ones about 8 mm long. Flowers 5- and 6-merous, four in each head, sessile, the peduncle very stout, about 2 mm long, 3 mm in diameter, marked by the bract-scars. Calyx 2.5 mm long, about 3 mm in diameter, the limb produced, truncate. Corolla 27 mm long, the tube 3 to 4 mm in length, the lobes 5 or 6, 2 mm wide below, narrowed somewhat above, the reflexed portion above the insertion of the stamens 8 to 9 mm long. Anther sessile, linear, 7 mm long.

LUZON, Province of Benguet, Baguio, *Williams 973*, September 21, 1904. *Cuming 1974* is probably referable here but my specimen is too fragmentary for certain identification.

A species well characterized by its 4-flowered, sessile, axillary, solitary heads, the flowers sessile, 5- and 6-merous.

DOUBTFUL AND EXCLUDED SPECIES.

LORANTHUS BLANCOANUS F.-Vill. Nov. App. (1883) 355.

Brabejum ? caliculatum Blanco Fl. Filip. ed. 2 (1845) 39; ed. 3, 1: 72.

F.-Villar's species was based on Blanco's *Brabejum ? caliculatum*, but if the latter's description is correct in all particulars, the species can not be referred to the *Loranthaceae*. I have therefore excluded it, although I have not been able to make out the identity of *Brabejum ? caliculatum*, or to which family it really belongs.

LORANTHUS HETERANTHUS Wall.; Vid. Sinopsis Atlas (1883) *t. 81, f. A.*

Undoubtedly an erroneous identification, as the species has not been found in the Philippines; I can not determine to which species Vidal's figure really belongs.

DENDROPHTHOË INCARNATA Blume; Vid. Cat. Pl. Prov. Manila (1880) 40 (=*Loranthus incarnatus* Jack).

Undoubtedly an erroneous identification; the species has not as yet been found in the Philippines.

LORANTHUS RETUSUS Jack; F.-Vill. Nov. App. (1883) 184; Vidal Rev. Pl. Vasc. Filip. (1886) 232.

This species was credited to the Philippines by Vidal on the strength of a specimen in the Kew Herbarium, collected by Lobb, and so localized; however, there are two sheets of Lobb's collection at Kew, one labeled Philippines, and the other Java. It is a well known fact that Lobb's specimens were distributed with erroneous localizations, the same number in some herbaria bearing the locality "Philippine," in others "Singapore," and in others "Java." A number of species have been credited to the Philippines only on the strength of Lobb's specimens so labeled, which have not been discovered in the Archipelago by any later collectors, and which undoubtedly do not extend to the Philippines; among these are *Eurycoma longifolia Jack*, *Archytaea vahlii* Choisy, *Medinilla luzoniensis* Hook. f., *Leucopogon malayanus* Jack, *Embelia myrtillus* Kurz, *Fagraea ligustrina* Blume, and *Loranthus retusus* Jack. Until the above species are actually discovered in the Philippines, they should not be considered as representatives of the Philippine flora.

LORANTHUS SCURRULA Linn.; Schultes Syst. Veg. 7 (1829) 96.

Credited to the Philippines by citation of Camell, Luzon. n. 36. The species has not been found in the Archipelago, and Camell's plant was undoubtedly the allied *Loranthus philippensis* C. & S.

LORANTHUS PAUCIFLORUS Blanco Fl. Filip. (1837) 235; F.-Vill. Nov. App. (1883) 184, non Sw.

Loranthus tomentosus Blanco l. c. ed. 2 (1845) 164; ed. 3, 1: 296, non Heyne.

I have not been able to find any specimens that agree exactly with Blanco's description, which is not sufficiently complete to make out the relationships of the species. The description calls for a plant with opposite, nearly lanceolate leaves, obtuse at the apex, the margins and both surfaces stellate-pubescent or tomentose. Flowers 6-merous, three or four grouped in each axil. The only Philippine specimens that agree with the above in vegetative characters are forms of *L. philippensis* and *L. sphenoideus*, but neither of these has 6-merous flowers. It is barely possible that Blanco's description was based on a mixture of material. F.-Villar considered it to be a distinct valid species, and retained it under Blanco's first specific name. Neither name is valid, and as the species is a very doubtful one I do not consider it advisable to coin a new name for it at this time.

LORANTHUS COCCINEUS Jack.

LORANTHUS WALLICHIANUS Schult.

LORANTHUS PULCHER DC.

LORANTHUS FASCICULATUS Bl.

LORANTHUS FUSCUS Bl.

LORANTHUS BICOLOR Roxb.

LORANTHUS GLOBOSUS Roxb.

LORANTHUS PALLENS Wall.

LORANTHUS CARINATULUS Wall.

LORANTHUS SPHAEROCARPUS Bl.

The above ten species were credited to the Philippines by F.-Villar in the Novissima Appendix to the third edition of Blanco's Flora de Filipinas (1883) 183, 184. It is very doubtful if any of them actually occur in the Philippines, and they were apparently credited to the Archipelago on the part of F.-Villar by misconceptions of the species and erroneous identifications.

2. CLEISTOLORANTHUS gen. nov.

Differt Lorantho corollae tubo apice corollae limborum interioribus partibus coalitis clauso, corollae limborum exterioribus partibus 4, liberis, late triangulari-obovatis, brevibus, patulis, apice subtruncatis, irregulariter dentatis.

1. Cleistoloranthus verticillatus sp. nov.

Glaber; foliis verticillatis, quaternis, petiolatis, oblongo-lanceolatis, coriaceis, usque ad 8 cm longis, basi acutis, apice acuminatis, nervis utrinque 2, subobsoletis; inflorescentiis axillaribus, solitariis, floribus 4-meris, in triadibus paucis, umbellatim dispositis, lateralibus breviter pedicellatis, intermedio sessile; corolla cylindracea, 4.5 mm longa, apice clausa.

Glabrous throughout. Branches terete, brown or gray, slender, slightly lenticellate, shining. Leaves whorled, four at each node, oblong-lanceolate, coriaceous, slightly shining when dry, 4 to 8 cm long, 1 to 2.5 cm wide, the base acute, the apex acuminate, acumen blunt or acute; nerves about 2 on each side of the midrib, very obscure; petioles 3 to 7 cm long. Inflorescence axillary, solitary, of depauperate umbellately disposed triads, the common peduncle about 1.5 cm long, slender, bearing at its apex three or four umbellately disposed branches, each branch in turn bearing a single triad of flowers, the branches about 6 mm long, the middle flower of each triad sessile, the lateral ones with pedicels about 2 mm in length. Flowers pink or red, 4-merous, each subtended by a single, ovate, acuminate bract about 1.5 mm long. Calyx 2 mm long, somewhat narrowly ovoid, its limb obscurely 4-toothed, slightly produced. Corolla 4.5 mm long, cylindric, 1 mm in diameter, the throat closed by inward projections of the corolla-limb, which are united and form a conical body closing the top of the corolla-tube, the exterior part of the limb consisting of four short, broadly triangular-obovate lobes, 2 to 2.3 mm wide, 1 to 2 mm long, their apices truncate and irregularly toothed. Stamens 4, included; filaments inserted near the base of the corolla-tube, opposite the lobes, 2.5 mm long; anthers continuous, oblong, 2-celled, introrse, obtuse, 1.5 mm long. Ovary 1-celled; style 3 mm long; stigma minute. Fruit narrowly ellipsoid, 8 mm long, with a single seed.

Luzon, Province of Benguet, Mount Pulog, *For. Bur. 16229 Curran, Merritt, & Zschokke*, January 5, 1909, on trees in hardwood forests at an altitude of about 2,500 m.

A peculiar plant, with the habit, vegetative and many floral characters of *Loranthus*, remarkable for its cleistogamous flowers, the throat of the corolla-tube being closed by a conical body formed of inward projecting and united portions of the limb. It differs from *Loranthus* also in its very short, broadly triangular-obovate, subtruncate and irregularly toothed, spreading corolla-lobes.

3. PHRYGILANTHUS Eichl.

1. **Phrygilanthus obtusifolius** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 189.

Luzon, Province of Bataan, Mount Mariveles, *Whitford 134, 1081,* May, 1904, February, 1905, *For. Bur. 1813 Borden,* September, 1904, *For. Bur. 6286 Curran,* February, 1907.

Endemic.

4. VISCUM Linn.

1. Branches leafy ..... 1. *V. orientale*
1. Branches leafless, terete or compressed.
2. Branches terete or angled..... 2. *V. angulatum*
2. Branches compressed.
3. Internodes 1.5 to 6 cm long; plant diffuse, pendulous or spreading, dichotomously branched, 20 to 80 cm long..... 3. *V. articulatum*
3. Internodes 2 or 3 to 15 mm long; plant erect, strict, less than 10 cm long. 4. *V. opuntia*

1. **Viscum orientale** Willd. Sp. Pl. 4 (1805) 224; DC. Prodr. 4 (1830) 278; Blume Fl. Jav. Loranth. (1828) *t. 24, 25;* Hook. f. Fl. Brit. Ind. 5 (1886) 224; Vid. Phan. Cuming. Philip. (1885) 141, Rev. Pl. Vasc. Filip. (1886) 232; F.-Vill. Nov. App. (1883) 184; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26 (1894) 408.

Fusanus ? parasitus Blanco Fl. Filip. ed. 2 (1845) 53; ed. 3, 1: 100.

Viscum monoicum Presl Epim. (1851) 251, non Roxb.

Viscum opuntioides Cav. Icon. 6 (1801) 3, in note, probably, non L.

Philippines, without locality, *Cuming 1948, 1950, 1954, 1961.* Luzon, Province of Nueva Ecija, *For. Bur. 8454 Curran:* Province of Bataan, Lamao, *For. Bur. 7230 Curran:* Province of Pangasinan, *Alberto 2.* Lubang, *Merrill 961.* Palawan, *For. Bur. 3814 Curran.*

India and Ceylon to southern China, through Malaya to New Guinea and northern Australia.

2. **Viscum angulatum** Heyne ex DC. Prodr. 4 (1830) 283; Miq. Fl. Ind. Bat. 1[1] (1856) 806; Hook. f. Fl. Brit. Ind. 5 (1886) 225; F.-Vill. Nov. App. (1883) 184.

Viscum ramosissimum Wight Icon. *t. 1017.*

Viscum capense Llanos Fragm. (1851) 53; Fl. Filip. ed. 3, 4: 38, non Linn. f. fide F.-Villar.

Viscum oxycedri Llanos Mem. Ac. Cienc. Madr. 4 (1858) 501; Fl. Filip. l. c. 102, non DC., fide F.-Vill.

Luzon, Province of Zambales, *For. Bur. 6943 Curran,* May, 1907, parasitic on *Casuarina equisetifolia* Forst.

India to Java and northern Australia.

3. **Viscum articulatum** Burm. Fl. Ind. (1768) 311; DC. Prodr. 4 (1830) 284; Hook. f. Fl. Brit. Ind. 5 (1886) 226; F.-Vill. Nov. App. (1883) 185.

Viscum compressum Poir. in Lam. Encycl. Suppl. 2 (1812) 861; Blume Fl. Jav. Loranth. (1828) *t. 26.*

Viscum philippense Llanos Fragm. (1851) 53, Fl. Filip. ed. 3, 4: 38, fide F.-Villar.

Viscum falcatum Llanos in Mem. Ac. Cienc. Madr. 4 (1858) 501, Fl. Filip. l. c. 102, non Wall., fide F.-Villar.

Luzon, Province of Benguet, *Williams 1009, For. Bur. 15894 Bacani, For. Bur. 10923 Curran, For. Bur. 16243 Curran, Merritt, & Zschokke:* Province of Union,

Elmer 5554: Province of Zambales, *For. Bur. 11051 Zschokke:* Province of Pangasinan, *For. Bur. 8347 Curran & Merritt:* Province of Rizal, *Loher 4482:* Province of Bataan, *For. Bur. 7230 bis Curran.* MINDANAO, Lake Lanao, *Mrs. Clemens 564.*

India to Formosa, the Malay Peninsula and Archipelago.

4. **Viscum opuntia** Thunb. Fl. Jap. (1784) 64.

Viscum japonicum Thunb. in Trans. Linn. Soc. 3 (1794) 329; Hook. f. Fl. Brit. Ind. 5 (1886) 228.

LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16074 Curran, Merritt & Zschokke:* Province of Zambales, Mount Tapulao, *For. Bur. 8080 Curran & Merritt.*

India to Japan, south to Mauritius, Malaya, and Australia; not previously reported from the Philippines.

5. NOTOTHIXOS Oliver.

1. Inflorescence of simple spikes.
   2. Leaves 2 cm long or less ..... 1. *N. curranii*
   2. Leaves 4 to 5 cm long ..... 2. *N. sulphureus*
1. Inflorescence cymose ..... 3. *N. philippinensis*

1. **Notothixos curranii** sp. nov.

Ramulis foliis junioribus inflorescentiisque densissime pallide griseo-puberulis; foliis oppositis, petiolatis, ovato-lanceolatis vel elliptico-lanceolatis, 1.5 ad 2 cm longis, trinerviis, apice obtusis vel leviter obtuse acuminatis, basi acuminatis, supra glabris, nitidis, subtus dense pallide puberulis; floribus 4-meris, oppositis, in spicis simplicibus terminalibus axillaribusque solitariis dispositis.

Branches terete, dark-brown or nearly black, glabrous, the youngest branchlets, inflorescences and young leaves densely pale-grayish-puberulent. Leaves opposite, ovate-lanceolate to elliptic-lanceolate, 1.5 to 2 cm long, 8 to 10 mm wide, subcoriaceous, the apex obtuse or obscurely and broadly acuminate, base acuminate, margins entire, the upper surface glabrous, brown and shining when dry, the lower surface densely pale-grayish-puberulent; nerves 3, slender, extending from the base nearly to the apex, rather distinct on the upper surface, nearly obsolete beneath; petioles 3 to 4 mm long, puberulent. Spikes terminal and axillary, solitary, about 1 cm long. Flowers 4-merous, sessile, opposite, each subtended by a small, broadly ovate, obtuse bract less than 1 mm long. Perianth-lobes 4, ovate, acute, 0.5 mm long.

LUZON, Province of Bataan, Limay, *For. Bur. 12402 Merritt & Curran,* August, 1908.

Distinguished among the Philippine species by its small leaves and pale, scarcely yellow, and not glandular puberulence.

2. **Notothixos sulphureus** sp. nov.

Ramulis foliis junioribus inflorescentiisque densissime sulphureo-glanduloso-puberulis; foliis oppositis, petiolatis, late ovatis, vel late ellipticis, usque ad 5 cm longis, subcoriaceis, basi apiceque late rotundatis, supra glabris, subtus pallide glanduloso-puberulis nitidisque, trinerviis;

floribus 4-meris, verticillatis, in spicis simplicibus axillaribus terminalibusque solitariis, usque ad 3 cm longis dispositis.

Branches terete, brown, glabrous. Leaves opposite, broadly ovate or broadly elliptic, subcoriaceous, broad and rounded at both base and apex, 3 to 5 cm long, 2 to 3.5 cm wide, the younger leaves like the branchlets and inflorescence densely yellow-glandular-puberulent, the adult leaves glabrous and often shining on the upper surface, beneath densely pale-glandular-puberulent and somewhat shining; nerves 3 from the base, extending nearly to the apex, slender, not prominent, the reticulations very lax; petioles 3 to 5 mm long, ultimately glabrous. Spikes axillary and terminal, solitary, 3 cm long or less, the flowers 4-merous, sessile, whorled, each flower subtended by a small, ovate, acute, 1 mm long bract. Perianth-lobes narrowly ovate, acute, about 1 mm long.

MINDANAO, District of Zamboanga, Port Banga, *For. Bur. 9132 Whitford & Hutchinson*, January, 1908.

A species well characterized by its broadly ovate or broadly elliptic leaves which are rounded at both ends, and its simple spikes.

3. **Notothixos philippinensis** Elmer Leafl. Philip. Bot. 2 (1908) 471 (*philippinense*).

Ramulis foliisque junioribus inflorescentiisque densissime aureo-glanduloso-puberulis; foliis oppositis, petiolatis, subcoriaceis, supra glabris, subtus dense aureo- vel griseo-glanduloso-puberulis, ovatis, ovato-lanceolatis vel subellipticis, basi acutis vel obtusis, supra angustatis, apice acutis vel acuminatis, 4 ad 6 cm longis, circiter 2.5 cm latis, trinerviis; inflorescentiis axillaribus terminalibusque, cymosis, 2 ad 5 cm longis; floribus 4-meris, ad apices ramulorum subcapitato-congestis.

NEGROS, Cuernos Mountains, near Dumaguete, *Elmer 10114*, May, 1908, parasitic on *Canarium* at an altitude of about 300 m. Readily distinguished among the Philippine species by its cymose inflorescence.

The genus has three species in Australia, one in Ceylon, one in Penang, and the above three in the Philippines.

6. GINALLOA Korth.

1. **Ginalloa cumingiana** (Presl) F.-Vill. Nov. App. (1883) 185; Vid. Phan. Cuming. Philip. (1885) 141, Rev. Pl. Vasc. Filip. (1886) 232.

Viscum cumingianum Presl Epim. (1851) 255; Walp. Ann. 2: 729.

PHILIPPINES, without locality, *Cuming 1968*, type number.

Endemic.

Var. **angustifolia** var. nov.

Differt a typo foliis multo minoribus angustioribusque, 2 ad 4 cm longis, 2 ad 4 mm latis.

LUZON, Province of Benguet, Mount Pulog, *For. Bur. 16242 Curran, Merritt, & Zschokke*. NEGROS, Canlaon Volcano, *Bur. Sci. 1139 Banks*, June, 1906.

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By E. D. Merrill

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

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A PRELIMINARY REVISION OF PHILIPPINE COMBRETACEÆ.

By E. D. Merrill.

(*From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.*)

This small group has been worked over chiefly with a view to clearing up some points connected with the genus *Terminalia*, some species of which are of importance from a forestry standpoint, as the timber is at least locally utilized to a greater or less extent. Four years ago I published a key to the Philippine species of *Terminalia*,[1] recognizing eleven species, the same number that is recognized in the following consideration, although several of the species admitted in the previous paper have been shown by additional material to be invalid, and have here been reduced. In the interim a single new species has been described, and a second one is proposed below. Some changes in nomenclature have also become necessary, and a few of the specimens previously referred to certain species, due to misinterpretation of these, have now been referred to their proper ones. Additional material is required to thoroughly work out the relationships of the forms in the section *Bialata*, *Terminalia calamansanai* (Blanco) Rolfe, and related forms, while as yet the flowers of *Terminalia quadrialata* are unknown. *T. magarapali* Vid., a very distinct species, judging from the very short description, has not as yet been rediscovered.

Table showing the distribution of Indo-Malayan, Chinese, Formosan, and Philippine Combretaceæ.

Genera.	Philippines.	Formosa.	China.	Malay Peninsula.	Malay Archipelago.	British India.
Anogeissus						4
Calycopteris				1		1
Combretum	4		2	10	11	18
Lumnitzera	2	1		2	2	2
Quisqualis	1	1	1	2	2	3
Terminalia	11	1	1	8	10	12
Total	18	3	4	23	25	40

[1] *Publications of the Bureau of Government Laboratories* 17 (1904) 31–36.

KEY TO THE GENERA.

Petals none, calyx-limb deciduous; trees..... 1. *Terminalia*
Petals 4 or 5.
Calyx-limb persistent; leaves alternate; trees of the mangrove swamps.
2. *Lumnitzera*
Calyx-limb deciduous; scandent shrubs.
Flowers small, the calyx-tube above the ovary less than 1 cm long.
3. *Combretum*
Flowers rather large, the calyx-tube above the ovary 4 to 6 cm long.
4. *Quisqualis*

1. TERMINALIA Linn.

Fruit ovoid, oblong, or elliptic, sometimes compressed, never winged, but in some species keeled at the edges. § CATAPPA.
Fruit ellipsoid, strongly compressed and keeled, about 5 cm long.... 1. *T. catappa*
Fruit oblong, very slightly compressed and keeled, about 10 cm long.
2. *T. magarapali*
Fruit slightly compressed, hardly keeled, 1.5 cm long or less; leaves glandular-punctate ..... 3. *T. edulis*
Fruit not at all compressed or keeled.
Inflorescence of paniculate spikes..... 4. *T. comintana*
Inflorescence of simple spikes; leaves glandular-punctate and with glands in the axils of the nerves; petioles usually with from 1 to 3 glands.
Spikes rather strongly pubescent; leaves 10 to 18 cm long; fruits ellipsoid or ovoid, not or very obscurely apiculate, about 5 cm long.
5. *T. oöcarpa*
Spikes glabrous; leaves 7 to 12 cm long; fruits oblong-ovoid and strongly apiculate or ovoid and scarcely apiculate, 4 cm long or less.
Petioles and midribs usually somewhat pubescent, the former with 3–4, or no glands near the apex; fruits less than 2.5 cm long.
6. *T. pellucida*
Leaves entirely glabrous, very strongly shining and usually dark-brown when dry, the petioles usually with two glands at about the middle; fruits about 4 cm long, strongly apiculate..... 7. *T. nitens*
Fruit elliptic or narrowly elliptic, its edges produced into two broad, coriaceous wings. § BIALATA.
Inflorescence, young branches, petioles and under surfaces of the leaves softly ferruginous-pubescent; fruit, including the wings, 6 cm wide.... 8. *T. blancoi*
Leaves glabrous beneath..... 9. *T. calamansanai*
Fruit equally or subequally 2–3 4-winged, the wings less than 5 mm wide; leaves ovate-elliptic to orbicular-elliptic; spikes panicled..... 10. *T. polygantha*
Fruit equally 4-winged, the wings submembranaceous, 1 to 1.3 cm wide; leaves oblong-obovate to elliptic-obovate, 15 to 25 cm long..... 11. *T. quadrialata*

1. **Terminalia catappa** Linn. Mant. (1771) 519; Hook. f. Fl. Brit. Ind. 2 (1878) 441; F. Vill. Nov. App. (1880) 80; Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 35.

T. latifolia Blanco Fl. Filip. (1837) 376, non Sw.

T. mauritiana Blanco l. c. ed. 2 (1845) 264, ed. 3, 2: 126, non Lam.

Throughout the Philippines at low altitudes, especially near the sea, and somewhat cultivated as a shade tree. India to Malaya and Polynesia; planted in most tropical countries.

Native names *Talisay* or *Dalisay* in most Philippine dialects; Sp.-Fil. *Almendras*, corresponding to the "Indian almond" of English speaking people in the east.

Terminalia polyantha Presl, which was previously reduced by me to this species from the abridged description given by Miquel, is in no way allied to *T. catappa*. The specimen reported as *T. catappa* from Mangsi Island, by A. Gray in the "Botany of the Wilkes U. S. Exploring Expedition", is *T. littoralis* Seem., and was doubtless wrongly localized on the label, as the species is a Polynesian one. The sterile specimen reported also by Gray "from a small island in the Sooloo Sea" as *T. glabrata* Forst.?, may have been *T. catappa*, but I have seen no specimen.

2. **Terminalia magarapali** Vidal Sinopsis Atlas (1883) XXIV, *t. 48, fig. C;* Merr. in Govt. Lab. Publ. (Philip.) **17** (1904) 35.

T. procera F.-Vill. Nov. App. (1880) 80, non Roxb.

Alabat Island, *fide Vidal*, specimen no longer extant, locally known as *Magarapali*.

This species should prove to be a very distinct one, characterized especially by its very large fruits, which are about 10 cm long. It has not as yet been collected a second time.

3. **Terminalia edulis** Blanco Fl. Filip. ed. 2 (1845) 265, ed. 3, **2**: 127; Vidal Rev. Pl. Vasc. Filip. (1886) 127; Merr. in Govt. Lab. Publ. (Philip.) **17** (1904) 33.

Terminalia angustifolia Blanco l. c. ed. 1 (1837) 377, non Jacq.

Pentaptera mollis Presl Epim. Bot. (1852) 214.

Terminalia mollis Rolfe in Journ. Bot. **23** (1885) 312; Vid. Phan. Cuming. Philip. (1885) 112, Rev. Pl. Vasc. Filip. (1886) 127.

Terminalia belerica F.-Vill. Nov. App. (1880) 80; Vidal Sinopsis Atlas (1883) *t. 48, fig. B*, non Roxb.

Luzon, Province of Cagayan, *For. Bur. 11275 Klemme, For. Bur. 14761, 14814 Darling, For. Bur. 17132 Curran:* District of Bontoc, *For. Bur. 17030 Curran:* District of Lepanto, *Bur. Sci. 7017 Ramos:* Province of Ilocos Sur, *For. Bur. 7116 Klemme:* Province of Nueva Ecija, *For. Bur. 8430, 8471 Curran:* Province of Nueva Vizcaya, *For. Bur. 14862, 14867 Darling:* Province of Zambales, *For. Bur. 5990, 6330 Curran, Merrill 2968:* Province of Pangasinan, *Cuming 1004* (cotype of *Pentaptera mollis Presl*): Province of Bulacan, *For. Bur. 11187 Aguilar:* Province of Rizal, *For. Bur. 1887, 3411 Ahern's collector, Merrill 1626, 2283, Bur. Sci. 2033 Ramos:* Province of Bataan, *Ahern 306, For. Bur. 1387, 1652 Borden:* Province of Tayabas, *For. Bur. 10 Ware, For. Bur. 6049 Kobbe, Merrill 2588, For. Bur. 10226, 10356, 10386 Curran:* Province of Camarines, *For. Bur. 10484, 10779 Curran, Ahern 1.* Mindoro, *For. Bur. 4481, 7142, 8848, 9882 Merritt.* Palawan, *For. Bur. 5187, 7421 Manalo.* Masbate, *For. Bur. 12818, 12657 Rosenbluth, Merrill 2759.* Guimaras, *For. Bur. 296 Gammill.* Mindanao, *For. Bur. 9412, 9488 Whitford & Hutchinson.*

Native names: *Calupi, Calusit, Alupi* (Cagayan); *Calantit* (Ilocos); *Sacat, Calamansali* (Nueva Ecija); *Calaotit* (Nueva Vizcaya); *Calumpit* (Zambales, Bataan, Rizal, Tayabas, Mindoro); *Bisal* (Bulacan); *Gayumayen* (Zambales); *Calumagon, Cotmoc* (Camarines); *Burauis* (Palawan); *Magtalisay, Calumanog* (Masbate); *Tayataya* (Guimaras).

A widely distributed endemic species, yielding the timber commercially known as *Calumpit*. With the abundant material cited above, I am no longer able to distinguish *Terminalia mollis* (Presl) Rolfe from *T. edulis* Blanco. Young specimens of Blanco's species have exactly the same type of pubescence as has Presl's.

and a number of specimens among those above cited show both softly pubescent leaves and branchlets, and other more mature perfectly glabrous leaves on the same branches. Mature plants are nearly glabrous throughout.

4. **Terminalia comintana** (Blanco) Merr. in Philip. Journ. Sci. 4 (1909) Bot. 300.

Bucida comintana Blanco Fl. Filip. (1837) 856, ed. 2 (1845) 265, ed. 3, 2: 48.

Terminalia chebula F.-Vill. Nov. App. (1880) 80, non Retz.

Terminalia multiflora Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 34.

This species is widely distributed in the Philippines, extending from northern Luzon to Mindanao. For numerous specimens representing the species, see those cited by myself l. c. Additional material is represented by the following:

Luzon, Province of Cagayan, *For. Bur. 18480 Alvarez:* Province of Ilocos Sur, *For. Bur. 13028 Paraiso:* Province of Nueva Ecija, *For. Bur. 14349 Saroca.* Leyte. *For. Bur. 12766 Rosenbluth.*

Native names: *Lasila, Lasilac* (Cagayan, Ilocos); *Banglas* (Nueva Ecija); *Bingas* (Zambales); *Magtalopoi* (Pangasinan); *Naghubo, Palauay, Saplungan* (Rizal); *Dinglas* (Batangas); *Bangias* (Tayabas, Mindoro); *Tiroron* (Camarines); *Malatagum* (Zamboanga); *Batitinan* (Zambales, Zamboanga); *Batitinan-babaye* (Ticao); *Bongas, Bungas* (Leyte).

Terminalia polyantha Presl, reduced to this species by me, with doubt, belongs in a different section of the genus.

Celebes.

5. **Terminalia oöcarpa** Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 32, Philip. Journ. Sci. 1 (1906) Suppl. 103, sphalm. *orocarpa.*

Terminalia ellipsoidea Merr. l. c. 33.

Terminalia pellucida Merr. l. c. pro parte.

Luzon, Province of Cagayan. *For. Bur. 17176 Curran:* Province of Ilocos Norte. *For. Bur. 13880 Merritt & Darling:* Province of Rizal, *Merrill 1829. For. Bur. 2992 Ahern's collector:* Province of Bataan, *For. Bur. 1216, 2075 Borden. Whitford 347, Williams 687, For. Bur. 67 Barnes* (type), *For. Bur. 2249, 2579 Meyer:* Province of Tayabas, *Merrill 1943, 1951, 1952, 2846, For. Bur. 14 Ware, Whitford 820. For. Bur. 10275 Curran, For. Bur. 11512 Whitford:* Province of Camarines, *For. Bur. 10634 Curran, Ahern 52.* Mindoro, *For. Bur. 3699, 11388 Merritt, Whitford 1470, Merrill 2148* (type of *Terminalia ellipsoidea* Merr.).

Native names: *Dalinsi* (Tayabas, Camarines); *Sacat* (Cagayan, Bataan); *Talisay del monte* (Bataan); *Talisay gubat* (Mindoro); *Calutit* (Ilocos); *Mapatad* (Rizal); *Calumpit* (Tayabas, Mindoro); *Balinsil* (Infanta); *Malagabi* (Mindoro).

This species is closely allied to *Terminalia pellucida* Presl, but is distinguished by its larger leaves, much larger fruits, and pubescent spikes. The abundant material now available has lead me to reduce *Terminalia ellipsoidea*, as the characters on which that species was based, do not appear to be constant.

Endemic.

6. **Terminalia pellucida** Presl Epim. (1852) 214; Vidal Phan. Cuming. Philip. (1885) 112, Rev. Pl. Vasc. Filip. (1886) 127; Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 35.

Luzon, Province of Zambales, *For. Bur. 11049 Zschokke, Merrill 1755, 2105, 2991:* Province of Pangasinan, *Cuming 1039* (cotype), *For. Bur. 8268 Curran & Merritt, For. Bur. 14351 Villamil:* Province of Pampanga, *For. Bur. 5923 Curran.* Two specimens from Palawan, *Bur. Sci. 752 Foxworthy, For. Bur. 4157 Curran,* may be referable here.

Native names: *Solo-solo* (Pampanga); *Sobo-sobo* (Zambales); *Saguet* (Zambales, Pangasinan); *Sacut, Aritongtong, Hakit* (Zambales).

Endemic.

7. **Terminalia nitens** Presl Epim. (1852) 214; Vid. Phan. Cuming. Philip. (1885) 112, Rev. Pl. Vasc. Filip. (1886) 127; Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 33, Philip. Journ. Sci. 1 (1906) Suppl. 103.

Terminalia belerica var. *laurinoides* F.-Vill. Nov. App. (1880) 80, non Clarke.

Luzon, Province of Cagayan, *Cuming 1326* (cotype): Province of Ilocos Norte, *For. Bur. 13958 Merritt & Darling:* Province of Ilocos Sur, *For. Bur. 13023, 13048 Paraiso:* Province of Zambales, *Hallier, For. Bur. 6001, 5911 Curran, For. Bur. 8313 Curran & Merritt, For. Bur. 9608, 9611 Zschokke:* Province of Rizal, *Merrill 2800, For. Bur. 10033 Curran, Bur. Sci. 2034 Ramos:* Province of Batangas, *For. Bur. 7634 Curran & Merritt:* Province of Bataan, *For. Bur. 1205, 1547, 1562, 1619, 1738, 3058 Borden, For. Bur. 2241 Meyer, For. Bur. 64 Barnes, Whitford 393, Bur. Sci. 1565 Foxworthy:* Province of Tayabas, *For. Bur. 15264 Rosenbluth.* Mindoro, *Whitford 1479, For. Bur. 7148 Merritt.* Palawan, *For. Bur. 4494 Curran.* Masbate, *For. Bur. 12594 Rosenbluth, Whitford 1691.* Mindanao, District of Zamboanga, *For. Bur. 9240, 9241, 9166 Whitford & Hutchinson.*

Native names: *Sacat* (Bataan, Rizal, Tarlac, Mindoro, Batangas); *Dalinsi* (Tayabas); *Daminsil, Malagabi* (Mindoro); *Magtalisay* (Masbate); *Mantalisay* (Zamboanga); *Calautit, Calactit, Anaguep* (Ilocos).

The last three species form a group of closely allied forms, but which are distinguishable, I believe, by the characters indicated in the key. The present species is usually distinguishable by its leaves being dark-brown and very shining when dry, a character in which it differs strongly from the other two.

Endemic.

8. **Terminalia blancoi** sp. nov. § *Bialata.*

Terminalia mollis Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 34, non Presl.

Arbor usque ad 20 m alta, ramulis junioribus, foliis subtus, petiolis, inflorescentiis, fructibusque ferrugineo-pubescentibus; foliis chartaceis vel subcoriaceis, elliptico-ovatis vel elliptico-obovatis, acuminatis, basi acutis, usque ad 18 cm longis, nervis utrinque circiter 10, distinctis, petiolo usque ad 4 cm longo; spicis simplicibus, axillaribus, foliis aequilongis; floribus 5-meris; fructibus 3 cm longis, late 2-alatis, cum alis 6 cm latis.

A tree 20 m high or less. Branches terete, brownish, the growing tips thickened, ferruginous-pubescent, and with numerous petiolar scars, the flowers and spikes crowded at the apices. Leaves chartaceous or subcoriaceous, elliptic-ovate to elliptic-obovate, 9 to 18 cm long, 5 to 10 cm wide, the base acute or acuminate, often slightly inequilateral, the apex acuminate, the upper surface glabrous, or the midrib sometimes pubescent, brown when dry and slightly shining, the lower surface paler, usually rather densely and softly ferruginous-pubescent, the pubescence persisting on specimens bearing mature fruits; nerves about 10 on each side of the midrib, distinct, obscurely anastomosing, the ultimate reticulations fine, brown, distinct; petioles 1.5 to 4 cm long, usually with three or four glands, these sometimes wanting. Spikes axillary, solitary, simple, crowded with the leaves at the apices of the branches, about as long as

the leaves, very densely ferruginous-pubescent. Flowers 5-merous, the calyx densely pubescent inside and out, about 4 mm in diameter, the lobes reflexed in anthesis, ovate. Stamens 10. Fruits ovate, slightly pubescent, 3 cm long, including the two coriaceous rounded wings 6 cm wide.

Luzon, Province of Rizal, *Merrill, Decades Philippine Forest Flora 2* (type), *207 Ahern's collector, For. Bur. 3254 Ahern's collector, Bur. Sci. 1069 Ramos, Merrill 2835:* Province of Benguet, Twin Peaks, *Elmer 6395.*

This species is probably the form mentioned by Blanco in the original description of *Gimbernatia calamansanai*, as differing from the original form, which was collected in Laguna Province by Azaola, in its broader fruits, *G. calamansanai* having fruits (including the wings) "mas de una pulgada de ancho y media de alto," while the other form mentioned has fruits up to two and one-half inches wide. The specimens cited above seem to represent a form that is constantly distinct from typical *Terminalia calamansanai*, recognizable by its much larger leaves, larger fruits, and its pubescence. All the sheets from Rizal Province bear the native (Tagalog) name *Calamansacat.*

9. **Terminalia calamansanai** (Blanco) Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 310; Vidal Rev. Pl. Vasc. Filip. (1886) 127; Merr. Govt. Lab. Publ. (Philip.) 17 (1904) 35.

Gimbernatia calamansanai Blanco Fl. Filip. ed. 2 (1845) 266, ed. 3, 2: 129.

Terminalia alata F.-Vill. Nov. App. (1880) 80, non Kürz.

Terminalia parviflora Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 36, non Presl.

This species presents several forms, which may eventually prove to be of specific rank when more material is available for study and comparison. The typical form is represented by specimens bearing fruits (including the wings) about 4 cm wide, and 2 cm long, as in the following specimens:

Luzon, Province of Zambales, *Merrill 2981, For. Bur. 5839 Curran:* Province of Bataan, *Ahern 785.* Mindanao, Province of Surigao, *Ahern 329. For. Bur. 6960 Curran*, specimen in flower, from Zambales, is probably also referable here.

Not being satisfied that the following two forms are specifically distinct, they are here indicated as varieties of *T. calamansanai:*

Var. **platypteris** var. nov.

Differt a typo fructibus majoribus, cum alis circiter 2.5 cm longis, 7 ad 8 cm latis.

Luzon, Province of Zambales, Subic, *For. Bur. 371 Maule*, March, 1904, locally known as *Subo-subo.*

Var. **acuminata** var. nov.

Differt a typo et var. praecedente fructibus longioribus, cum alis 3 ad 3.5 cm longis, 5 ad 5.4 cm latis.

Luzon, Province of Tayabas (Principe), *Merrill 1067*, August–September, 1902. Endemic.

10. **Terminalia polyantha** Presl Epim. (1852) 213; Vidal Phan. Cuming. Philip. (1885) 112, Rev. Pl. Vasc. Filip. (1886) 128.

Terminalia parviflora Presl l. c. 214; Vidal l. cc.

Luzon, Province of Zambales, *For. Bur. 6950, 6986, 6989, 6990 Curran:* Province of Batangas, *Cuming 1439* (cotype of *Terminalia parviflora*). Mindoro, *Cuming 1516* (cotype of *Terminalia polyantha*).

This species, although remarkably uniform in vegetative and floral characters, shows some variation in its fruits, which have from two to four wings, one of the Cuming specimens showing 2- and 3-winged fruits on the same plant. From an examination of cotypes of both of Presl's species, before me, I am unable to distinguish them, and hence have included both under the first specific name. In my first consideration of Philippine *Terminalia*[2] both of the species described by Presl were misinterpreted, as neither the original descriptions of the species, nor cotype material was then available in Manila. *T. polyantha* was reduced to *T. catappa*, to which it is not at all closely allied, while the specimen referred to *T. parviflora* does not represent that species. Later[3] *T. polyantha* was referred by me with doubt to *T. comintana*, which it resembles strongly in its inflorescence, and closely in its leaves, but which has entirely different fruits.

Endemic.

11. **Terminalia quadrialata** Merr. in Philip. Journ. Sci. 4 (1909) Bot. 301.

This species is represented by a number of specimens from southern Luzon, Masbate, and Samar, but the flowers are as yet unknown. It is apparently universally known as *Toog* in the regions in which it is found.

Endemic.

EXCLUDED SPECIES.

TERMINALIA ARJUNA Bedd.; F.-Vill. Nov. App. (1880) 80.

An Indian form, not known from the Philippines, and doubtless listed by F.-Villar through a misconception of the species.

2. LUMNITZERA Willd.

Racemes axillary; flowers white; stamens as long as the petals..... 1. *L. racemosa*
Racemes terminal; flowers scarlet; stamens twice as long as the petals.
2. *L. littorea*

1. **Lumnitzera racemosa** Willd. in Ges. Naturf. Fr. Neue Schr. 4 (1803) 187; DC. Prodr. 3 (1828) 22; Clarke in Hook. f. Fl. Brit. Ind. 2 (1878) 452; Miq. Fl. Ind. Bat. 1[1] (1856) 606; F.-Vill. Nov. App. (1880) 81; King in Journ. As. Soc. Beng. 66[2] (1897) 334; Vid. Sinopsis Atlas (1883) *t. 48, fig. G.* Rev. Pl. Vasc. Filip. (1886) 128.

Petaloma alba Blanco Fl. Filip. (1837) 344, ed. 2 (1845) 240, ed. 3, 2: 82; Naves l. c. ed. 3, *t. 126.*

LUZON, Province of Tayabas, *For. Bur. 10334 Curran*, April, 1908. CEBU, *Bur. Sci. 1718 McGregor*, September, 1906.

Native names *Culasi* (Tag.), ex Blanco; *Labau* (Tag.).

In mangrove forests, apparently not very common in the Philippines. India to Formosa, the Malay Peninsula and Archipelago, Madagascar, tropical Australia, and Polynesia.

2. **Lumnitzera littorea** (Jack) Voigt Hort. Suburb. Calcut. (1845) 39; Kurz Forest Fl. Brit. Burma 1 (1877) 469.

Pyrranthus littoreus Jack Mal. Miscel. 2 (1822) 57.

Laguncularia purpurea Gaudich. Voy. Uranie (1826) 481, *t. 104.*

Lumnitzera purpurea Presl Repert. 1 (1834) 155; Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 468; Merr. in Forest. Bureau (Philip.) Bull. 1 (1903) 155.

[2] *Publications of the Bureau of Government Laboratories* 17 (1904) 31–36.
[3] *This Journal* 4 (1909) *Botany* 300.

Lumnitzera coccinea W. & A. Prodr. 1 (1834) 316; Miq. Fl. Ind. Bat. 1[1] (1856) 606; Clarke in Hook. f. Fl. Brit. Ind. 2 (1878) 452; F.-Vill. Nov. App. (1880) 80; Vid. Rev. Pl. Vasc. Filip. (1886) 128; King, in Journ. As. Soc. Beng. 66[2] (1897) 334.

Petaloma coccinea Blanco Fl. Filip. (1837) 345, ed. 2 (1845) 240, ed. 3, 2: 83.

Luzon. Province of Cagayan. *For. Bur. 7083 Klemme:* Province of Zambales, *Merrill 2082, For. Bur. 5888 Curran, Bur. Sci. 4722 Ramos:* Province of Tayabas, *Merrill 2483, 2065, For. Bur. 10234, 10386, 10250 Curran,* (Principe) *Merrill 1146:* Province of Sorsogon, *For. Bur. 10596 Curran.* Mindoro, *Merrill 2395, For. Bur. 5427, 9807, 9892 Merritt.* Culion, *Merrill 583.* Palawan, *Bur. Sci. 266 Bermejos, For. Bur. 3511 Curran, Bur. Sci. 614 Foxworthy.* Masbate, *For. Bur. 12669 Rosenbluth, For. Bur. 1004 Clark.* Negros. *For. Bur. 15013 Diehl, For. Bur. 5603 Everett.* Dinagat, *Ahern 441.* Basilan, *For. Bur. 4020 Hutchinson.* Mindanao. Province of Surigao, *Ahern 501;* District of Davao, *Copeland 1323;* District of Zamboanga, *For. Bur. 9345, 9436 Whitford & Hutchinson.*

Native names: *Carifuroy* (Negrito, Cagayan); *Lebato, Pasasic, Libato, Agnaya, Aguia, Calapini, Culasi, Anilay, Colisiman* (Tag.); *Tabao, Duloc-duloc, Buloc-buloc, Saga-sa, Maoro* (Vis.); *Panting-panting* (Moro).

In mangroves and beach forests throughout the Philippines, abundant. India to the Malay Peninsula and Archipelago to New Guinea, tropical Australia, and Polynesia. *Lumnitzera pedicellata* Presl of the Marianne and Marshall Islands is doubtfully distinct.

3. COMBRETUM Linn.

Calyx-tube less than 3 mm long.

All parts glabrous or nearly so..... 1. *C. acuminatum*

Inflorescence and calyx-tubes very densely lepidote..... 2. *C. squamosum*

Calyx-tube elongated, at least 5 mm long.

Flowers in elongated spikes, the calyx-tubes only slightly puberulent. 3. *C. extensum*

Flowers densely arranged at the ends of the panicle-branches, the calyx-tubes rather densely puberulent ..... 4. *C. confusum*

1. **Combretum acuminatum** Roxb. Hort. Beng. (1814) 28, Fl. Ind. 2 (1832) 228; Clarke in Hook. f. Fl. Brit. Ind. 2 (1878) 455; Vidal Phan. Cuming. Philip. (1885) 112, Rev. Pl. Vasc. Filip. (1886) 128; F.-Vill. Nov. App. (1880) 81.

Samar, *Cuming 1681.*

The range given for this species by Clarke, *l. c.*, is from the Transgangetic Peninsula from Assam to Singapore, Ceylon, Madras Peninsula?, Malaya to the Philippines, but he may have included more than typical *Combretum acuminatum* Roxb. in his conception of the species. King[1] does not include the species in his "Materials for a Flora of the Malayan Peninsula" as occurring in the area covered by that work, nor does he mention it in his discussions of the accepted species. As I have only a fragment of Cuming's specimen, and no Indian material for comparison, I am constrained to accept Clarke's identification of Cuming's specimen for the present. The Philippine specimen seems, however, to differ from Roxburgh's species, as described, in being quite glabrous.

As to the name of the species, Kurz[2] accepts *Combretum costatum* Roxb., which has page priority over *C. acuminatum* Roxb.

[1] Journ. As. Soc. Beng. 66[2] (1897) 335–341.

[2] Forest Flora of British Burma 1 (1877) 465.

2. **Combretum squamosum** Roxb. Hort. Beng. (1814) 28, Fl. Ind. 2 (1832) 231; Miq. Fl. Ind. Bat. 1[1] (1856) 607; Clarke in Hook. f. Fl. Brit. Ind. 2 (1878) 456; F.-Vill. Nov. App. (1880) 81; Vid. Phan. Cuming. Philip. (1885) 112, Rev. Pl. Vasc. Filip. (1886) 128; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 103; King in Journ. As. Soc. Beng. 66[2] (1897) 339.

Combretum squamosum var. *luzonicum* Presl Epim. (1852) 216.

Combretum distillatorium Blanco Fl. Filip. (1837) 295.

Combretum laxum Blanco l. c. ed. 2 (1845) 206, ed. 3, 2: 22; F.-Vill. Nov. App. (1880) 81, non Roxb.

Luzon, Province of Ilocos Sur, *Cuming 1122:* Province of Zambales, *Hallier s. n.:* Province of Nueva Ecija, *For. Bur. 8504 Curran:* Province of Pangasinan, *Bur. Sci. 4831 Ramos:* Province of Rizal, *Bur. Sci. 5 Foxworthy, Merrill 1840, For. Bur. 1995 Ahern's collector:* Province of Bataan, *Whitford 1032, For. Bur. 2304, 2173 Meyer, Elmer 6715, For. Bur. 2341, 2338 Borden.* Culion, Merrill *604.* Panay, *Copeland s. n.* Basilan, *Hallier s. n.*

Northern and eastern Bengal to Nepal, Chittagong, the Malay Peninsula and Archipelago.

3. **Combretum extensum** Roxb. Hort. Beng. (1814) 28, Fl. Ind. 2 (1832) 229; Clarke in Hook. f. Fl. Brit. Ind. 2 (1878) 458; King in Journ. As. Soc. Beng. 66[2] (1897) 337; Merr. in Philip. Journ. Sci. 4 (1909) Bot. 300.

Palawan, Mount Pulgar, *Bur. Sci. 547 Foxworthy.* Mindoro, *For. Bur. 4074 Merritt.*

India to the Andaman Islands, the Malay Peninsula, and Java.

4. **Combretum confusum** Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) Bot. 116.

Combretum sexalatum Merr. l. c. 1 (1906) Suppl. 212, pro parte.

Luzon, Province of Rizal, *For. Bur. 3130 Ahern's collector, Bur. Sci. 4607 Ramos.*

An endemic species, closely allied to and possibly not specifically distinct from *Combretum sundaicum* Miq. of the Malay Peninsula and Sumatra.

EXCLUDED SPECIES.

C. wallichii DC.; F.-Vill. Nov. App. (1880) 81.

C. ovalifolium Roxb.; F.-Vill. *l. c.*

C. micropetalum DC.; Llanos in Mem. Ac. Cienc. Madr. 4 (1859) 502.

C. rotundifolium DC.; Llanos *l. c.*

None of the above species are represented by extant Philippine botanical material, and all were doubtless credited to the Archipelago through misconceptions of the species by F.-Villar and Llanos.

4. QUISQUALIS Linn.

Quisqualis indica Linn. Sp. Pl. ed. 2 (1762) 556; Presl Rel. Haenk. 2 (1830) 25; Blanco Fl. Filip. (1837) 361, ed. 2 (1845) 254, ed. 3, 2: 109; Hook. f. Fl. Brit. Ind. 2 (1878) 459; F.-Vill. Nov. App. (1880) 81; Vid. Cat. Pl. Prov. Manila (1880) 30, Sinopsis Atlas (1883) *t. 48, f. D,* Phan. Cuming. Philip. (1885) 112, Rev. Pl. Vasc. Filip. (1886) 128; Miq. Fl. Ind. Bat. 1[1] (1855) 610; King in Journ. As. Soc. Beng 66[2] (1897) 342; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 103, 3 (1908) Bot. 422.

Q. spinosa Naves in Blanco Fl. Filip. ed. 3, *t. 133.*

Q. malabarica F.-Vill. Nov. App. (1880) 81, non Bedd.

Q. densiflora F.-Vill. l. c. non Wall.?

Babuyanes, Camiguin Island, *Bur. Sci. 3958 Fénix.* Luzon, Province of Cagayan, *For. Bur. 18610 Klemme, Bur. Sci. 7930 Ramos:* Province of Isabela, *Bur. Sci. 3127 Mearns, For. Bur. 18582, 18587 Alvarez, Bur. Sci. 8069 Ramos:* Province of Zambales, *Merrill 1746, Cuming 1197:* Province of Nueva Ecija, *Merrill 276:* Province of Bataan, *For. Bur. 1497 Ahern's collector, Bur. Sci. 952 Mangubat, Whitford 39, 1287:* Manila, *Normal School 169 Nuñez:* Province of Rizal, *For. Bur. 2907 Ahern's collector, Merrill 1676, 2324, Bur. Sci. 3300 Ramos:* Province of Tayabas, *Gregory 89, Whitford 706, For. Bur. 6611 Kobbe, Bur. Sci. 2357 Mearns:* Province of Camarines, *Ahern 179, 290:* Province of Albay, *Bur. Sci. 6418 Robinson.* Mindoro, *Merrill 913, 2216, 2464, McGregor 157.* Ticao, *For. Bur. 1053, 2536 Clark.* Cebu, *Barrow 9.* Mindanao, Lake Lanao, *Mrs. Clemens 278.*

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MEDICAL SURVEY OF THE TOWN OF TAYTAY
PART V, THE PRINCIPAL FOODS UTILIZED BY THE NATIVES

By Elmer D. Merrill

(From the Botanical Section of the Biological Laboratory of the Bureau of Science, Manila, P. I.)

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MEDICAL SURVEY OF THE TOWN OF TAYTAY.

V. THE PRINCIPAL FOODS UTILIZED BY THE NATIVES.

By E. D. Merrill.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

Comparatively little has been written regarding the dietary of the natives of the Philippines, although it is a well-known fact that, in common with most oriental people, their staple foods are fish and rice. Among the poorer classes there is probably little variation from these primary articles of food, though their diet is modified by a number of food products of secondary importance. Taytay is a typical provincial town and its food supply seems to be almost entirely local, although it is within a short distance from Manila; hence the town in this respect is characteristic of most medium-sized and small settlements in the Philippines.

Here, as in nearly all other parts of the Archipelago, rice is the basis of the meal, and fish, both fresh and dried, apparently ranks as the second most commonly utilized food. The town is situated in the midst of a large rice-growing region, and the supply of this staple is practically all local, although in times of scarcity foreign rice is brought from Manila. Comparatively few varieties of rice seem to be cultivated locally, at least in any great quantity.

Most of the fresh fish found in the local markets, and apparently most of the dried fish, are fresh-water varieties secured in Lake Bay, although some dried fish originating in salt water is brought from Manila. The variety found locally is very limited, the only kinds noticed by me in any quantity being the species known as *dalag* and *candoli*, both fresh-water fish brought from Lake Bay, and these were found fresh (alive) and salted. Other varieties said to be brought into the market at various times are *kitang, buan-buan, talilong, talakaitok, palos, tegiti, hito, bia, ayungin, tuyo* and *matinik*. Dried fish, imported from Manila, and apparently always to be found in the market or in the tiendas in greater or less abundance, are *halobabai, sapsap* and *dilis*. *Hipon*, a small fresh-water shrimp, is usually abundant in the market. No other shellfish were observed.

Meats play a very secondary part in the local dietary as in other parts of the Philippines. Apparently the only local supply that is at all constant is of fresh pork; pigs, both large and small, being abundant in the town and always offered for sale on market days. Goats are utilized for food to a limited extent. Beef is apparently never, or at least very rarely, offered for sale in the local market; a meat closely resembling it—that is, the meat of the water buffalo or carabao—is probably sold at times here as in other Philippine towns, but the supply must be very limited and inconstant as these animals are far too valuable for other purposes to be used for food under ordinary conditions, so they are probably rarely slaughtered for food except when incapacitated for further work. Here, as elsewhere in the Archipelago, animals such as horses and carabaos that have died a natural death from any cause are doubtless utilized as food, although no direct evidence is at hand bearing on the local case.

Fowls, especially chickens and ducks, are found abundantly locally and are considerably utilized for food, especially among the natives of the well-to-do classes, while eggs, both fresh and "balut" (incubated) are somewhat used. The comparatively high price of all meats, poultry and eggs, place these products beyond the means of the average native of the laboring class for regular articles of diet.

Various prepared foods are sold in the market and in the tiendas, such as *suman,* made of tapioca, rice and sugar, wrapped in banana leaves and boiled: *poto,* made of boiled rice flour and sugar; *poto seco,* the same thing, but dried after cooking; *bibinka ñg malagkit,* prepared from a glutinous variety of rice with grated coconut meat and sugar, and doubtless some other similar forms of food. Various prepared foods of Chinese origin are also sold, such as *gulaman,* made from a seaweed; *bihon,* made of rice flour, corresponding roughly to our spaghetti; and *miki* somewhat similar but made of rice flour and mongo beans (*Phaseolus mungo*). Cakes made from wheat flour, either baked locally or imported from Pasig or Manila, are sold in small quantities. Wheat bread is used scarcely at all, so that wheat can not be considered to have any place in the dietary of the average native.

Dairy products such as milk, butter and cheese have no place in the dietary of the natives, except the former, which is obtained from the water buffalo and is used to a limited extent.

In spite of the proximity of Taytay to Manila with its relatively very rich markets, its food supply seems to be almost entirely local as noted above. Imported preserved meats, fish, fruits, vegetables, milk, butter, cheese, etc., are not to be found in the local markets or tiendas, and are probably not at all utilized by the inhabitants of the town or else to a very limited extent and among a very limited class of inhabitants. Fresh potatoes, onions, etc., although always to be found in the Manila market, are rarely obtainable locally, and then only in very limited quantities.

Below is given a list of the different fruits, vegetables, pot herbs, and condiments found in the markets of Taytay, giving so far as possible their native, English and scientific names, their origin, whether grown locally or imported, and their uses. The list of fruits especially is a comparatively long one, but for many of them the season is comparatively limited, and with the exception of bananas and coconuts, none of them are to be found in the market throughout the year; doubtless a few additions could be made to the list by examining the products sold in the local markets at other seasons. It should be remembered also that a high percentage of the fruits utilized by the natives and many of the vegetables, judged from the European or American standpoint, are decidedly inferior and are scarcely ever or not at all utilized by others than the natives; while many of them are to be found in only very limited quantities so that the list of available foods is really smaller than one would be led to expect from mere examination of the appended list. Of the entire list of fruits given below, bananas, mangoes and pineapples are the only ones that can be ranked as first-class fruits from an edible standpoint.

FRESH FRUITS.

Bananas (including both the common banana and the plantain; *Musa sapientum* L., and *M. paradisiaca* L.). Three varieties are found in abundance, all grown locally—*gloria* and *latandal*, edible bananas, and *saba*, a plantain used for food only when cooked.

Anonas (custard-apple or bullock's heart, *Anona reticulata* L.). A fruit of American origin, grown locally and in small quantities.

Ates (sweet-sop, *Anona squamosa* L.). Like the preceding, a fruit of American origin, somewhat more abundant than the custard-apple.

Bayabas (guava, *Psidium guajava* L.). A fruit of American origin, very abundant and grown locally without cultivation; the fruits are inferior.

Bilimbi (*Averrhoa carambola* L.). A very acid fruit of American origin, usually eaten with fish or with other foods when something sour is desired; common but in limited quantities.

Calamansi (lime, *Citrus medica* Linn., var.). A small very acid lime, found in limited quantities, utilized like the preceding.

Camates (tomato, *Lycopersicum esculentum* Mill.). Of American origin, found in the markets in abundance, but inferior in size and flavor.

Camias (*Averrhoa bilimbi* L., and *Cicca disticha* L.). Found in limited quantities, similar in flavor and uses to Bilimbi.

Cahel (sour orange, *Citrus aurantium* L., var.). A very sour, tight-skinned, light-yellow orange, grown locally; found in small quantities.

Casoy (cashew, *Anacardium occidentale* L.). A fruit of American origin, eaten fresh; the seeds are roasted and eaten. Common.

Dayap (lime, *Citrus medica* L., var.). Abundant in season.

Granates (pomegranate, *Punica granatum* L.). Very rare, apparently used mostly for medicinal purposes.

Guanabano (sour-sop, *Anona muricata* L.). A fruit of American origin, grown locally; not abundant.

Lansones (*Lansium domesticum* Jack). In season; imported from the lake region.

Luchan (pomelo, *Citrus decumana* L.). Grown locally, rather common.

Manga (mango, *Mangifera indica* L.). Very abundant in season.

Melon (muskmelon, *Cucumis melo* L.). Occasional, inferior in flavor.

Naranjitas (orange, *Citrus aurantium* L., var.). The common looseskinned, sweet orange of the Philippines.

Niog (cocoanut, *Cocos nucifera* L.). Common in the market, imported from the lake region.

Papaya (papaw, *Carica papaya* L.). A fruit of American origin, very common.

Piña (pineapple, *Ananassa sativa* Lindl.). Abundant in season, of American origin.

Sampalok (tamarind, *Tamarindus indicus* L.). Abundant; in addition to the use of the fruit, the flowers and young leaves are cooked with fish.

Sandias (watermelon, *Citrullus vulgaris* Schrad.). Rather common, but inferior in texture and flavor.

Santol (*Sandoricum indicum* Cav.). A native fruit, inferior.

VEGETABLES.

Ampalaya (*Momordica charantia* L.). It is cooked with fish and used in stews; common.

Batao (*Dolichos lablab* L.). A common bean.

Bawang (garlic, *Allium sativum* L.). Found in all small stores and common in the market.

Calabaza (squash, *Cucurbita maxima* Duch.). Rather abundant but in limited quantities; the young shoots and flowers are also cooked as a pot herb.

Camote (sweet potato, *Ipomoea batatas* L.). Abundant.

Camoting cahoy (cassava, tapioca, *Manihot utilissima* Pohl). Common in cultivation, but not utilized extensively.

Cebollas (onions, *Allium cepa* L.). These are imported from Manila, in very small quantities; young onions grown locally and eaten raw as a relish are found in the market and are known as *cebollas na mura*.

Gabi (taro, *Colocasia antiquorum* Schott). The fleshy corms are common in the market. In many parts of the Philippines the leaves and petioles are cooked as a pot herb, but I am informed that they are not so used here.

Labong ñg cauayan (bamboo shoots, *Bambusa* sp.). Rather common, in season.

Maiz (Indian corn or maize, *Zea mays* L.). Of American origin; very commonly cultivated and found in abundance.

Mongos (green gram, *Phaseolus mungo* L.). A very small bean, found in abundance.

Opo (bottle gourd, *Lagenaria vulgaris* Seringe). Rather common.

Patatas (potato, *Solanum tuberosum* L.). Imported in small quantities from Manila.

Patola (*Luffa cylindrica* Roem. and *L. acutangula* Roxb.). Rather common.

Poso (banana flowers, *Musa paradisiaca* and *M. sapientum*). Common.

Rabanos (radishes, *Raphanus sativus* L.). The radish is found in abundance in season, and is eaten both raw and cooked.

Sincamas (turnip-bean, *Pachyrhizus bulbosus* Kurz). Very abundant in season, eaten raw.

Sitao (Chinese bean, *Vigna sinensis* Endl.). Abundant.

Talong (egg plant, *Solanum melongena* L.). Abundant.

Tsitsao (green peas, *Pisum sativum* L.). Rather abundant in season.

Tubo (sugar cane, *Saccharum officinarum* L.). Abundant.

Ubi (yam, *Dioscorea daemona* Roxb.). Found in small quantities; probably other varieties of yams are more or less utilized.

POT HERBS.

Calabaza (squash, *Cucurbita maxima* Duch.). The young shoots and flowers are commonly used for greens.

Camote (sweet potato, *Ipomoea batatas* L.). The young shoots and leaves are commonly used.

Caturay (*Sesbania grandiflora* Poir.). The large white flowers of this tree are cooked as greens.

Cancong (*Ipomoea reptans* Poir.). Much like sweet-potato leaves and shoots, and similarly used.

Mostaza (mustard, *Brassica juncea* Coss.). Cultivated, the stems and leaves utilized.

CONDIMENTS.

Achuete (arnatto, *Bixa orellana* L.). The seeds are used to give a reddish color to cooked rice, and to various dishes in which rice is the chief ingredient.

Alibangbang (*Bauhinia malabarica* L.). The leaves and young shoots of this tree have a pleasant acid taste and are cooked with rice.

Luya (ginger, *Zingiber officinale* Rosc.). Commonly found in the market.

Sanki (star anise, *Illicium verum* Hook.). The dried fruits are found in the tiendas; imported from China.

Sibug (*Acacia pennata* Willd.). The pods are used to flavor fish.

Sili (Chile pepper, *Capsicum frutescens* L.). Abundant, and much used.

Sampalok (tamarind, *Tamarindus indica* L.). The flowers and young shoots are cooked with fish, etc.

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THE PHILIPPINE
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VOL. V MAY, 1910 No. 1

AN ENUMERATION OF PHILIPPINE LEGUMINOSAE, WITH KEYS TO THE GENERA AND SPECIES.

By E. D. MERRILL.

(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

This family ranks second or third in number of species among those represented in the Philippines, being definitely exceeded only by the *Orchidaceae*. It seems probable, when our material of the *Rubiaceae* is carefully revised, that the latter family will somewhat exceed *Leguminosae* in the number of species found in the Archipelago. A rough estimate of the former, based on the classified and unclassified material available here, brings the number of species approximately to the same figure as *Leguminosae,* but novelties are much more numerous in *Rubiaceae* than in *Leguminosae,* and the species appear to be more local. The introduced element in *Leguminosae* is comparatively large, but in *Rubiaceae* there are relatively few introduced forms.

An attempt has been made in the following enumeration to account for all the genera and species of the family that have been credited to the Philippines in botanical literature; to determine, so far as possible, those which really extend to the Archipelago, excluding the forms erroneously credited to the group by various authors, and to classify the abundant material accumulated in the herbarium of this Bureau during the past few years, describing the apparently new forms.

The material available for study comprises a complete set of all the collections made by employees of this Bureau, and the Bureau of Forestry, as well as numerous other collections of recent date, some of Cuming's Philippine plants, and occasional specimens collected by Mr. Loher. Opportunity has occurred, previous to the inception of this work, of examining the Philippine material collected by Cuming, Vidal, Loher, and others, preserved in the Kew Herbarium, as well as various Philippine

types in the United States National Herbarium, the Berlin Herbarium, DeCandolle Herbarium, and Philippine material in some other institutions.

A considerable amount of work has been done in the past on Philippine *Leguminosae,* so that in the great quantity of material examined, I have found it necessary or expedient to describe as new, only a single genus, twelve species, and a few varieties. A number of complicated cases of synonymy were encountered, some of which I have not as yet been able to solve in a satisfactory manner. In accordance with the rules of priority approved by the Vienna Botanical Congress, a certain number of changes have become necessary, and in most cases the earliest valid name has been adopted, both in genera and species, except in the case of the former, where the list of *nomina conservanda* of the Vienna Congress has been accepted.

A tabulated list is given below of the retained generic names, as approved by the Vienna Congress, and also the rejected ones, so far as this affects Philippine *Leguminosae.*

Retained names.	Rejected names.
Crudia Schreb. (1789)	Apalatoa Aubl. (1775).
	Touchiroa Aubl. (1775).
	Waldschmidtia Scop. (1777).
Pterolobium R. Br. (1814)	Cantuffa J. F. Gmel. (1791).
Peltophorum Walp. (1842)	Baryxylum Lour. (1790).
Ormosia Jack (1811)	Toulichiba Adans. (1763).
Tephrosia Pers. (1807)	Cracca L. (1753).
	Colinil Adans. (1763).
	Needhamia Scop. (1777).
Clianthus Banks & Soland. (1832)	Donia G. Don (1832).
Ormocárpum Beauv. (1804)	Diphaca Lour. (1790).
Smithia Ait. (1789)	Damapana Adans. (1763).
Desmodium Desv. (1813)	Meibomia Adans. (1763).
	Pleurolobus St. Hil. (1812).
Alysicarpus Neck. (1790)	Fabricia Scop. (1777).
Dalbergia L. f. (1781)	Amerimnon P. Br. (1756).
	Ecastaphyllum P. Br. (1756).
Pongamia Vent. (1803)	Pongam Adans. (1763).
	Galedupa Lam. (1786) (quoad descr.).
	Pungamia Lam. (1797).
Derris Lour. (1790)	Salken Adans. (1763).
	Solori Adans. (1763).
	Deguelia Aubl. (1775).
	Cylizoma Neck. (1790).
Centrosema Benth. (1838)	Bradburya Raf. (1817).
	Vexillaria Hoffmg. (1824).
Mucuna Adans. (1763)	Zoophthalmum P. Br. (1756).
	Stizolobium P. Br. (1756).
Rhynchosia Lour. (1790)	Dolicholus Medic. (1787).
Pachyrrhizus Rich. (1825)	Cacara Thou. (1805).
Psophocarpus Neck. (1790)	Botor Adans. (1763).

In the above list the 18 retained names given in the first column would be displaced by the older ones, given in the second column, were the principles of priority to be applied without reservation. The author does not personally approve of all the retained generic names, and it is believed that in a number of cases better results would have been secured had the list been made up with more discretion. The list will not bear close inspection without showing its deficiencies, both in names included, and in those omitted. The method by which these names were selected appears to have been purely arbitrary, with little or no consideration of the facts in the individual cases, and it is believed that, granting a list of *nomina conservanda* to be expedient and necessary, better results would have been secured, had a proposed list been adopted by the Vienna Congress, for definite acceptance or rejection at the next International Botanical Congress, thus giving opportunity for some discussion of the proposed names, arguments for and against the adoption of certain ones, and opportunity to propose additions to the list.

In the *Leguminosae* of the Philippines alone, similar action should have been taken in the case of several genera, in order to have made the list of *nomina conservanda* consistent. *Entada* Adans. (1763), should have been retained instead of *Pursaetha* L. (1747), *Gigalobium* P. Br. (1756), or *Lens* Stickm. (1754); *Sesbania* Scop. (1777), instead of *Sesban* Adans., or *Agati* Adans. (1763); *Sindora* Miq. (1860), instead of *Galedupa* Lam. (1786); and possibly also *Dalea* L. (1737), instead of *Parosela* Cav. (1802), although the last case is complicated by synonymy and homonymy. If, as in the list of *nomina conservanda, Clianthus* be given preference to *Donia*, then for the sake of consistency, *Atylosia* should have been retained in place of *Cantharospermum*, yet on the one hand *Clianthus* is given preference to *Donia*, and on the other *Cantharospermum* is preferred to *Atylosia*, although in both cases there is only page priority, and in the last case *Atylosia* is certainly the more generally used name.

In the following consideration generic limits as defined by Bentham in the "Genera Plantarum," and by Taubert in Engler and Prantl's "Die natürlichen Pflanzenfamilien" have been followed, and the sequence of genera followed is that of the latter work. In studying the Philippine material, as well as the extra-Philippine plants in this herbarium, I have been impressed with the inequality in the treatment of genera by the above authors. Especially in the *Papilionatae* one finds genera separated by exceedingly slight and often obscure characters, as with *Dunbaria* and *Cantharospermum, Vigna* and *Phaseolus*, and, as some authors propose, the separation of *Lablab* from *Dolichos* as a distinct genus. In the cases just cited, the characters considered worthy of being the bases of generic distinctions, are certainly not as strong, nor as well defined, as are those by which various sections or subgenera of *Caesalpinia, Cassia, Bauhinia,*

Desmodium, Mucuna, etc., are distinguished, yet the movement by some botanists again to raise certain groups of species, in the above and other genera, to generic rank, meets with comparatively little support. The author is personally of the opinion that it would be more logical and practically as convenient, to divide some of the larger genera into several smaller ones, where the sections or subgenera are sharply defined as are some of them in *Caesalpinia, Cassia, Desmodium,* etc. For purposes of comparison, however, generic limits as defined by Bentham and by Taubert are retained in the present paper.

Generic nomenclature in the present enumeration differs from that of De Dalla Torre & Harms "Genera Siphonogamarum" only in two cases, these being the adoption of *Delonix* Raf. for *Caesalpinia* auct., non L., and *Parosela* Cav. for *Dalea* L., for what are considered valid reasons.

The only previous attempt to enumerate all the species of this family known in the Philippines was by F.-Villar,[1] who credited to the Archipelago 78 genera and 229 species. Of these, it has been necessary to exclude 6 genera and about 35 species, as no material is extant by which F.-Villar's identifications can be checked, and the excluded genera and species have not been found in the Philippines by any preceding or succeeding botanists.

In the present enumeration 90 genera are considered. Of these, two, *Monarthrocarpus,* described as new, and *Luzonia,* are monotypic and endemic; the former allied to *Desmodium* § *Podocarpium,* and the latter to *Dioclea.* Of the 90 genera included, 14, *Enterolobium, Leucaena, Schrankia, Mimosa, Prosopis, Tamarindus, Delonix, Medicago, Gliricidia, Arachis, Pisum, Centrosema, Pachyrrhizus,* and *Psophocarpus,* are represented in the Philippines by introduced species only, while in other genera, such as *Cassia, Crotalaria, Desmodium,* etc., there are many introduced forms.

The number of species recognized is 285, with several varieties, and this list will doubtless be somewhat increased as exploration progresses. Of these 285 species I consider the following 53 to have been introduced, although most of them are now thoroughly naturalized and must be considered as constituents of the Philippine flora: *Enterolobium saman,* Pithecolobium dulce,* Albizzia lebbeck, Acacia farnesiana,* Leucaena glauca,* Schrankia quadrivalvis,* Mimosa pudica,* Prosopis vidaliana,* Cynometra cauliflora, Tamarindus indica* (prehistoric), *Bauhinia tomentosa, B. monandra,* Cassia fistula, C. glauca, C. tora, C. hirsuta,* C. sophera,* C. occidentalis,* C. alata,* C. siamea, Delonix regia, Caesalpinia pulcherrima,* Crotalaria juncea, C. incana,* Medicago denticulata, M. sativa, Trifolium pratense, T. hybridum, T. incarnatum, T. repens, Indigofera suffruticosa,* Parosela glandulosa,* Gliricidia sepium,* Sesbania*

[1] Nov. App. (1880) 57–76.

grandiflora (prehistoric), *Arachis hypogœa,* Desmodium scorpiurus,* D. procumbens,* Lourea vespertilionis, Inocarpus edulis* (prehistoric), *Pisum sativum, Centrosema plumieri,* Mucuna deeringiana, Canavalia gladiata,* Cajanus indicus, Phaseolus lunatus,* P. adenanthus,* P. semierectus,* P. radiatus, Vigna sinensis, Dolichos lablab, Pachyrrhizus erosus,* and Psophocarpus tetragonolobus.* Of these apparently introduced species, those marked with an asterisk are undoubtedly of American origin. It is interesting to note that of these 26 species which have, for most part, at least, originated in tropical America, the following have not as yet been reported from any other part of the Orient, although all, with the exception of the first, are very common and widely distributed in the Philippines: *Schrankia quadrivalvis, Prosopis vidaliana, Parosela glandulosa, Gliricidia sepium,* and *Desmodium scorpiurus.*

It is possible that other species than those listed above, now cosmopolitan in the tropics, have originated in tropical America, and it is also very probable that still others of these cosmopolitan species now considered as indigenous in the Philippines, have been introduced within historic times from other parts of Malaya or from Asia. This is especially likely of the constituents of the low country flora in the vicinity of towns, for in dealing with the flora of the settled areas it is frequently difficult to determine whether or not an individual species is really native or introduced.

One reason for considering that many of the plants found about towns and in cultivated areas in the Philippines are not really natives of the Archipelago, is found in the results obtained in the botanical exploration of Polillo, an island having an area of about 300 square miles, off the east coast of Luzon. Botanical work was carried on here, extending over a period of about four months, by Dr. C. B. Robinson in August, and Mr. R. C. McGregor from September to November, 1909. From a botanical standpoint the island is more interesting because of the species it lacks, rather than from those actually found there. Most of the species collected are of wide distribution in the Philippines and in the Indo-Malayan region generally, while novelties are comparatively rare. A striking character of the flora of the island, as a whole, is the lack of very numerous species, characteristic of the low country throughout the Philippines, weeds of cultivation, etc. Conditions are not lacking for the growth of these plants, for Polillo supports a population of about 3,000 inhabitants, and considerable areas are in cultivation and lying fallow. In *Leguminosae* alone, the following results were obtained: Total number of species collected or observed 27; of these but 2 are endemic in the Philippines, 21 are of wide Indo-Malayan distribution, including 8 strand plants, and only 5 are considered to be of American origin. The common leguminous weeds and various other plants, characteristic of waste lands of the low country, and for most part cosmopolitan in the tropics, are conspicuous by their absence. It has been

noted above that about 26 species of this family, found in the Philippines, are of American origin; it is worthy of note that but 5 of these have been found in Polillo. The fact that there are so few of these American plants definitely known from Polillo, leads us to conclude also that many of the other species, now cosmopolitan in the tropics, abundant in other parts of the Philippines, but wanting in Polillo, have been introduced into the Archipelago in comparatively recent times, perhaps contemporaneously with the introduction of many of the American species, and like the latter have not as yet reached the isolated parts of the Archipelago.

Some cases of geographical distribution are worthy of note, but evidence of special affinities with the flora of surrounding regions is not as strong in this family as it is in some others. The flora as a whole is preponderatingly Malayan. Excluding from the present consideration the species that manifestly have been introduced from tropical America, and are now for most part widely distributed in Indo-Malaya, we have about 150 common to the Philippines and the Malayan region; of these about 120 are common to India, the Philippines, and Malaya, and many also extend to other regions. About 31 are confined to the Philippines and Malaya, but less than one-half this number are common to continental Asia and the Philippines and do not extend to Malaya.

The following species extend from northern India to China and the Philippines: *Desmodium podocarpum* DC. (also in Japan), *D. retroflexum* DC., *Indigofera nigrescens* Kurz, *Lespedeza juncea* var. *sericea* Forbes & Hemsl. (also in Australia), *Shuteria vestita* W. & A., and *Smithia ciliata* Royle. From northern India and the Philippines, but not reported from China, we have: *Dolichos falcatus* Klein, *Crotalaria acicularis* Ham. (also in Java), *Desmodium pseudotriquetrum* DC., and *Crotalaria assamica*, while the genus *Kingiodendron* has one species in India, and one in the Philippines. Confined to China and the Philippines we have *Phaseolus minimus* Roxb., while *Gleditsia rolfei* Vid., Luzon and Celebes, and the only representative of the genus in Malaya, is closely allied to species of southern China, the genus not being represented in India except by introduced species. A considerable number of the above continental types are confined to the Benguet-Lepanto region in northern Luzon, in the regional distribution of *Pinus insularis* Endl., but others are widely distributed at low altitudes. *Acacia confusa* Merr., which has been identified by some authors with *A. richii* A. Gray, of Polynesia, is the only species, known to me, common and confined to Luzon and Formosa; however, this species must be considered an Australian type as it is one of the few extra-Australian species of the great group *Phyllodineae* so characteristic of that continent. *Desmodium buergeri* Miq., a Japanese species now reported from the Philippines, has been confused with *D. heterocarpum* (L.) DC., so that its exact range is uncertain.

Australian types are *Acacia confusa,* mentioned above, and *Clianthus binnendyckianus* Kurz, the genus with one species in Mindanao, Polillo, and Celebes, and two in Australia. An indication of a probable line of migration from Australia through the Philippines and intervening islands to southeastern Asia, or *vice versa,* is represented by *Glycine tomentosa* Benth., Queensland, Luzon, and China, and *Pycnospora nervosa* W. & A., Australia, Philippines (common and widely distributed), China, and India, but not known from Malaya, while the genus *Erythrophloeum* has one species in Australia, one in the Philippines, one in China, and is, so far as is known at present, wanting in Malaya and India, but has about five species in Madagascar and tropical Africa.

New Guinea and the Philippines have in common *Rhynchosia calosperma* Warb. (also in the Aru Islands and Bismarck Archipelago), and the genus *Macropsychanthus,* with one species in New Guinea, and two in Mindanao. The Celebes alliance is stronger, with the monotypic genus *Wallaceodendron, Dalbergia minahassae* Koord., *Pithecolobium subacutum* Benth., *Clianthus binnendyckianus* Kurz, and *Pterocarpus echinatus* Pers. (also in Salayer), while *Pueraria warburgii* Perk., of the southern Philippines, is represented in Celebes by an identical, or closely allied form. Special cases of distribution from other parts of Malaya are few. *Pithecolobium prainianum* Merr. appears to be known only from the Philippines, Borneo, and Java, *Cassia divaricata* Nees & Bl., Luzon and Java, *Mezoneurum latisiliquum* Merr., and *M. pubescens* Desf., Timor and the Philippines, as well as the typical form of *Parkia timoriana* Merr. *Spatholobus gyrocarpus* Benth. is known only from Luzon, Penang, and the Malay Peninsula (Perak), and *Desmodium ovalifolium* Wall. from Luzon, Sumatra, and Penang.

A notable characteristic of the Philippine flora as a whole, is the high percentage of endemic species, but endemism is not particularly developed in *Leguminosae.* Two genera, *Monarthrocarpus* Merr., and *Luzonia* Elm., both monotypic, and the following 82 species, are, so far as is known at present, confined to the Philippines: *Pithecolobium scutiferum* Benth., *P. pauciflorum* Benth., *P. mindanaense* Merr., *P. platycarpum* Merr., *Albizzia scandens* Merr., *A. acle* Merr., *Adenanthera intermedia* Merr., *Entada parvifolia* Merr., *Erythrophloeum densiflorum* Merr., *Cynometra inaequifolia* A. Gray, *C. warburgii* Harms, *C. luzoniensis* Merr., *C. simplicifolia* Harms, *Kingiodendron alternifolium* Merr. & Rolfe, *Sindora supa* Merr., *Intsia acuminata* Merr., *Pahudia rhomboidea* Prain, *Crudia blancoi* Rolfe, *C. subsimplicifolia* Merr., *Bauhinia dolichocalyx* Merr., *B. leptopus* Perk., *B. subglabra* Merr., *B. whitfordii* Elm., *B. cumingiana* F.-Vill., *B. nymphaeifolia* Perk., *B. perkinsiae* Merr., *B. aherniana* Perk., *B. antipolana* Perk., *B. merrilliana* Perk., *B. pinchotiana* Perk., *B. warburgii* Perk., *Pterolobium membranulaceum* Merr., *Mezoneurum mindorense* Merr., *Ormosia paniculata* Merr., *O. calavensis* Azaola, *Crotalaria*

radiata Merr., *Indigofera unifolia* Merr., *Psoralea badocana* Blanco, *Tephrosia dichotoma* Desv., *T. obovata* Merr., *Millettia longipes* Perk., *M. ahernii* Merr. & Rolfe, *M. canariifolia* Merr., *M. merrillii* Perk., *M. cavitensis* Merr., *M. foxworthyi* Merr., *Desmodium cumingianum* Benth., *D. quinquepetalum* Merr., *D. malacophyllum* DC., *Monarthrocarpus securiformis* Merr., *Dalbergia polyphylla* Benth., *D. cumingiana* Benth., *Pterocarpus blancoi* Merr., *Derris polyantha* Perk., *D. cumingii* Benth., *D. philippinensis* Merr., *D. micans* Perk., *D. mindorensis* Perk., *D. lianoides* Elm., *Erythrina stipitata* Merr., *Strongylodon macrobotrys* A. Gray, *S. elmeri* Merr., *S. zschokkei* Elm., *S. caeruleus* Merr., *S. crassifolius* Perk., *S. pulcher* C. B. Rob., *Mucuna curranii* Elm., *M. mindorensis* Merr., *M. longipedunculata* Merr., *M. aurea* C. B. Rob., *M. sericophylla* Perk., *M. lyonii* Merr., *Dioclea umbrina* Elm., *Luzonia purpurea* Elm., *Macropsychanthus mindanaensis* Merr., *M. ferrugineus* Merr., *Pueraria tetragona* Merr., *Dunbaria cumingiana* Benth., *D. merrillii* Elm., *Flemingia philippinensis* Merr. & Rolfe, and *F. cumingiana* Benth.

If we exclude the 53 species definitely known to have been introduced into the Philippines, considering the leguminous flora of the Philippines as comprising only the 232 indigenous, or presumably indigenous species, then the percentage of endemism for the family is slightly less than 36 per cent.

Tabulation of the Indo-Malayan genera and species has been omitted, because of the great number of genera and species involved. The summary is as follows: India, including the Malay Peninsula,[2] 147 genera and 1058 species; Malay Peninsula,[3] 73 genera and 291 species; Malay Archipelago,[4] 105 genera and 554 species; China,[5] 89 genera and 469 species; Formosa,[6] 56 genera and 136 species; Philippines, 90 genera and 285 species.

From an economic standpoint this family takes high rank in the Philippines. With the exception of the *Dipterocarpaceae*, no family compares with the *Leguminosae* in the quantity and value of its timber trees. All grades of timber are produced by various species of the family, from the very soft and low grade timber known as *cupang*, from *Parkia timoriana* (DC.) Merr., to the highest grade building and furniture woods found in the Archipelago. Among the more valuable

[2] Baker in Hook. f. Fl. Brit. Ind. **2** (1876–1878) 56–306; Prain in Journ. As. Soc. Beng. **66**[2] (1897) 347–518.

[3] Prain in Journ. As. Soc. Beng. **66**[2] (1897) 21–275.

[4] Boerl. Handl. Kenn. Fl. Nederl. Ind. **1** (1890) 321–419.

[5] Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1886–87) 150–217; M. Smith ex Forbes & Hemsl. l. c. **36** (1905) 451–530.

[6] Mats. & Hayata in Journ. Coll. Sci. Tokyo **22** (1906) 102–117; Hayata l. c. **25**[19] (1908) 74–77.

timbers are *narra,* corresponding to the *padouk* of India, from *Pterocarpus indicus* Willd., and *P. echinatus* Pers.; *acle,* from *Albizzia acle* (Blanco) Merr.; *supa,* from *Sindora supa* Merr.; *ipil,* from *Intsia bijuga* (Colebr.) O. Ktz.; *tindalo,* from *Pahudia rhomboidea* (Blanco) Prain; *banuyo,* from *Wallaceodendron celebicum* Koord.; *batete* from *Kingiodendron alternifolium* (Elm.) Merr. & Rolfe, while many other species yield timber used locally for different purposes. Shade-trees and various ornamental plants are represented by *Enterolobium saman* (Jacq.) Prain, *Albizzia lebbeck* (L.) Benth., *Delonix regia* (Boj.) Raf., *Cassia siamea* Lam., *Peltophorum inerme* (Roxb.) Naves, *Sesbania grandiflora* (L.) Benth., *Caesalpinia pulcherrima* (L.) Sw., *Bauhinia tomentosa* L., *B. acuminata* L., *B. monandra* Kurz, *Erythrina indica* Lam., and others. Plants cultivated for food are *Phaseolus lunatus* L., *P. radiatus* L., *Vigna sinensis* Endl., *Arachis hypogea* L., *Pisum sativum* L., *Canavalia gladiata* DC., *Cajanus indicus* Spreng., *Pachyrrhizus erosus* Urban, *Dolichos lablab* L., *Psophocarpus tetragonolobus* (L.) DC., *Tamarindus indica* L., *Sesbania grandiflora* (L.) Pers., *Pithecolobium dulce* Benth., also yielding a valuable tanbark, and *Inocarpus edulis* Forst. Plants yielding dyes are represented by *Caesalpinia sappan* L., *Indigofera suffruticosa* Mill., and *I. tinctoria* L. Substitutes for soap, used in bathing, washing the hair, etc., are derived from *Albizzia saponaria* (Lour.) Bl., *A. acle* (Blanco) Merr., *Entada scandens* Benth., and *E. parvifolia* Merr. Various species of *Derris* are utilized for the purpose of stupefying fish. Extensively used hedge-plants are *Gliricidia sepium* (Jacq.) Steud., and to some extent *Leucaena glauca* Benth., the wood of the former also highly prized for making charcoal. *Gliricidia* and *Erythrina indica* Lam., are more or less utilized as shade trees in various plantations. A considerable number of species are utilized by the natives in their materia medica, while a great number are employed for various minor purposes.

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In the following keys to the genera, that part dealing with the *Papilionatae* has been made purely artificial in many respects. In the construction of the keys to both genera and species suggestions have been taken from the previously published works of various authors, modified by the forms dealt with in the following enumeration. In these keys only Philippine representatives have been taken into consideration.

KEY TO THE GENERA.

1. Petals valvate; flowers regular ..... A. Mimosoideae
1. Petals imbricate; flowers irregular (nearly or quite regular in *Gleditsia*, trees with branched spines).
2. Flowers not papilionaceous, the upper petal interior ..... B. Caesalpinioideae
2. Flowers papilionaceous, the upper petal (standard) exterior. C. Papilionatae

A. Mimosoideae.

1. Calyx-lobes valvate.
2. Stamens many, at least more than 10, or more than twice the number of petals.
3. Filaments more or less connate (*Ingeae*).
4. Endocarp not distinct from the pericarp and not forming individual envelopes about the seeds.
5. Pods indehiscent, septate between the seeds.
6. Pod turgid, about 5 cm wide, the sutures not thickened; petals adnate below to the staminal tube, otherwise free .... 1. *Serianthes*
6. Pod scarcely turgid, spongy or fleshy, less than 2 cm wide, the sutures thickened: petals connate below into a tube. 2. *Enterolobium*
5. Pods dehiscent or indehiscent, not septate between the seeds.
6. Pods very strongly curved or twisted ..... 3. *Pithecolobium*
6. Pods straight, not curved or twisted ..... 4. *Albizzia*
4. Endocarp distinct and free from the pericarp, the latter not septate, the former septate between the seeds and forming an individual envelope about each seed ..... 5. *Wallaceodendron*
3. Stamens free; inflorescence capitate (*Acacieae*) ..... 6. *Acacia*
2. Stamens as many as or double the number of petals.
3. Anthers not gland-tipped.
4. Pods straight, flat, smooth, with continuous valves, dehiscing through the sutures; erect trees ..... 7. *Leucaena*
4. Pods slightly curved or nearly straight, somewhat aculeate, with always persistent, indehiscent sutures; suffrutescent herbs or undershrubs.
5. Pods subcylindric, 4-angled ..... 8. *Schrankia*
5. Pods flattened ..... 9. *Mimosa*
3. Anthers gland-tipped.
4. Seeds albuminous (*Adenanthereae*); erect trees or shrubs.
5. Spiny shrubs or small trees; pods indehiscent ..... 10. *Prosopis*
5. Spineless trees; pods dehiscent ..... 11. *Adenanthera*
4. Seeds exalbuminous (*Piptadenieae*); great climbers, usually tendril-bearing, with very large pods and seeds ..... 12. *Entada*
1. Calyx-lobes imbricate (*Parkieae*); very large trees with capitate inflorescence. 13. *Parkia*

B. Caesalpinioideae.

1. Calyx entire, or the segments above the receptacle more or less united into a toothed or lobed tube.
2. Leaves 2-pinnate; stamens 10 (*Dimorphandreae*).
3. Erect, unarmed trees, with few, medium to large leaflets; flowers small; pods woody, not winged ..... 14. *Erythrophloeum*
3. Scandent, usually armed shrubs, with many, usually small leaflets; flowers medium-sized; pods thin, winged down one suture (*Eucaesalpinioideae*). 28. *Mezoneurum*

2. Leaves simple, entire, 2-cleft, or divided to the base; stamens 10 or less; vines, shrubs, or trees ..... 22. *Bauhinia*

1. Calyx-segments free or nearly free above the receptacle (except in *Mezoneurum*).
2. Leaves 2-pinnate, (except *Gleditsia*) (*Eucaesalpinioideae*).
3. Leaves 1-pinnate, the leaflets crenulate, the trunk and larger branches with elongated, branched spines; flowers nearly regular..... 24. *Gleditsia*
3. Leaves 2-pinnate; leaflets entire, spines, if present, simple; flowers irregular.
4. Calyx-segments valvate; large trees with very numerous, small leaflets, and large, red and yellow flowers; cultivated only..... 26. *Delonix*
4. Calyx-segments imbricate.
5. Ovary 1-ovuled; scandent armed shrubs with the pod winged at the apex (samaroid) ..... 25. *Pterolobium*
5. Ovary 2- to many-ovuled; scandent or erect, armed or unarmed, the pods not samaroid.
6. Scandent or erect, usually armed; pods not winged. 27. *Caesalpinia*
6. Scandent, usually armed; pods thin, winged along the upper suture. 28. *Mezoneurum*
6. Erect, unarmed trees with subequal calyx-segments; stigma peltate; pod narrowly winged along both sutures..... 29. *Peltophorum*
2. Leaves 1-pinnate or reduced to single leaflets.
3. Anthers basifixed, opening by terminal pores; herbs, shrubs or trees (*Cassieae*) ..... 23. *Cassia*
3. Anthers versatile, opening by longitudinal slits.
4. Ovary or its stipe more or less adnate to the calyx-tube (*Amherstieae*).
5. Petals wanting ..... 18. *Crudia*
5. Petals present.
6. Petals 3; stamens 3, monadelphous; pod fleshy..... 19. *Tamarindus*
6. Petal one.
7. Calyx and pod armed with spines..... 17. *Sindora*
7. Calyx and pod unarmed.
8. Perfect stamens 3; seeds not arillate; pods flat..... 20. *Intsia*
8. Perfect stamens usually 7; seeds with a very prominent aril; pods woody, turgid ..... 21. *Pahudia*
4. Ovary quite free from the calyx; ovules 1 or 2, rarely 3.
5. Petals 5; leaflets few, sometimes solitary..... 15. *Cynometra*
5. Petals wanting; leaflets few, large, glandular-punctate. 16. *Kingiodendron*

C. Papilionatae.

1. Stamens free; trees.
2. Stigma oblique; pod short, turgid, few-seeded..... 30. *Ormosia*
2. Stigma terminal; pod elongated, moniliform, several-seeded..... 31. *Sophora*

1. Stamens more or less united, mon- or diadelphous.
2. Fruit a loment, that is, ultimately separating into indehiscent, 1-seeded joints, rarely reduced to a single joint (*Monarthrocarpus*), or not jointed (*Pseudarthria*), and very rarely dehiscent (*Pycnospora, Desmodium* § *Pleurolobium*).
3. Leaves pinnate; leaflets 5 or more, not stipellate.
4. Stamens united into two phalanges of five each.
5. Erect shrubs; joints of the pod longitudinally ribbed, somewhat muricate ..... 42. *Ormocarpum*

5. Herbs; joints of the pods not ribbed.
6. Leaves odd-pinnate; pod exserted ..... 43. *Aeschynomene*
6. Leaves even-pinnate; pod folded together within the calyx. 44. *Smithia*
4. Stamens united into a closed tube; leaves even-pinnate, the rachis ending in a bristle; cultivated herbs with hypogeal fruit ..... 45. *Arachis*
3. Leaves digitately 2-foliolate; joints of the pod muricate ..... 46. *Zornia*
3. Leaves pinnately 3-foliolate or reduced to a single leaflet; leaflets mostly stipellate; vexillary filament free or more or less united with the others.
4. Ovary with from 2 to many ovules.
5. Pod equaling or exceeding the calyx, exserted.
6. Articulations of the pod distinct.
7. Pod flattened ..... 47. *Desmodium*
7. Pod cylindric ..... 51. *Alysicarpus*
6. Pod obscurely or not articulated, but with transverse lines between the seeds, or with transverse reticulations.
7. Pod flat, indehiscent, thin, with transverse lines between the seeds ..... 49. *Pseudarthria*
7. Pod inflated, dehiscent, with transverse reticulations. 50. *Pycnospora*
5. Pod folded together within the calyx.
6. Calyx-teeth setaceous, not accrescent; leaflets longer than broad; flowers in very dense, spike-like or capitate racemes ..... 52. *Uraria*
6. Calyx-teeth lanceolate, accrescent; leaflets as broad, or broader than long; flowers few, in lax racemes ..... 53. *Loureo*
4. Ovary 1-ovuled; pods indehiscent, with a single seed.
5. Scandent; flowers and fruit completely hidden by a large, membranaceous, accrescent bract ..... 54. *Phylacium*
5. Erect or suberect, herbaceous or suffrutescent; flowers and fruits not inclosed by bracts.
6. Leaflets 1- or 3-foliolate, ample, stipellate ..... 48. *Monarthrocarpus*
6. Leaflets 3-foliolate, small, exstipellate ..... 55. *Lespedeza*
2. Fruit a dehiscent or indehiscent pod, not jointed.
3. Leaves simple or with three or more digitately arranged leaflets.
4. Leaves simple.
5. Trees ..... 61. *Inocarpus*
5. Herbs or undershrubs.
6. Stamens monadelphous; herbs with inflated, several- to many-seeded pods ..... 32. *Crotalaria*
6. Stamens diadelphous; seeds few.
7. Pods dehiscent.
8. Shrubby; leaves petioled, ample; flowers and fruits hidden by large, thin, persistent bracts ..... 85. *Flemingia*
8. Herbs with sessile or subsessile leaves, the flowers not hidden by bracts.
9. Erect herbs from tuberous rootstocks; pod oblong, turgid. 84. *Eriosema*
9. Roots not tuberous; pods globose, 1-seeded, or linear and several-seeded ..... 34. *Indigofera*
7. Pod indehiscent, 1-seeded; leaves glandular, petioled; racemes dense ..... 35. *Psoralea*
4. Leaves with 3 or more digitately arranged leaflets.
5. Stamens monadelphous; pods inflated ..... 32. *Crotalaria*

5. Stamens diadelphous.
6. Leaflets narrow, small; pods linear ..... 34. *Indigofera*
6. Leaflets large, ovate; pods inflated..... 85. *Flemingia*

3. Leaflets pinnately 3-foliolate.
4. Leaflets not stipellate.
5. Pods indehiscent.
6. Herbs with small, toothed leaflets; pods small, falcate or spiral. 33. *Medicago*
6. Woody vines with ample, entire leaflets; pods flat, winged down one side ..... 59. *Derris*
5. Pods dehiscent.
6. Leaves not glandular-dotted beneath ..... 78. *Pueraria*
6. Leaves glandular-dotted beneath.
7. Ovules 4 or more.
8. Scandent, herbaceous; stigma small, terminal; seeds strophiolate or substrophiolate.
9. Pod acuminate, hardly depressed between the seeds; funicle expanded, but seeds not distinctly strophiolate. 81. *Dunbaria*
9. Pod obtuse or apiculate-acuminate, deeply transversely lineate between the seeds; strophiole large.... 82. *Cantharospermum*
8. Erect, shrubby; stigma dilated, oblique; seeds not strophiolate; pods acuminate, with depressed lines between the seeds. 80. *Cajanus*
7. Ovules 2; scandent ..... 83. *Rhynchosia*
4. Leaflets not stipellate, the stipels replaced by large glands; trees with large red flowers ..... 70. *Erythrina*
4. Leaflets stipellate.
5. Style bearded below the stigma.
6. Stigma oblique.
7. Keel spirally twisted ..... 86. *Phaseolus*
7. Keel not spiral.
8. Style filiform; flowers mostly yellow; leaflets entire..... 87. *Vigna*
8. Style flattened upwards; flowers blue; leaflets sinuate-toothed; root large, turnip-shaped ..... 89. *Pachyrrhizus*
6. Stigma terminal.
7. Pod flattened, not winged ..... 88. *Dolichos*
7. Pod square, 4-winged ..... 90. *Psophocarpus*
5. Style not bearded below the stigma.
6. Stamens monadelphous, the vexillary filament more or less united with the others.
7. Nodes of the raceme not swollen.
8. Anthers uniform, all fertile ..... 68. *Glycine*
8. Five stamens bearing fertile anthers, the alternating five sterile. 69. *Teramnus*
7. Nodes of the raceme swollen.
8. Upper lip of the calyx projecting, distinctly longer than the lower one ..... 79. *Canavalia*
8. Upper lip of the calyx not, or but slightly exceeding the lower one.
9. Pods large, turgid, few-seeded (unknown in *Luzonia*); flowers medium to large.
10. Fertile stamens 10 ..... 77. *Macropsychanthus*

10. Fertile stamens 6.
11. Calyx-teeth connate into two lobes, the upper one minutely 2-toothed, the lower minutely 3-toothed.... 76. *Luzonia*
11. Upper two calyx-teeth connate into an entire or minutely 2-toothed lobe, the lower three calyx-teeth distinct, about as long as the upper lobe..... 75. *Dioclea*
9. Pods small, narrow, elongated, many-seeded; flowers small to medium; fertile stamens 10 ..... 78. *Pueraria*
6. Stamens diadelphous, the vexillary one free from the others.
7. Pod indehiscent, membranaceous, oblong, with faint transverse lines between the seeds ..... 49. *Pscudarthria*
7. Pod indehiscent, coriaceous, reticulated; with no transverse lines, 1-seeded ..... 48. *Monarthrocarpus*
7. Pod dehiscent only at the seed-bearing apex, elsewhere seedless and indehiscent, thin; scandent woody vines..... 73. *Spatholobus*
7. Pod dehiscent from end to end.
8. Nodes of the racemes not swollen.
9. Petals very unequal; flowers large; pods prominently longitudinally ridged ..... 65. *Centrosema*
9. Petals subequal; flowers small; pods not longitudinally ridged.
10. Pods with transverse lines between the seeds, or with transverse reticulations; erect or ascending herbaceous or suffruteseent plants.
11. Pods thin, flat, dehiseent by the lower suture, with transverse lines between the seeds; flowers pink or purplish. 47. *Desmodium*
11. Pod short, inflated, with numerous transverse reticulations; flowers blue ..... 50. *Pycnospora*
10. Pods with no transverse lines or reticulations; herbaeeous vines.
11. Style filiform; calyx-teeth distinet..... 67. *Shuteria*
11. Style flattened upwards; calyx truncate..... 66. *Dumasia*
8. Nodes of the raeemes swollen.
9. Flowers large; petals very unequal; herbaeeous or woody vines.
10. Keel exceeding the wings and standard; pods flat, variously grooved or smooth, often with stinging hairs. 72. *Mucuna*
10. Keel and standard equal, wings short; pods thiek, glabrous, not grooved ..... 71. *Strongylodon*
9. Flowers small; petals subequal; herbaeeous vines. 74. *Galactea*

3. Leaves pinnately 5- to many-foliolate.
4. Leaves even-pinnate.
5. Rachis terminating in a tendril..... 62. *Pisum*
5. Rachis not terminating in a tendril.
6. Vines with pink flowers and flat pods..... 63. *Abrus*
6. Erect, suffrutescent, coarse herbs with yellow flowers, or trees with very large white flowers; pods very long, subcylindric, septate between the seeds ..... 40. *Sesbania*
4. Leaves odd-pinnate.
5. Pods ultimately dehiscing by both sutures.

6. Herbaceous or suffrutescent, if erect shrubs then with subcylindric pods.
7. Anthers apiculate, hairs centrally fixed; erect suffrutescent herbs, or shrubs; pods cylindric or 4-angled ..... 34. *Indigofera*
7. Anthers obtuse, hairs basifixed; pods flat ..... 37. *Tephrosia*
6. Trees; pods flat.
7. Racemes terminal or in the upper axils ..... 38. *Millettia*
7. Racemes from the branches below the leaves ..... 39. *Gliricidia*
6. Scandent woody or somewhat herbaceous vines.
7. Flowers large, axillary, solitary; pods flat; leaflets 5 to 7. 64. *Clitorea*
7. Flowers small, in dense racemes; pods turgid; leaflets numerous. 41. *Clianthus*

5. Pods indehiscent.
6. Erect herbs with small leaflets and dense, subcapitate inflorescence of small blue flowers ..... 36. *Parosela*
6. Erect shrubs or small trees with racemose flowers; pods ellipsoid or oblong-ovoid, 1-seeded, almost berry-like, not at all flattened. 60. *Euchresta*
6. Erect trees or scandent woody shrubs; pods flattened.
7. Leaflets distinctly alternate; pods winged.
8. Large trees; flowers yellow, medium-sized; pods orbicular. 57. *Pterocarpus*
8. Scandent shrubs or small trees; flowers small, pink or white; pods elongated, narrow ..... 56. *Dalbergia*
7. Leaflets opposite.
8. Pod thick, not winged; erect trees ..... 58. *Pongamia*
8. Pod thin, winged; scandent shrubs ..... 59. *Derris*

1. SERIANTHES Benth.

1. **Serianthes grandiflora** (Wall.) Benth. in Hook. Lond. Journ. Bot. **3** (1844) 225, Trans. Linn. Soc. **30** (1875) 599; Miq. Fl. Ind. Bat. **1**[1] (1855) 40; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 301; F.-Vill. Nov. App. (1880) 75; Naves in Blanco Fl. Filip. ed. 3, *pl. 454;* Vidal Sinopsis Atlas (1883) *t. 44, f. E,* Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. Filip. (1886) 121; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 251.

Inga grandiflora Wall. Cat. (1832) no. 5285.

Negros, *For. Bur. 5616 Everett.* Palawan, *For. Bur. 3800 Curran.* Dinagat, *Ahern 447.* Mindoro (*Cuming 1592*).[7] Negros (*Vidal 288*).

Native names: *Jonoc* (Dinagat); *casay* (Negros).

In beach forests, Malay Peninsula and Archipelago to New Guinea and the Aru Islands.

2. ENTEROLOBIUM Mart.

1. **Enterolobium saman** (Jacq.) Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 252.

Mimosa saman Jacq. Fragm. (1800–1809) 15, *t. 9.*

Inga saman Willd. Sp. Pl. **4** (1805) 1024.

Pithecolobium saman Benth. in Hook. Lond. Journ. Bot. **3** (1844) 216, Trans. Linn. Soc. **30** (1875) 587; F.-Vill. Nov. App. (1880) 76; Naves in Blanco Fl. Filip. ed. 3, *pl. 309.*

[7] Specimens cited in parentheses not seen.

Calliandra saman Griseb. Fl. Brit. West Ind. (1864) 225.

LUZON, Manila, *Merrill 11, Decades Philip. Forest Fl. 276, For. Bur. 10793 Curran, Sabino 403.* PALAWAN, *For. Bur. 4133 Curran, Bur. Sci. 878 Foxworthy.*

A native of tropical America, introduced into the Philippines about the year 1860, and now widely cultivated as a shade tree in towns throughout the Archipelago; subspontaneous in some localities. It is locally known as *"acacia"*; the rain tree of the West Indies.

3. PITHECOLOBIUM Mart.

Armed with spinescent stipules; seeds arillate; pinnæ and leaflets 1-jugate.
1. *P. dulce*

Unarmed; seeds without arillus.

Pods deeply lobed between the seeds, the lobes extending more than half way or quite to the upper suture and turned regularly and alternately right and left, dehiscent only opposite the seeds..... 2. *P. scutiferum*

Pods only faintly or not at all sinuate on the lower suture between the seeds, the dehiscence continuous.

Pinnæ 1–2-jugate; leaflets few, medium to large, 2–3-jugate.

Pinnæ 1-jugate.

Leaflets 12 to 15 cm long; pods nearly straight, flattened, not at all twisted, 3.5 cm broad..... 3. *P. platycarpum*

Leaflets less than 12 cm long; pods very strongly curved, sometimes twisted, less than 2 cm broad..... 4. *P. pauciflorum*

Pinnæ 2-jugate.

Leaflets 10 cm long or less; pods less than 2 cm wide.
5. *P. mindanaense*

Leaflets up to 20 cm in length; pods about 3 cm wide.... 6. *P. ellipticum*

Pinnæ mostly 4- to 10-jugate; leaflets small, all more or less rhomboidal, numerous, 5- to 20-jugate.

Pinnæ 2–4-jugate; distal leaflets larger than the lower ones.
7. *P. angulatum*

Pinnæ 6–10-jugate; leaflets equal or subequal, the terminal pair not larger than the others.

Leaflets rhomboid, 5 to 10 mm wide..... 8. *P. subacutum*

Leaflets rhomboid-linear or rhomboid-oblong, 2 to 3 mm wide.
9. *P. prainianum*

1. **Pithecolobium dulce** (Roxb.) Benth. in Hook. Lond. Journ. Bot. 3 (1844) 199, Trans. Linn. Soc. 30 (1875) 572; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 302; F.-Vill. Nov. App. (1880) 75; Vid. Rev. Pl. Vasc. Filip. (1886) 121; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 61; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 263.

Mimosa dulcis Roxb. Pl. Corom. 1 (1795) 67, *t. 99.*

Inga dulcis Willd. Sp. Pl. 4 (1805) 1005.

Inga camatchili Perr. Mém. Soc. Linn. Paris 3 (1824) 122; C. B. Rob. in Philip. Journ. Sci. 3 (1908) Bot. 305.

Mimosa unguis-cati Blanco Fl. Filip. (1837) 731, non Linn.

Inga lanceolata Blanco l. c. ed. 2 (1845) 370, ed. 3, 2: 322; Naves l. c. *pl. 237*, non H. & B.

LUZON, Province of Abra, *For. Bur. 14512 Darling:* Province of Ilocos Norte, *Bur. Sci. 2207 Mearns:* Province of Union, *Elmer 5613:* Province of Batangas, *Marave 71:* Province of Rizal, *Merrill 1640:* Province of Bataan, *Ahern 763,*

For. Bur. 1265, 1268 Borden, For. Bur. 63 Barnes, For. Bur. 2274 Meyer, Williams 380: Manila, *Merrill 654, For. Bur. 19009 Curran:* Province of Tayabas, *Ritchie s. n.* PALAWAN, *For. Bur. 3595 Curran.* PANAY, *Merrill 2410, For. Bur. 112 Gammill.* NEGROS, *For. Bur. 12319 Everett.* MINDANAO, District of Cotabato, *For. Bur. 3952 Hutchinson.*

A species of tropical America, introduced into the Philippines at an early date, and now spontaneous, very widely distributed and abundant in the Archipelago. From the Philippines it has been introduced into other parts of Malaya and into British India, being known in the latter country as the "Manila tamarind." It is known throughout the Philippines as *camonchiles* or *camonsiles*, or variations of the name, such as *camatsile, camanchiles, camonsil*, etc.

The fleshy aril surrounding the seeds is eaten, and the bark is extensively used in the Philippines for tanning leather.

2. **Pithecolobium scutiferum** (Blanco) Benth. in Hook. Lond. Journ. Bot. 3 (1844) 211; Miq. Fl. Ind. Bat. 1[1] (1855) 39; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 228.

Mimosa scutifera Blanco Fl. Filip. (1837) 735, ed. 2 (1845) 507, ed. 3, 3: 138.

Pithecolobium lobatum F.-Vill. Nov. App. (1880) 75; Naves in Blanco Fl. Filip. ed. 3, *pl. 438;* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 62, non Benth.

A widely distributed endemic species, represented by the numerous specimens cited previously by me, *l. c.*, extending from northern Luzon south to Ticao, Masbate, and Guimaras. Bentham originally considered it as a distinct species, but later,[8] and I believe erroneously, reduced it to the Malayan *P. lobatum* Benth., in which he has been followed by subsequent Philippine authors. The Philippine form is well distinguished from the Malayan one by its peculiar fruits, and is well represented by the plate in the third edition of Blanco's "Flora de Filipinas" cited above.

Native names: *Anagap* (in most islands and provinces where it occurs); *bunsilac* (Mindoro); *anagop* (Ticao); *anaguep* (Camarines); *bincalan* (Bataan); *bag* (Cagayan).

3. **Pithecolobium (?) platycarpum** sp. nov.

Arbor glabra circiter 5 m alta, ramis teretibus, lenticellatis; pinnis 1-jugatis, foliolis 2-jugatis, firmiter chartaceis, elliptico-oblongis, usque ad 15 cm longis, basi acutis, apice breviter acuminatis, nervis utrinque circiter 6, distinctis, anastomosantibus: leguminibus planis, subrectis, circiter 20 cm longis, 3.5 cm latis, basi longe stipitatis, utrinque dehiscentibus, leviter irregulariter sinuosis.

A glabrous tree about 5 m high. Branches terete, lenticellate, reddish-brown. Leaves alternate, pinnae 1-jugate, the petiole 2.5 to 3 cm long; leaflets 2-jugate, the rachis of the individual pinnae about 9 cm long, the leaflets firmly chartaceous, elliptic-oblong, 11 to 15 cm long, 5 to 6 cm wide, shining, gradually narrowed below to the acute base, the apex shortly and sometimes rather abruptly acuminate; nerves about 6 on each side of the midrib, distinct beneath, curved-ascending, anastomosing, the primary reticulations distinct, rather lax; petiolules 2 to 3 mm long. Flowers unknown. Pods pendent, flat, including the slender stipe about

[8] Trans. Linn. Soc. 30 (1875) 575.

20 cm long, 3.5 cm wide, smooth, shining, irregularly sinuate and dehiscent on both sutures, straight or nearly so, apex with a stout, somewhat incurved beak, the stipe slender, about 4 cm long. Seeds 6 or 7 in each pod, flattened, black, elliptic in outline, about 2 cm long.

LUZON, Province of Benguet, Twin Peaks, *Elmer 6439*, June 8, 1904.

A species in vegetative characters similar to *Pithecolobium scutiferum*, but distinguishable at once by its very different pods.

4. **Pithecolobium pauciflorum** Benth. in Lond. Journ. Bot. 3 (1844) 212; Miq. Fl. Ind. Bat. 1[1] (1855) 40; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 229.

LUZON, Province of Albay, *For. Bur. 10566 Curran*. LEYTE, *For. Bur. 11639 Whitford, For. Bur. 12893 Rosenbluth*. BOHOL, *Cuming 1854* (cotype). MINDANAO, Province of Surigao, *Bolster 286*.

Native names: *Malatagum* (Albay); *panauisaming* (Surigao).

An endemic species, erroneously reduced by Bentham [9] to *Pithecolobium lobatum* Benth., from which it is quite distinct in vegetative and fruit characters.

5. **Pithecolobium mindanaense** sp. nov. § *Clypearia*.

Arbor parva, subglabra; foliis bipinnatis, pinnis 2-jugatis, foliolis 2- vel 3-jugatis, elliptico-ovatis vel oblongo-ovatis, chartaceis vel submembranaceis, usque ad 12 cm longis, basi acutis, apice plerumque abrupte obtuse acuminatis, interdum caudato-acuminatis, nervis utrinque 3 vel 4, prominentibus, valde obliquis; floribus sessilibus, capitato-dispositis; leguminibus circinatis, 10 ad 12 cm longis, circiter 1.5 cm latis, in sicco extus nigris vel brunneis, intus rubris.

A small tree (4 m high *fide* Clemens), glabrous or nearly so, or the branchlets and inflorescence at first slightly pubescent. Branches terete, light-gray or brown, somewhat lenticellate. Leaves bipinnate, the petiole and rachis varying from 5 to 10 cm in length, with from two to four small sessile glands on the upper surface; pinnae 2-jugate; leaflets 2- or 3-jugate, those on the upper pair of pinnae usually 3-jugate, those on the lower pair 2-, rarely 1-jugate, elliptic-ovate to oblong-ovate, chartaceous or submembranaceous, slightly shining when dry, 7 to 12 cm long, 3 to 5 cm wide, the base acute, the apex usually rather abruptly acuminate, the acumen blunt, or sometimes the apex caudate-acuminate; nerves prominent, curved-ascending, 3 or 4 on each side of the midrib, the reticulations lax; petiolules about 2 mm long. Panicle-branches very slender, elongated, the flowers sessile, in heads of from three to five flowers each at the ends of the branchlets, the bracts and bracteoles small, about 1.5 mm long, obtuse, oblong. Calyx about 1.5 mm long, glabrous, with five broad teeth. Corolla 5 mm long, the lobes somewhat acuminate, veined. Stamens about 50, nearly 1.5 cm long. Pods 10 to 12 cm in length, about 1.5 cm wide, curved into an almost complete circle, glabrous, ultimately dehiscing by both sutures, before dehiscence not sinuate between the seeds, the base acute, the apex rounded, when

[9] Trans. Linn. Soc. 30 (1875) 575.

dry black or dark-brown outside, red within. Seeds 8 to 10 in each pod, elliptic, somewhat compressed, black when dry, about 12 mm long.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.* (type), May, 1907, also *no.* 277, February, 1906, and unnumbered specimens collected in June and September, 1907. BASILAN, *DeVore & Hoover 96*, and apparently also a sterile specimen collected on that island by *Hallier, s. n.*

The above species is recognizable by its bipinnate leaves, the pinnæ being 2-jugate, and the leaflets 2- or 3-jugate, by its strongly and obliquely nerved leaflets which are abruptly and usually prominently blunt-acuminate, its slender panicle-branches, capitate sessile flowers, and its pods, which are curved into an almost complete circle.

6. **Pithecolobium ellipticum** (Blume) Hassk. in Retzia 1 (1855) 225; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 270, 516; Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) Bot. 104.

Inga elliptica Blume Cat. Gew. Buitenzorg (1823) 88; Walp. Repert. 1 (1842) 930.

Pithecolobium fasciculatum Benth. in Hook. Lond. Journ. Bot. 3 (1844) 208; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 304.

PALAWAN, *For. Bur. 4144 Curran.* MINDANAO, District of Zamboanga, *Copeland s. n., Williams 2094.*

Malay Peninsula and Archipelago.

7. **Pithecolobium angulatum** (Grah.) Benth. in Hook. Lond. Journ. Bot. 3 (1844) 208, Trans. Linn. Soc. 30 (1875) 580; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 306; F.-Vill. Nov. App. (1880) 76; Perk. Frag. Fl. Philip. (1904) 4; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 274.

Inga angulata Grah. in Wall. Cat. (1832) no. 5271.

LUZON, Province of Tayabas, *Whitford 650, For. Bur. 10743 Curran.* POLILLO, *Bur. Sci. 6869 Robinson, Bur. Sci. 10765 McGregor.* MINDORO, *Merrill 1799, McGregor 138, For. Bur. 3692, 4100, 5321, 9881, 11498 Merritt.* PALAWAN, *For. Bur. 3477 Curran, Bur. Sci. 748 Foxworthy.* MASBATE, *For. Bur. 1716 Clark.* GUIMARAS, *For. Bur. 270 Gammill.* NEGROS, *For. Bur. 5574 Everett.*

Native names: *Saga, barocmoc, bahay* (Mindoro); *bunsicag* (Palawan); *bagatngo* (Negros).

This species is exceedingly variable, and extends from India to the Malay Peninsula, Sumatra, Java, and Borneo.

The typical form, with terminal leaflets 7 to 12 cm long, which Prain has designated as var. *heterophylla*, is not found in the Philippines, but rather the var. *intermedia* Prain, characterized by its more numerous pinnæ, and smaller, more numerous leaflets.

8. **Pithecolobium subacutum** Benth. in Hook. Lond. Journ. Bot. 3 (1844) 210, Trans. Linn. Soc. 30 (1875) 578; Miq. Fl. Ind. Bat 1 [1] (1855) 37; F.-Vill. Nov. App. (1880) 76; Vid. Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. Filip. (1886) 121.

Mimosa scutifera var. *(casai)* Blanco Fl. Filip. (1837) 736, ed. 2 (1845) 508, ed. 3, 3: 138; Naves l. c. *pl.* 447.

Pithecolobium montanum Perk. Frag. Fl. Philip. (1904) 5; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 61, non Benth.?

BATANES ISLANDS, Sabtan, *Bur. Sci. 3740 Fénix.* LUZON, Province of Cagayan, *Bur. Sci. 7782 Ramos, For. Bur. 17069 Curran, For. Bur. 6656 Klemme, For. Bur. 14798 Darling:* Province of Isabela, *For. Bur. 18551 Alvarez:* Province of Benguet, *Elmer 6088, Bur. Sci. 2708 Mearns, Williams 1290:* Province of Ilocos Norte,

Bur. Sci. 7639 Ramos: Province of Zambales, *For. Bur. 6501 Aguilar, Hallier s. n., For. Bur. 6334 Curran, Merrill 2926:* Province of Nueva Vizcaya, *For. Bur. 18397 Alvarez:* Province of Bataan, *For. Bur. 2746 Borden, Williams 688:* Province of Pangasinan, *For. Bur. 9634 Zschokke:* Province of Bulacan, *For. Bur. 11137 Aguilar:* Province of Laguna, *Hallier s. n., For. Bur. 10042, 10068 Curran, For. Bur. 7702 Curran & Merritt:* Province of Rizal, *Bur. Sci. 106 Foxworthy, Merrill 1622, 5048, 2330, For. Bur. 2444 Ahern's collector:* Province of Sorsogon, *For. Bur. 10540 Curran.* CULION, *Merrill 579.* PALAWAN, *Bur. Sci. 688 Foxworthy.* SAMAR, *For. Bur. 12883 Rosenbluth.* LEYTE, *Elmer 7114.* NEGROS, *For. Bur. 17403 Curran.*

Native names: *Tugayong, narandauel, saplit* (Cagayan); *carisquis, ayamguitan* (Zambales); *tugurare* (Pangasinan); *inep* (Bulacan); *malasaga, malaganip, tekin* (Laguna); *bahay* (Sorsogon); *tagomtagom* (Samar); *tique* (Rizal); *casai, malacamonsili, alobahai,* ex Blanco.

Celebes (*fide* Koorders).

This species is exceedingly variable, but after a careful study of the material cited above, I feel confident that all the specimens are referable to one species. The variability seems to parallel that of the preceding form. As I have no authentic material of *Pithecolobium montanum* Benth. for comparison, I am unable to determine the points of difference between the two. It is barely possible that *P. subacutum* Benth., is only a form or variety of *P. montanum* Benth. The two species are placed by Bentham under separate series, *Sessiliflorae* and *Pedicellatae*, but in our Philippine material the flowers appear to be indifferently pedicelled, subsessile or sessile. The plate in the third edition of Blanco's "Flora de Filipinas," cited above, well represents the species.

9. **Pithecolobium prainianum** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 61, l. c. 2 (1907) Bot. 276.

Pithecolobium parvifolium Merr. Govt. Lab. Publ. (Philip.) 29 (1905) 19, non Benth.

Pithecolobium montanum var. *microphylla* Benth. Trans. Linn. Soc. 30 (1875) 581; Vidal Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. Filip. (1886) 121, non *P. microphyllum* Benth.

P. montanum Vid. Sinopsis Atlas (1883) *t. 45, f. A.* ?, non Benth.

LUZON, District of Lepanto, *For. Bur. 14488 Darling:* Province of Benguet, *Topping 128, For. Bur. 928 Barnes, For. Bur. 4919, 10893 Curran, Elmer 5863, Bur. Sci. 2713 Mearns, Williams 1322, For. Bur. 18303 Alvarez:* Province of Pampanga, *Merrill 3836:* Province of Bataan, *Whitford 1179, Merrill 3876, For. Bur. 2790 Meyer:* Province of Tayabas, *For. Bur. 7837 Curran & Merritt.* MINDORO, *Merrill 5702, For. Bur. 8508, 8719 Merritt.* LEYTE, *For. Bur. 12623 Rosenbluth.*

Borneo, Java.

This species is usually found at higher altitudes than any of the preceding ones, and is frequently found in exposed ridge-forests on mountains, ascending to at least 1600 m. It shows a tendency to intergrade with the preceding species, through such forms as *Fénix 3740,* and *Elmer 7114.* On the whole, however, it appears to be fairly constant, and readily distinguishable by its very small leaflets.

DOUBTFUL AND EXCLUDED SPECIES.

PITHECOLOBIUM BIGEMINUM Mart. This is credited to the Philippines by F.-Villar, Nov. App. (1880) 75, and by Stapf, Trans. Linn. Soc. Bot. II 4 (1894) 144. I have seen no Philippine specimens, and the typical form of Martius' species probably does not extend to the Archipelago.

PITHECOLOBIUM CLYPEARIA Benth. Credited to the Philippines by Usteri, Beitr. Ken. Phil. Veg. (1905) 117, but probably an erroneous identification for *P. angulatum* Benth., or *P. subacutum* Benth.

4. ALBIZZIA Durazz.

Leaflets small or medium-sized, mostly oblong, ovate-oblong or linear-oblong, never more than 5 cm in length.

Scandent shrub; the petioles subtended by a thick, curved, hook-like pulvinus. 1. *A. scandens*

Erect trees or shrubs; pulvinus not enlarged.

Leaflets oblong or ovate-oblong, obtuse, 1.5 to 5 cm long, the costa central or subcentral.

Flowers sessile; the portion of the leaflet on the upper side of the costa broader than the lower ..... 2. *A. procera*

Flowers pedicelled; leaflets subequilateral or the lower half broader than the upper.

Leaflets subequilateral; umbels few-flowered; flowers, including the stamens, 1.5 cm long; stamens purplish ..... 3. *A. retusa*

Leaflets inequilateral, the portion on the lower side of the midrib manifestly broader than the upper; umbels many-flowered; flowers including the stamens, about 3 cm long, white ..... 4. *A. lebbeck*

Leaflets small, linear or linear-oblong, usually more or less falcate and less than 1.5 cm in length, the costa strongly excentric, near the upper margin; flowers sessile.

Pinnæ usually 4- to 6-jugate; costa distinct from the upper margin of the leaflets ..... 5. *A. lebbekoides*

Pinnæ usually 9- to 15-jugate; costa close to the upper margin of the leaflets; stipules large, inequilateral, ovate, cordate, caducous, 2 to 2.5 cm long ..... 6. *A. marginata*

Leaflets large, ovate, acute or acuminate, the upper ones 10 to 18 cm long.

Pinnæ 2-jugate; leaflets pubescent with short appressed hairs beneath; inflorescence terminal; pods flat, not at all inflated, thin, dehiscent, 20 cm long or less ..... 7. *A. saponaria*

Pinnæ 1-jugate; leaflets entirely glabrous; inflorescence axillary; pods indehiscent strongly inflated opposite the seeds, 25 to 40 cm long ..... 8. *A. acle*

1. **Albizzia scandens** Merr. in Philip. Journ. Sci. 4 (1909) Bot. 265.

PALAWAN, Iwahig, *Bur. Sci. 829 Foxworthy*, May, 1906. In thickets near the seashore.

Endemic.

2. **Albizzia procera** (Roxb.) Benth. in Lond. Journ. Bot. 3 (1844) 89, Trans. Linn. Soc. 30 (1875) 564; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 299; Miq. Fl. Ind. Bat. 1[1] (1855) 21; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 259, 513; F.-Vill. Nov. App. (1880) 75; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 62.

Mimosa procera Roxb. Pl. Coromandel 2 (1798) 12, *pl. 121.*

Acacia procera Willd. Sp. Pl. 4 (1805) 1063.

Mimosa coriaria Blanco Fl. Filip. (1837) 734, ed. 2 (1845) 506, ed. 3, 3: 136.

Albizzia retusa Perk. Frag. Fl. Philip. (1904) 6, non Benth.

LUZON, Province of Abra, *For. Bur. 14513, 14552, 14634 Darling:* Province of Ilocos Norte, *For. Bur. 13848 Merritt & Darling:* Province of Ilocos Sur, *For. Bur. 13025 Paraiso, For. Bur. 5241 Klemme:* Province of Union, *For. Bur. 14140 Merritt & Darling, Elmer 5692:* Province of Benguet, *Williams 1286, For. Bur.*

4900, 10866 Curran, For. Bur. 1410 Merritt & Darling: Province of Pampanga, *For. Bur. 9621 Zschokke:* Province of Zambales, *Merrill 2909, 3006, For. Bur. 6022, 6505 Aguilar:* Province of Rizal, *For. Bur. 5193 Curran, Merrill 2703:* Province of Bataan. *Merrill 1516, Williams 373, 726, For. Bur. 20005 Topacio, Whitford 41. For. Bur. 158 Barnes, For. Bur. 5271 Curran, Elmer 6892, For. Bur. 1270, 1292, 1293, 1310, 1382, 1555, 1567, 1620, 1823 Borden.* Mindoro. *For. Bur. 8756, 8819, 9704 Merritt. For. Bur. 11322 Rosenbluth.*

Native names: *Adaan* (Abra, Ilocos Norte and Sur, Union, Benguet); *calay* (Abra); *daan* (Benguet); *caral* (Pangasinan); *alalangad* (Pampanga, Bataan); *anapla* (Pampanga, Rizal); *carail* (Zambales); *aclong parang* or *acle parang* (Zambales, Bataan, Mindoro); *anapla* (Mindoro); *anitap, agangao, dariangao,* ex Blanco.

An abundant species in the regions where it is found, occurring especially at low altitudes in thickets and in open grass lands, but in some provinces reaching an altitude of at least 1,000 m. Nepal to Central China, Andaman Islands, Malay Archipelago to New Guinea and northern Australia; not as yet found in the Malay Peninsula.

3. **Albizzia retusa** Benth. in Hook. Lond. Journ. Bot. **3** (1844) 90, Trans. Linn. Soc. **30** (1875) 563; Miq. Fl. Ind. Bat. 1[1] (1855) 23; Vid. Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. Filip. (1886) 120; F.-Vill. Nov. App. (1880) 75.

Mimosa lebbek Blanco Fl. Filip. (1837) 733, ed. 2 (1845) 506, ed. 3, **3**: 135, non Linn.

Albizzia littoralis Teysm. & Binn. Nat. Tijdschr. Ned. Ind. **29** (1867) 259; Prain in Journ. As. Soc. Beng. **66**[2] (1897) 257, 512; Koord. & Valet. Meded. 's Lands Plant. **11** (1894) 301; Benth. Trans. Linn. Soc. **30** (1875) 648; Merr. in Forest. Bureau (Philip.) Bull. **1** (1903) 23.

Albizzia procera "Teysm. & Binn.;" Perk. Frag. Fl. Philip. (1904) 5, non Benth.

Luzon, Province of Cagayan, *For. Bur. 11309 Klemme, For. Bur. 13114 Bernardo, For. Bur. 16969 Curran, Bur. Sci. 7433 Ramos:* Province of Ilocos Norte, *Cuming 1223* (type number): Province of Tayabas, *For. Bur. 10181, 10302 Curran, Merrill 10274:* Province of Camarines, *For. Bur. 10689 Curran, Ahern 69.* Mindoro, *Cuming 1593, For. Bur. 3685, 9878 Merritt, Whitford 1433, Merrill 1213.* Palawan, *For. Bur. 3837 Curran, For. Bur. 11250 Manalo.* Balabac, *Bur. Sci. 508 Mangubat.* Leyte, *For. Bur. 12637 Rosenbluth.* Mindanao, District of Davao, *Williams 2696, Copeland 557.*

Native names: *Tagolo, malenab* (Cagayan); *saplit* (Principe); *casay* (Camarines, Mindoro, Palawan); *sintog* (Davao); *langil* ex Blanco.

This species is apparently confined to the beach forests, at least in the Philippines, and is rather widely distributed, extending from the Nicobar Islands and Penang to Java, Amboina, Celebes, and the Caroline Islands (Yap, *Volkens 525*, distributed as *Albizzia retusa* Benth.). The type of *Albizzia retusa* was from the Philippines, *Cuming 1223*, supplemented by *Cuming 1593;* the former has leaflets somewhat smaller than those of typical *A. littoralis*, but the latter has them intermediate in size, while among the numerous specimens cited above all intergradations can be found. The retuse apices of the leaflets is by no means a constant character. The original description of *Albizzia littoralis* calls for flowers sessile or minutely pedicelled, but Koorders and Valeton, who had before them authentic material collected by Teysmann in Amboina, state that the pedicels are 3 to 4 mm long, which agrees with our Philippine material. The gland characters given by Prain to distinguish this species from *Albizzia procera* will not hold, as glands are found on both the primary and secondary

rachises in both species. It can at once be distinguished from *A. procera* by its pedicelled flowers, and entirely different pods. It is manifestly closely allied to *Albizzia lebbeck*, although very distinct from that species. The pods of the two are very similar.

4. **Albizzia lebbeck** (Linn.) Benth. in Hook. Lond. Journ. Bot. 3 (1844) 87, Trans. Linn. Soc. 30 (1875) 562 (*lebbek*); Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 298; F.-Vill. Nov. App. (1880) 75; Naves in Blanco Fl. Filip. ed. 3. *pl. 316;* Vidal Rev. Pl. Vasc. Filip. (1886) 120. Sinopsis Atlas (1883) *t. 45. fig. E;* Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 257.

Mimosa lebbeck Linn. Sp. Pl. (1753) 516.

Acacia lebbeck Willd. Sp. Pl. 4 (1805) 1066.

Luzon, Province of Ilocos Sur, *Bur. Sci. 10098 McGregor:* Manila, *Ahern 721, 741, Merrill 2777, For. Bur. 19015, 19061 Curran* (all from cultivated trees: Province of Bataan, *For. Bur. 15559 Curran* (from cultivated tree). Palawan, *For. Bur. 15044 Danao.*

This species is almost certainly not a native of the Philippines; all the specimens seen from Luzon are from cultivated trees, but Danao states that the specimen from Palawan came from the forest. It appears to be wild in the drier parts of Africa and Asia, and is now widely cultivated in many parts of the world, China, Japan, West Indies, South America, etc. Most authors have followed DeCandolle and Bentham and spelled the specific name "*lebbek*," the original is, however, "*lebbeck*."

5. **Albizzia lebbekoides** (DC.) Benth. in Hook. Lond. Journ. Bot. 3 (1844) 89, Trans. Linn. Soc. 30 (1870) 568; Koord. & Valet. Meded.'s Lands Plantent. 11 (1894) 306; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 62; Prain in Journ. As. Soc. Beng. 66 [2] (1897) 513.

Acacia lebbekoides DC. Prodr. 2 (1825) 467; Decne. Ann. Mus. Paris 3 (1834) 461.

Mimosa carisquis Blanco Fl. Filip. (1837) 734, ed. 2 (1845) 507; ed. 3, 3: 137.

Albizzia julibrissin F.-Vill. Nov. App. (1880) 75, non Durazz.

Luzon, Province of Abra, *For. Bur. 14521 Darling:* Province of Ilocos Norte, *For. Bur. 13806 Merritt & Darling:* Province of Nueva Ecija, *For. Bur. 14324 Saroca:* Province of Pangasinan, *For. Bur. 8345 Curran & Merritt:* Province of Rizal, *For. Bur. 1126, 1857, 3305 Ahern's collector:* Province of Bataan, *Whitford s. n., For. Bur. 6347 Curran.* Mindoro, *For. Bur. 9815 Merritt.*

Native names: *Malaghanip* (Rizal); *carisquis* (Abra, Ilocos Norte, Nueva Ecija).

Usually found at low altitudes, and often back of mangrove swamps, ascending to 600 m in Abra.

Burma and Siam to Java and Timor.

6. **Albizzia marginata** (Lam.) comb. nov.

Mimosa marginata Lam. Encycl. 1 (1783) 12.

Mimosa stipulata Roxb. Hort. Beng. (1814) 40, nomen, Fl. Ind. 2 (1832) 549 (*stipulacea*).

Acacia marginata Ham. in Wall. Cat. (1832) no. 5243, nomen.

Albizzia stipulata Boiv. Encycl. XIX Siècle 2: 33; Benth. in Hook. Lond. Journ. Bot. 3 (1844) 92, Trans. Linn. Soc. 30 (1875) 568; F.-Vill. Nov. App. (1880) 75; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 300; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 255, 515; Koord. & Valet. Meded. 's Lands Plantent. 11 (1894) 303.

Albizzia julibrissin Vid. Cat. Pl. Prov. Manila (1880) 28; Perk. Frag. Fl. Philip. (1904) 5, non Durazz.

Luzon, Province of Abra, *For. Bur. 14523 Darling:* Province of Nueva Vizcaya, *For. Bur. 18021 Merritt, For. Bur. 10861 Curran:* Manila, *Ahern 743:* Province of Rizal, *Merrill 1865, Decades Philip. Forest Fl. 215 Ahern's collector:* Province of Tayabas, *For. Bur. 6040 Kobbe:* Province of Bataan, *For. Bur. 17319 Curran, For. Bur. 13377 Cortes.*

Native names: *Malagahanip* (Tayabas); *malatiqui* (Rizal); *malasampaloc* (Bataan).

Tropical Asia to the Andaman Islands, Southern China, Java, and probably other islands of the Malay Archipelago.

I can see no valid reason why Lamarck's specific name should not be adopted, as it is much the earliest one for the species. Bentham[10] states that it is evident from the description and citation that Lamarck's species is referable to *Albizzia stipulata* Boiv., and not to *A. odoratissima* Benth. Lamarck's specimens were from Pondichéry, and he also refers to Rheede, Hort. Malabar. 6: 9, *tab. 5*, as representing the species. The reference to *Albizzia marginata* Ham. Wall. Cat. no. 5243, in "Index Kewensis," does not constitute a valid transfer. Most of the specimens cited above have been distributed as *Albizzia julibrissin* Durazz., but some of the material recently collected shows the very large stipules characteristic of *Albizzia marginata*, hence the specimens are here referred to the latter.

7. **Albizzia saponaria** (Lour.) Blume ex Miq. Fl. Ind. Bat. 1[1] (1855) 19; Benth. in Trans. Linn. Soc. **30** (1875) 561; Vidal Rev. Pl. Vasc. Filip. (1886) 120; Perk. Frag. Fl. Philip. (1904) 6.

Mimosa saponaria Lour. Fl. Cochinch. (1790) 653.

Inga saponaria Willd. Sp. Pl. 4 (1805) 1008.

Albizzia lucida Merr. in Forestry Bureau (Philip.) Bull. 1 (1903) 23, non Benth.

Albizzia tomentella Merr. l. c., non Miq.?

Luzon, Province of Ilocos Norte, *For. Bur. 13883 Merritt & Darling, For. Bur. 14696 Darling:* Province of Ilocos Sur, *For. Bur. 5266 Klemme:* Province of Benguet, *For. Bur. 5132 Curran:* Province of Pangasinan, *For. Bur. 8269 Curran & Merritt:* Province of Pampanga, *For. Bur. 9612 Zschokke, For. Bur. 5779 Curran, Merrill 1390:* Province of Bataan, *For. Bur. 1563, 1932 Borden, For. Bur. 1498 Ahern's collector, For. Bur. 5298, 5468 Curran, Merrill 1515, For. Bur. 849 Maule, For. Bur. 20001 Topacio:* Province of Rizal, *Decades Philip. Forest Flora no. 84 Ahern's collector, Bur. Sci. 132 Foxworthy, For. Bur. 3339 Ahern's collector, For. Bur. 5195 Curran, Bur. Sci. 1509 Ramos:* Province of Laguna, *For. Bur. 10049 Curran:* Province of Tayabas, *For. Bur. 12268 Rosenbluth, Merrill 2602, For. Bur. 10285 Curran:* Province of Camarines, *For. Bur. 10424 Curran:* Province of Albay, *Bur. Sci. 2878, 2879 Mearns.* Mindoro, *McGregor 260, Merrill 2213, 2368, 2451, 2469, For. Bur. 11419 Merritt.* Ticao, *For. Bur. 1012 Clark.* Masbate, *Merrill 3377, For. Bur. 1009 Clark, Whitford 1681.* Guimaras, *For. Bur. 305 Gammill.* Samar, *For. Bur. 12884 Rosenbluth.* Leyte, *Elmer 7340.* Negros, *For. Bur. 17423 Curran.* Mindanao, District of Zamboanga, *Williams 2095, For. Bur. 9003 Whitford & Hutchinson, Ahern 395, For. Bur. 9520 Hutchinson:* Province of Surigao, *Ahern 678, For. Bur. 7575 Hutchinson.* Basilan, *Hallier s. n.*

Native names: *maratica* (Ilocos Norte and Sur); *gogon-toco* (Pangasinan, Pampanga, Rizal, Bataan); *malatuco* (Pampanga, Rizal, Laguna); *gogo-casay* (Tayabas); *salunguigui* (Mindoro, Ticao, Masbate); *salukugui* (Samar); *pipi* (Negros); *saluncugui, salancugui, siangcugi* (Mindanao).

The range of this species is somewhat doubtful, but it is probably rather widely

[10] Trans. Linn. Soc. **30** (1875) 569.

distributed in the Malay Archipelago. It was based on the description and very crude figure of *Cortex saponarius* given by Rumphius in "Herbarium Amboinense" 4 (1743) 131, *pl. 66*. I believe that there is very little doubt but that the material cited above represents the species, and consider it very doubtful if *Albizzia tomentella* Miq. will prove to be distinct. The bark contains a considerable amount of saponin, and is used throughout the Philippines as a substitute for soap. The species is variable in vegetative characters, large and small leaflets being frequently found on the same specimen.

8. **Albizzia acle** (Blanco) comb. nov.

Mimosa acle Blanco Fl. Filip. (1837) 738, ed. 2 (1845) 509, ed. 3, **3**: 140.

Xylia dolabriformis Vid. Cat. Pl. Prov. Manila (1880) 28; F.-Vill. Nov. App. (1880) 73, non Benth.

Pithecolobium acle Vid. Rev. Pl. Vasc. Filip. (1886) 121; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 61, Forestry Bureau (Philip.) Bull. **1** (1903) 23; Perk. Frag. Fl. Philip. (1904) 4.

A tree, reaching a height of 25 or 30 m, glabrous or nearly so except the inflorescence. Branches terete, gray or brown, usually strongly lenticellate. Leaves bipinnate, the petiole 2 to 5 cm long, with a single large gland at the apex; pinnæ a single pair only, their rachises with a gland between each pair of petiolules; leaflets 2- to 4-jugate, the uppermost ones of each pinna the largest, when young very thinly membranaceous, becoming chartaceous, or ultimately even subcoriaceous, ovate to elliptic-ovate or oblong-ovate, often somewhat inequilateral, the largest ones up to 18 cm long and sometimes 8 cm wide, the lower ones smaller, shining when dry, the base acute or rounded, the apex distinctly blunt- or sharp-acuminate; nerves about 6 on each side of the midrib, distinct, anastomosing, the reticulations rather lax; petiolules 1.5 to 3 mm long. Inflorescences usually appearing with the leaves, axillary, softly pubescent, of many, fasciculate, rather densely disposed short panicles, the ultimate branches or peduncles to the heads of flowers 4 cm long or less. Flowers greenish-white, sessile, 10 to 15 in each head. Calyx somewhat tubular, pubescent, about 3 mm long, with 5 short teeth. Corolla pubescent, narrowly funnel-shaped, about 7 mm long. Stamens many, much exserted. Pods 20 to 40 cm long, varying from 3.5 to 5 cm in width, straight, indehiscent, thickly coriaceous, the base usually acute, the apex acuminate or rounded, sometimes slightly retuse and apiculate, constricted between the seeds, but without dissepiments, opposite the seeds much inflated, ultimately breaking irregularly across the pods at the constrictions between the seeds, and also breaking from the continuous and somewhat thickened margins. Seeds 10 to 12 in each pod, elliptic, about 2 cm long, 1.5 cm wide, and 7 or 8 mm thick, dark-reddish-brown, not arillate, marked on both sides with a horseshoe-shaped scar or line.

Luzon, Province of Ilocos Sur, *For. Bur. 13001 Paraiso:* Province of Nueva Ecija, *For. Bur. 11053 Saroca, For. Bur. 9602 Zschokke:* Province of Pangasinan, *For. Bur. 14355 Villamil:* Province of Zambales, *Merrill 2974, Hallier s. n., For. Bur. 8123 Curran & Merritt, For. Bur. 11041 Zschokke, For. Bur. 5816, 5835*

Curran: Province of Rizal, *Merrill 1306, 1635, 5035, Decades Philip. Forest Flora no. 53 Ahern's collector:* Province of Bataan, *Whitford 35, 1367, Williams 371, Elmer 6688, For. Bur. 5291, 6291, 6375 Curran, Bur. Sci. 1566 Foxworthy, For. Bur. 687, 689, 720 Borden, For. Bur. 366, 507 Barnes:* Province of Tayabas, *Merrill 2047, 2595, For. Bur. 1251 Rosenbluth, For. Bur. 14944 Darling, For. Bur. 6666 Kobbe, For. Bur. 11517 Whitford, Hagger s. n., For. Bur. 10261 Curran:* Province of Camarines, *Ahern 142:* Province of Sorsogon, *For. Bur. 10622 Curran.* Mindoro, *For. Bur. 9723bis Merritt.* Palawan, *For. Bur. 7429, 11249 Manalo, Curran s. n.* Masbate, *For. Bur. 995 Clark, For. Bur. 12579, 12602 Rosenbluth.* Negros, *For. Bur. 11238 Everett, For. Bur. 18230 Rosenbluth.*

Native names: *Acle* (in most islands and provinces where it is found, and its commercial name); *quitaquita* (Ilocos Sur, Pangasinan, Zambales); *tili, teles* (Zambales): *langin* (Masbate); *sauriri* (Palawan); *banuyo* (Negros).

After a careful study of the above material, I am convinced that the species must be referred to *Albizzia*, rather than to *Pithecolobium*, where it was placed by Vidal. It differs from *Pithecolobium*, at least from the majority of the species now referred to that genus, in its straight and indehiscent pods, the first character being true of all species of *Albizzia* known to me, while a number of species have indehiscent pods. The seeds of *Albizzia acle* have on both sides rather distinct horseshoe-shaped markings, corresponding to the circular, oblong, oval, or elliptic markings on the seeds of *Albizzia* spp., and *Entcrolobium saman*, while none of the species of *Pithecolobium* in this herbarium show corresponding scars or lines. The bark of *Albizzia acle* contains a considerable amount of saponin, like that *Albizzia saponaria* Blume, and like that of the latter species, is used by the natives as a substitute for soap; I know of no species of *Pithecolobium* having this property. The wood of this species has been described by Foxworthy;[11] it is dark-colored, moderately hard and heavy, and in structure and properties much more like that of various species of *Albizzia* than of *Pithecolobium*. Among the Philippine species it is most closely allied to *Albizzia saponaria* Bl.

Albizzia acle is a valuable timber tree in the Philippines, and is widely distributed at low altitudes. It is commercially known as *acle*, and the timber is used for many purposes.

Endemic.

EXCLUDED SPECIES.

Albizzia lucida (Roxb.) Benth.; F.-Vill. Nov. App. (1880) 75.

An Asiatic species, doubtfully extending to Singapore and Java, and not definitely known from the Philippines. Probably an erroneous identification on the part of F.-Villar for some form of *A. saponaria* Bl.

Albizzia odoratissima (L. f.) Benth.; F.-Vill. l. c.

Like the preceding, a species not definitely known from the Philippines. Probably an erroneous identification for *A. lebbekoides* Benth.

5. WALLACEODENDRON Koorders.

1. **Wallaceodendron celebicum** Koord. Meded. 's Lands Plantent. 19 (1898) 146, 631; Gilg in Engl. & Prantl Nat. Pflanzenfam. Nachtr. 2 (1900) 30; Merr. Forest. Bureau (Philip.) Bull. 1 (1903) 23, Philip. Journ. Sci. 3 (1908) Bot. 409; Perk. Frag. Fl. Philip. (1904) 5.

Pithecolobium williamsii Elm. Leafl. Philip. Bot. 1 (1907) 223.

Babuyanes Islands, Camiguin, *Bur. Sci. 4098 Fénix:* Province of Cagayan,

[11] *This Journal* 2 (1907) Botany 269.

For. Bur. 11302 Klemme, For. Bur. 17129, 17274 Curran, For. Bur. 18430, 18527 Alvarez, For. Bur. 13116 Bernardo: Province of Isabela, *For. Bur. 18574 Alvarez:* Province of Benguet, *Elmer 8833* (type number of *Pithecolobium williamsii* Elm.): Province of Tayabas, *Merrill 2026, For. Bur. 10343, 10380 Curran:* Province of Camarines, *Ahern 49bis, For. Bur. 10468, 10655 Curran.* Ticao, *For. Bur. 15791 Rosenbluth, For. Bur. 2533 Clark.* Burias, *For. Bur. 1730 Clark.* Masbate, *For. Bur. 12605, 12825 Rosenbluth.* Samar, *For. Bur. 12844 Rosenbluth.* Negros, *For. Bur. 8506 Everett.*

Native names: *Banuyo* (Tayabas, Samar, Masbate, Burias, Ticao, Camarines); *lupigui* (Cagayan, Isabela); *melmel, dauer* (Cagayan).

A monotypic genus at present known only from Celebes and the Philippines, growing especially near the seashore, but also occurring inland and at considerable altitudes. It undoubtedly belongs in the *Mimosoideae-Ingeae*, although in fruit characters it is closer to some of the genera in *Mimosoideae-Piptadenieae*. It is well characterized by its dehiscent pods, the exocarp of which is not transversely jointed, and which is free from the transversely septate endocarp, the latter forming a somewhat loose, parchment-like, more or less inflated envelope surrounding each seed, quite similar to that of *Entada*, and doubtless an adaptation for dispersal of the seeds by water. The timber is of considerable value, and has been considered by Foxworthy,[12] under the head of *Banuyo*.

6. ACACIA Willd.

Leaves reduced to simple, flat, narrowly lanceolate, somewhat falcate phyllodia, 6 to 11 cm long; heads axillary, solitary, pedunculed ..... 1. *A. confusa*

Leaves all bipinnate.

Erect shrubs or small trees with stipular spines; heads solitary or fascicled, axillary; pods cylindric ..... 2. *A. farnesiana*

Scandent shrubs with non-spinescent stipules and with prickly branches; heads mostly panicled, sometimes axillary; pods flat.

Heads fascicled or subpaniculately racemose at the nodes; pods thickened, more or less depressed and septate between the seeds..... 3. *A. rugata*

Heads usually in terminal panicles; pods thin, not septate between the seeds.

Leaflets oblong, 2 to 3 mm wide, not closely crowded, the costa submedian, at least well removed from the upper margin..... 4. *A. caesia*

Leaflets linear to linear-oblong, 1 to 1.3 mm wide, crowded, the costa close to the upper margin, at least near the base of the leaflets.

5. *A. pennata*

1. **Acacia confusa** sp. nov.

Acacia richii Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1887) 215; Perk. Frag. Fl. Philip. (1904) 6; Mats. & Hayata Enum. Pl. Formosa (1906) 117; non A. Gray.

Arbor glabra 6 ad 15 m alta, differt a *A. richii* A. Gray phyllodinis angustioribus longioribusque, distincte plus falcatis, nervis paucioribus, leguminibus angustioribus, capitulis solitariis, non fasciculatis.

A glabrous tree 6 to 15 m high. Branches terete, gray or brown, lenticellate, the branchlets rather slender. Phyllodes narrowly lanceolate, subcoriaceous, rather distinctly falcate, 6 to 11 cm long, 5 to 8 mm wide, gradually narrowed at both ends, the apex rather blunt, sometimes subacute; nerves about 5, distinct. Heads axillary, solitary, about 5

[12] *This Journal* 2 (1907) Botany 376.

mm in diameter, the peduncles slender, about 1 cm long. Flowers yellow, with a faint odor, the calyx 2 mm long. Pods 4 to 9 cm long, 7 to 10 mm wide, dark-colored when dry, shining, base acute or acuminate, the apex acute or somewhat curved-apiculate, somewhat inflated opposite the seeds and frequently constricted between them, scarcely reticulated. Seeds 4 to 8 in each pod, elliptic, compressed, 5 mm long, their longer diameter arranged parallel with the pod, not at right angles to it.

Luzon, Province of Zambales, *Merrill 2114* (type), *For. Bur. 5922, 7010 Curran.* Formosa, *Henry 774.*

Acacia richii is said to be represented also by the following Formosan specimens, which I have not seen: *Oldham 193, Swinhoe s. n., Ford s. n., fide* Forbes & Hemsley; *Faurie 41, 141, fide* Matsumura and Hayata.

After a careful examination of the Philippine material, and a specimen of *Henry 774* from Formosa, and comparison of this material with the original description and figure, as well as with a typical phylloclade from the type collection of *Acacia richii* A. Gray, I am convinced that the form above described as *Acacia confusa* is specifically distinct from Gray's species. About four years ago Dr. C. B. Robinson, then at the New York Botanical Garden, called my attention to the differences between the Philippine material and the type collection of *A. richii*, and kindly supplied me with a fragment of the latter, expressing the opinion that two species were represented, an opinion in which I entirely concur.

Native names: *Ayañgili, nalisin* (Zambales).

Luzon and Formosa.

2. **Acacia farnesiana** (Linn.) Willd. Sp. Pl. 4 (1805) 1083; Benth. in Trans. Linn. Soc. **30** (1875) 502; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 292; Vid. Sinopsis Atlas (1883) *t. 45, fig. C,* Rev. Pl. Vasc. Filip. (1886) 119; F.-Vill. Nov. App. (1880) 74.

Mimosa farnesiana Linn. Sp. Pl. (1753) 521; Blanco Fl. Filip. (1837) 729, ed. 2 (1845) 504, ed. 3, **3**: 133.

Luzon, Province of Cagayan, *For. Bur. 17041 Curran:* Province of Abra, *For. Bur. 16561 Darling:* Province of Ilocos Sur, *For. Bur. 14083 Merritt & Darling:* Province of Union, *Elmer 5598:* Manila, *Merrill 3461:* Province of Laguna, *Elmer:* Province of Rizal, *Lieup 382, Merrill 1641:* Province of Bataan, *Elmer 7003, Williams 361:* Province of Tayabas, *Bur. Sci. 2359 Mearns.* Mindoro, *For. Bur. 8564 Merritt.* Masbate, *Merrill 3404.* Guimaras, *For. Bur. 47 Ritchie.* Mindanao, *For. Bur. 3915 Hutchinson, Copeland s. n.*

Quite universally known in the Philippines by the name *aroma,* of Spanish origin; in Ilocos Sur, *candaroma.*

Probably a native of tropical America, now widely distributed in the tropics of the world; common and widely distributed at low altitudes in the Philippines and entirely naturalized.

3. **Acacia rugata** (Lam.) Ham. in Wall. Cat. (1832) no. 5251.

Mimosa rugata Lam. Encycl. 1 (1783) 20.

Mimosa concinna Willd. Sp. Pl. 4 (1805) 1039.

Acacia concinna DC. Prodr. 2 (1825) 464; Benth. in Trans. Linn. Soc. **30** (1875) 531; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 296; Vid. Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. (1886) 120.

Acacia philippinarum Benth. in Hook. Lond. Journ. Bot. 1 (1842) 514, quoad no. 1166 Cuming.

LUZON, Province of Union, *Elmer 5689.*

Acacia philippinarum Benth. was based on two specimens, one of which is referable to *A. rugata* (*A. concinna*), to which Bentham himself reduced the species, and the other is *Acacia caesia* Willd.

Apparently not common in the Philippines; India to southern China and the Malay Archipelago.

4. **Acacia caesia** (Linn.) Willd. Sp. Pl. 4 (1805) 1090; Benth. in Trans. Linn. Soc. **30** (1875) 530; Perk. Frag. Fl. Philip. (1904) 6; Trimen Fl. Ceylon **2** (1894) 127.

Mimosa caesia Linn. Sp. Pl. (1753) 522.

Mimosa intsia Linn. l. c.

Acacia intsia Willd. l. c. 1091; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 297; F.-Vill. Nov. App. (1880) 74; Vid. Sinopsis Atlas (1883) *t. 45, fig. D,* Rev. Pl. Vasc. Filip. (1886) 120; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 62.

Acacia concinna Naves in Blanco Fl. Filip. ed. 3, *pl. 374,* non DC.

LUZON, Province of Ilocos Sur, *For. Bur. 5267 Klemme:* Province of Bataan, *Williams 478, Merrill 3796:* Province of Rizal, *Bur. Sci. 1431, 4578 Ramos, Merrill 2812, For. Bur. 3255 Ahern's collector.*

Native names: *Salsalomague* (Ilocos Sur); *daug, camat-cabay* (Bataan); *daug-manoc, sibog-aso* (Rizal).

Widely distributed in India and Ceylon, extending to Java and Sumatra, but not reported from the Malay Peninsula or from southern China. The specific name *caesia* has only page priority over *intsia* and has been here adopted following Bentham and Trimen. Trimen, *l. c.*, states that *Acacia intsia* can not be distinguished from *A. caesia*, even as a variety.

5. **Acacia pennata** (Linn.) Willd. Sp. Pl. 4 (1805) 1090; Benth. in Trans. Linn. Soc. **30** (1875) 530; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 297; Trimen Fl. Ceylon **2** (1894) 127; F.-Vill. Nov. App. (1880) 75; Vidal Phan. Cuming. Philip. (1885) 111, Rev. Pl. Vasc. Filip. (1886) 120; Prain Journ. As. Soc. Beng. **66**[2] (1897) 250, 510.

Mimosa pennata Linn. Sp. Pl. (1753) 522.

Mimosa tenuifolia Blanco Fl. Filip. (1837) 739, ed. 2 (1845) 510, ed. 3, **3**: 141, non Linn.

BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4038 Fénix.* LUZON, Province of Rizal, *For. Bur. 2891 Ahern's collector, Merrill 1660.*

Native name: *Sibog* (Rizal).

Var. **arrophula** (Don) Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 298; Prain l. c.

PALAWAN, *Bur. Sci. 897 Foxworthy.*

Var. **pluricapitata** (Steud.) Baker l. c.; Prain l. c.

LUZON, Province of Tayabas, *Elmer 9340.*

Tropical Asia and Africa to southern China, the Malay Peninsula and Archipelago.

Acacia pennata (L.) Willd, as interpreted by recent botanists, contains several rather distinct forms, three of which are found in the Philippines. I am not at all sure that the specimens above referred to the species represent the typical form. As here interpreted, it is characterized by its small and raised basal petiolar gland, with few small glands on the rachis, and its axillary, fascicled or solitary heads, which are sometimes arranged in short racemes. The var. *arrophula* is characterized by a large basal petiolar gland, with few small ones on the upper part of the rachis, while the var. *pluricapitata* is distinguished by its heads being arranged in ample terminal panicles, small, raised basal petiolar gland, and numerous small glands on the rachis, one between every pair of pinnæ,

except the lower three or four. Prain[13] has expressed the opinion that both the varieties *arrophula* and *pluricapitata* are worthy of specific rank, but that the point can only be determined satisfactorily by a monographic revision of the Indian species. I have here followed Baker and Prain, as there is not sufficient Indian material in our herbarium to determine the limits of the various forms.

Acacia holosericea A. Cunn. ex G. Don Gen. Syst. 2 (1832) 407; Benth. Fl. Austr. 2 (1864) 411.

This Australian species has been recently introduced, and is cultivated at Lamao, Province of Bataan, Luzon, where it has been collected by Mr. Cuzner, by Mr. Curran, *For. Bur. 12404*, and by Dr. Shaw.

7. LEUCAENA Benth.

1. **Leucaena glauca** (Linn.) Benth. in Hook. Journ. Bot. 4 (1842) 416, Trans. Linn. Soc. 30 (1875) 443; Baker in Hook f. Fl. Brit. Ind. 2 (1878) 290; F.-Vill. Nov. App. (1880) 74; Vid. Sinopsis Atlas (1883) *t. 45, fig. B;* Naves in Blanco Fl. Filip. ed. 3, *pl. 400.*

Mimosa glauca Linn. Sp. Pl. (1753) 520.

Acacia glauca Willd. Sp. Pl. 4 (1805) 1075.

Luzon, Province of Union, *Elmer 5565, 5654:* Province of Ilocos Sur, *For. Bur. 14021, 14022 Merritt & Darling:* Province of Nueva Ecija, *For. Bur. 11055 Saroca:* Province of Cavite, *Bur. Sci. 1287 Mangubat:* Province of Bataan, *For. Bur. 7515 Curran:* Province of Laguna, *Williams 2047:* Manila, *Merrill 49, McGregor 39:* Province of Rizal, *Merrill 2730, 1880:* Province of Tayabas, *Whitford 566:* Province of Albay, *Bur. Sci. 2897, Mearns.* Panay, *For. Bur. 113 Gammill.* Basilan, *For. Bur. 3970 Hutchinson.*

Native names: *Agho* (Panay); *datels* (Leyte); *comcompitis* (Ilocos Sur); in some provinces (Cavite, Pampanga, Rizal, Nueva Ecija, etc.), erroneously called *aele*, which properly belongs to *Albizzia aele.*

A native of tropical America, now widely distributed in tropical and subtropical parts of the world; very abundant and widely distributed in the Philippines at low altitudes, the timber being used for house posts and for firewood. In Leyte the seeds are used by the natives as a substitute for coffee.

8. SCHRANKIA Willd.

1. **Schrankia quadrivalvis** (Linn.) comb. nov.

Mimosa quadrivalvis Linn. Sp. Pl. (1753) 522; Blanco Fl. Filip. (1837) 732, ed. 2 (1845) 506, ed. 3, 3: 135.

Schrankia aculeata Willd. Sp. Pl. 4 (1805) 1041; Benth. in Trans. Linn. Soc. 30 (1875) 441; F.-Vill. Nov. App. (1880) 74.

Mindanao, Province of Misamis, Cagayan, *L. Borja,* December, 1907. Luzon, Province of Batangas, Bauang (*fide Blanco*).

This genus is confined entirely to America, except for the above species which appears to be the only one that has established itself in the East. It was probably introduced into the Philippines at the time the colony was governed as a dependency of Mexico, when all communication between Spain and the Philippines was via Vera Cruz and Acapulco, Mexico. In spite of its apparently early introduction, it does not appear to be at all common in the Philippines. The earliest specific name is adopted.

Native name: *Bulong-siri* (Misamis).

[13] Journ. As. Soc. Beng. 66[2] (1897) 250.

9. MIMOSA Linn.

1. **Mimosa pudica** Linn. Sp. Pl. (1753) 518; Willd. Sp. Pl. 4 (1805) 1031; Benth. in Trans. Linn. Soc. 30 (1875) 397; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 291; Naves in Blanco Fl. Filip. ed. 3, *pl. 253.*

Mimosa asperata Blanco Fl. Filip. (1837) 732. ed. 2 (1845) 505, ed. 3, 3: 134, non Linn.

Luzon, Province of Isabela, *Merrill 199:* Province of Benguet, *Williams 919:* Province of Union, *Elmer 5573:* Manila, *Merrill 3468:* Province of Pangasinan, *Merrill 2867:* Province of Rizal, *For. Bur. 3195 Ahern's collector:* Province of Tayabas, *For. Bur. 7468 Reyes, Gregory 28, Merrill 2417:* Province of Albay, *Bur. Sci. 6257 Robinson.* Polillo, *Bur. Sci. 9211 Robinson.* Cebu, *Barrow 12.* Panay, *Yoder 18.*

Universally known among the natives as *macahia* (literally "ashamed"). The sensitive plant.

Throughout the Philippines at low altitudes, in open lands. A native of tropical America, now widely distributed in the tropics of the world, and in many regions an extremely troublesome weed.

DOUBTFUL SPECIES.

Mimosa blancoana Llanos Mem. Acad. Cienc. Madrid 4 (1858) 503; Blanco Fl. Filip. ed. 3, 4[1] (1880) 103.

Nothing at all agreeing with the very imperfect description has been recently collected in the Philippines; it is possible that the description was based in part on fragmentary material of *Entada scandens.* It is not a *Mimosa.*

10. PROSOPIS Linn.

1. **Prosopis vidaliana** Naves in Ephem. "Oriente" (1877) *fide* F.-Villar, "Prosopis vidaliana" (1877) 1–19, *pl. 1, 2,* Blanco Fl. Filip. ed. 3. *pl. 392;* Vidal Cat. Pl. Prov. Manila (1880) 28, Sinopsis Atlas (1883) *t. 44, fig. C.*

Prosopis juliflora F.-Vill. Nov. App. (1880) 73; Perk. Frag. Fl. Philip. (1904) 7, non DC.

Luzon, Manila, *Merrill 370:* Province of Rizal, *Feliciano 291:* Province of Bataan, *Williams 379, For. Bur. 5934, 15562 Curran, Decades Philip. Forest Fl. no. 192 Borden, For. Bur. 56 Barnes.* Basilan, *Hallier s. n., DeVore & Hoover 72.*

This species was originally described by Naves in a daily or weekly paper published in Manila, and in the same year redescribed in detail and illustrated by two plates in a pamphlet entitled "Prosopis Vidaliana Naves. Descripción de la espécie botanica Prosopis Vidaliana de la Flora de Filipinas" issued to subscribers to the third edition of Blanco's "Flora de Filipinas." It was later reduced by F.-Villar to *Prosopis juliflora* (Sw.) DC. which reduction has been accepted by recent authors.

Having noticed that the Philippine material differed remarkably from the single American specimen in this herbarium labeled *Prosopis juliflora,* I asked Dr. J. N. Rose to compare the Philippine material in the United States National Herbarium with American specimens of *Prosopis.* This he has kindly done, and writes as follows: "I do not think your species is the same as any of our United States ones. It is not the same as the one of central and southern Mexico, which is probably *P. dulcis.* Neither do I think that it is *P. juliflora* of the West Indies. It resembles very much some unidentified material of mine from the west coast [of Mexico]. The pods of your Philippine plants are rather

peculiar in that they are straight below and with rather an abrupt bend near the top. It is a constant character."

I feel rather confident that this species is a native of Mexico, and that it was introduced into the Philippines at the time when communication with Spain and Manila was via Vera Cruz and Acapulco, in spite of the fact that it was not described by Father Blanco. While it is undoubtedly allied to *Prosopis juliflora*, and may possibly be interpreted as an extreme form of that variable species, it is considered best to retain it as a distinct species for the present.

11. ADENANTHERA Linn.

1. **Adenanthera intermedia** Merr. in Philip. Journ. Sci. 3 (1908) Bot. 228.

Mimosa virgata Blanco Fl. Filip. (1837) 737, non Linn.

Mimosa punctata Blanco l. c. ed. 2 (1845) 508, ed. 3, 3: 139, non Linn.

Adenanthera pavonina Auct. Philip., non Linn.

Widely distributed in the Philippines at low altitudes, represented by numerous specimens cited by myself l. c.

Native names: *Tañglin* (Bataan); *malabago* (Masbate); *baguiroro* (Albay); *pamiasin* (Zambales); *ipil-tañglin, butaric* (Cagayan); *malasagad* (Rizal); *quinasacasai*, ex Blanco.

Endemic.

12. ENTADA Adans.

Leaflets 3 to 10 cm long; pods 0.5 to 1 m long..... 1. *E. scandens*

Leaflets less than 1.5 cm long; pods 10 to 25 cm long..... 2. *E. parvifolia*

1. **Entada scandens** (Linn.) Benth. in Hook. Journ. Bot. 4 (1842) 332, Trans. Linn. Soc. 30 (1875) 363; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 287; F.-Vill. Nov. App. (1880) 73; Vid. Sinopsis Atlas (1883) *t. 44, fig. A.*

Mimosa scandens Linn. Sp. Pl. ed. 2 (1763) 1501.

Mimosa entada Linn. Sp. Pl. (1753) 518.

Adenanthera gogo Blanco Fl. Filip. (1837) 353.

Entada pursaetha DC. Prodr. 2 (1825) 425; Blanco Fl. Filip. ed. 2 (1845) 247, ed. 3, 2: 96.

Luzon, Province of Cagayan, *For. Bur. 16982 Bacani:* Province of Abra, *For. Bur. 16564 Darling:* Province of Benguet, *Elmer 8977:* Province of Pangasinan, *Alberto 48:* Province of Rizal, *For. Bur. 2901 Ahern's collector:* Province of Bataan, *For. Bur. 2542 Borden:* Province of Camarines, *For. Bur. 12256 Curran.* Polillo, *Bur. Sci. 9247, 9269 Robinson.* Mindoro, *For. Bur. 11423 Merritt.* Palawan, *For. Bur. 4500 Curran.* Leyte, *For. Bur. 12450 Danao.* Mindanao, *Mrs. Clemens 365.*

Native names: *Gogo* (in most Provinces in Luzon); *barugo* (Leyte); *balugo* (Mindoro); *lipai* (Abra, Ilocos Sur & Norte, Union); *bayogo, gogong-bacay*, ex Blanco.

Widely distributed in the tropics of the world, in the Philippines common, especially at low altitudes, the stems extensively used as a substitute for soap.

The nomenclature of this genus and species is somewhat complicated, and in accepting the above binomial I have followed general usage. As to the genus, *Entada* was first published in 1763[14] but is not the earliest proposed name. O. Kuntze[15] has adopted the generic name *Pusaetha* Linn. Fl. Zeyl. (1747) 236, in which he has been followed by Taubert,[16] but this name as a genus apparently

[14] Adans. Fam. 2 (1763) 318.

[15] Rev. Gen. Pl. (1891) 204.

[16] Engl. & Prantl Nat. Pflanzenfam. 3[3] (1894) 122.

has no standing according to any generally accepted rules, as it was not adopted by Linnaeus in his later works, and can hence be ignored. *Gigalobium*[17] is another synonym, but as to the validity of the publication of this as a generic name, I am unable to determine, as the work in question is not available here. Recently W. F. Wight[18] has taken up the binomial "*Lens phaseoloides* Stickman Herb. Amb. 1754; Amoen. Acad. 4: 128, 1759," which may be the earliest valid generic name, but which is apparently not the earliest specific designation; the generic name has moreover been generally adopted by later authors for an entirely different genus in the same family, and it is not reasonable to suppose than many botanists will willingly follow Wight's lead in adopting the generic name *Lens* in place of *Entada*, which will necessitate a new generic designation for the genus *Lens* Gren. & Godr., which in turn, according to "Index Kewensis," was based on the much earlier *Lens* (Tourn.) Linn. Syst. ed. 1 (1735). The case is not covered by the list of *nomina conservanda* of the Vienna Botanical Congress.

As to the specific name, the earliest valid one is apparently *Mimosa entada* Linn. Sp. Pl. (1753) 518, based on Fl. Zeyl. 219, and *Entada* Rheede Hort. Malabar. 9: 151, *t.* 67 (later authors, Trimen, Baker, etc., cite the plate as *t.* 77). According to Trimen[19] both references are *Entada scandens*. Bentham[20] has, however, referred *Mimosa entada* Linn. to *Entada polystachya* DC., an American species, after examining the specimen in the Linnean Herbarium. The specimen is, however, not the type of the species, and accordingly has no bearing on the case.

2. **Entada parvifolia** Merr. in Philip. Journ. Sci. 3 (1908) Bot. 229.

LUZON, Province of Zambales, *Hallier s. n., Bur. Sci. 4810, 5067 Ramos:* Province of Bataan, *For. Bur. 20028 Topacio.*

Native name: *Hinagui.*

Used as a substitute for soap.

Endemic.

13. PARKIA R. Br.

1. **Parkia timoriana** (DC.) comb. nov.

Inga timoriana DC. Prodr. 2 (1825) 442.

Mimosa biglobosa Roxb. Fl. Ind. 2 (1832) 551, non Jacq.

Parkia roxburghii G. Don Gen. Syst. 2 (1832) 397; Benth. in Trans. Linn. Soc. 30 (1875) 360; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 289; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 239; F.-Vill. Nov. App. (1880) 74; Vid. Sinopsis Atlas (1883) *t.* 44, *fig. D*, Rev. Pl. Vasc. Filip. (1886) 119; Perk. Frag. Fl. Philip. (1904) 7; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 62.

Acacia niopo Llanos Mem. Acad. Cienc. Madrid 4 (1858) 508, non HBK.

Mimosa peregrina Blanco Fl. Filip. (1837) 737, ed. 2 (1845) 509, ed. 3, 3: 139, non Linn.

LUZON, without locality, *Loher 2182:* Province of Zambales, *For. Bur. 5986 Curran:* Province of Bataan, *For. Bur. 89, 323 Barnes, Decades Philip. Forest Fl. no. 79 Barnes, Merrill 1530, 5142, Elmer 6888, For. Bur. 1290, 1320, 1518, 1549, 1614, 1626, 2132 Borden, Bur. Sci. 1569 Foxworthy, For. Bur. 5275 Curran:* Manila, *Ahern 702:* Province of Tayabas, *For. Bur. 17 Ware.* PALAWAN, *For. Bur. 5183 Manalo.*

Widely distributed in the Philippines at low altitudes, indigenous, never cultivated; quite universally known as *cupang.* Timor (typical form); cultivated

[17] P. Br. Hist. Jamaic. (1756) 362.

[18] Contr. U. S. Nat. Herb. 9 (1905) 307, 308, *pl. LVI.*

[19] Fl. Ceylon 2 (1894) 119.

[20] Trans. Linn. Soc. 30 (1875) 364.

in Java, and, according to Prain, in Indo-China, wild in Silhet, Cachar, and Chittagong.

Inga timoriana DC. was reduced by Bentham to *Parkia roxburghii* G. Don, and following the principles of priority, the earliest specific name must be adopted. In order to be sure of the identity of the Philippine plant with DeCandolle's species, material comprising flowers, fruits, and leaves of the Philippine plant, as well as fragments of two species cultivated in the Botanic Garden at Buitenzorg, labeled *Parkia intermedia* Hassk., and *P. roxburghii* G. Don, was sent to M. C. DeCandolle for comparison with the type of *Inga timoriana* DC. I am indebted to him for the following statement: "I have entrusted to M. Buser the comparisons you desired to be made of three specimens of *Parkia* with *Inga timoriana* DC. and *Parkia Roxburghii* Don, and of the latter with what we have here under *P. intermedia* Hassk., in view of ascertaining if they are distinct species. M. Buser has submitted to me his following conclusions in which I entirely concur.

"'Taking for the type of *Parkia intermedia* Hassk. the plant distributed under this name by Zollinger (n. 3586) there exists a complete identity with *intermedia* for the plant "ex Hort. Bot. Bogor. cult." under the name of *P. Roxburghii*, but not for the plant labeled, *ibidem*, *P. intermedia* Hassk.

"'*P. intermedia* Hassk. (=Zollinger n. 3586, n. 736) and *P. Roxburghii* G. Don (Wall. Cat. 5288) are certainly two distinct species (see leaflets and floral characters).

"'*Inga ? timoriana* DC. is the same plant as Barnes 323=*P. intermedia* Hort. Bogor. cult., and quite different from true *P. intermedia* Hassk. In a broad sense it may be identified with *P. Roxburghii* Don, as done by Bentham; in a more restricted specific conception it may be regarded as a species of secondary order.

"'**Roxburghii**: rhachide rotundato-angulata, foliolis utrinque glaberrimis, margine adpresse ciliatis, subconcoloribus, costa tenui, nervis secundariis inconspicuis, rhachilla tenuiore. Corollae segmentis extus hirsutis.

"'**Timoriana**: rhachide quadrangulari, foliolis utrinque, supra praesertim, plus minus pilosis, subtus pallidioribus, costa latiuscula, nervis secundariis supra subreticulate-prominulis, rhachilla latiore; corollae segmentis (Barnes 89) glaberrimis.'"

The specimens sent for comparison were *For. Bur. 323 Barnes* (leaves and fruits), with flowers of *For. Bur. 89 Barnes* from the same locality (Lamao River, Province of Bataan, Luzon), and two specimens from trees cultivated in the Botanic Garden at Buitenzorg, Java, one labeled "Cult. in Hort. Bog. I. B. 51, *Parkia intermedia* Hassk.," which is not Hasskarl's species, but is *Parkia timoriana*, and the other labeled "I. B. 4=48=50, *Parkia Roxburghii* Don," which is not Don's species but is *P. intermedia* Hassk. Prain[21] who has worked over the species of *Parkia* occurring in the Malay Peninsula, also expresses the opinion that *P. roxburghii* Don, and *P. intermedia* Hassk., are distinct. Comparative studies with a full series of specimens of typical *P. roxburghii* G. Don, and *P. timoriana* may show the distinguishing characters indicated above to be constant, and the two species worthy of specific rank, a point that is left for some future monographer to decide.

[21] Journ. As. Soc. Beng. 66 [2] (1897) 240.

14. ERYTHROPHLOEUM Afzel.

1. **Erythrophloeum densiflorum** (Elm.) Merr. in Philip. Journ. Sci. 4 (1909) Bot. 267.

Cynometra densiflora Elmer Leafl. Philip. Bot. 1 (1907) 222.

LUZON, Province of Cagayan, *For. Bur. 17198 Curran:* Province of Tayabas, *Elmer 9014* (type number), *For. Bur. 10154, 10215, 10272 Curran, For. Bur. 11513 Whitford, For. Bur. 12507 Rosenblunth.* MINDANAO, District of Zamboanga, *For. Bur. 9163 Whitford & Hutchinson* (probably, specimen sterile).

Native names: *Camatog, calamantao, tacloban* (Tayabas); *salsal* (Cagayan).

Endemic. Widely distributed in the Philippines at low and medium altitudes.

The generic distribution is peculiar, about five species being found in tropical Africa and Madagascar, one in Australia, one in the Philippines, and one in southern China.

Since the above transfer to *Erythrophloeum* was published, I have received a note from the Director of the Royal Gardens, Kew, verifying its correctness.

15. CYNOMETRA Linn.

Flowers on the stem and thick branches in racemes with a produced axis; pedicels glabrous; leaflets 1-jugate ..... 1. *C. cauliflora*

Flowers in the leaf-axils on the branchlets, in racemes or corymbs without a produced axis; pedicels puberulous.

Leaves pinnate, the leaflets 1-2-jugate.

Leaflets 2-jugate, the lower pair usually very much smaller than the upper.

Leaflets usually blunt-acuminate, the acumen broad and retuse at the apex; pods not or but slightly rugose ..... 2. *C. inaequifolia*

Leaflets usually acuminate, sometimes rounded, but scarcely retuse at the apex; pods rugose ..... 3. *C. bijuga*

Leaflets 1-jugate.

Leaflets 10 to 14 cm long ..... 4. *C. ramiflora*

Leaflets 1 to 6 cm long ..... 5. *C. warburgii*

Leaves reduced to single leaflets.

Leaflets up to 12 cm long, the apex sharply acuminate, the base broad, rounded, subcordate ..... 6. *C. luzoniensis*

Leaflets usually less than 10 cm in length, the apex broadly and bluntly acuminate, the base narrowed, acute ..... 7. *C. simplicifolia*

1. **Cynometra cauliflora** Linn. Sp. Pl. (1753) 382; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 268; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 197; F.-Vill. Nov. App. (1880) 71; Vidal Sinopsis Atlas (1883) *t. 43, fig. H;* Naves in Blanco Fl. Filip. ed. 3, *pl. 213.*

Cynometra acutiflora Vid. Rev. Pl. Vasc. Filip. (1886) 118, sphalm.

LUZON, Manila, *Vidal 1278, Loher 2205,* in Herb. Kew., from a specimen cultivated in the old Botanical Garden.

This species has properly no place in the Philippine flora, except as a cultivated plant, or one that was cultivated, as the tree from which Vidal and Loher collected their material is no longer in existence. Loher's specimen is labeled as having been collected in the Botanical Garden, but Vidal's specimen bears only the label "Luzon;" in his "Revision," however, he adds Manila, and tracing the matter back further, we find that his drawing in the "Sinopsis Atlas," was from this Botanical Garden specimen. F.-Villar's reference is undoubtedly to this same tree.

Malaya; cultivated occasionally in India and the Malay Peninsula, *fide* Prain. Koorders[22] says that in Java it is cultivated for its edible fruit, and thinks it probably a native of India.

2. **Cynometra inaequifolia** A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 473; F.-Vill. Nov. App. (1880) 71; Vid. Phan. Cuming. Philip. (1885) 110, Rev. Pl. Vasc. Filip. (1886) 118; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 63, 3 (1908) Bot. 82.

Schotia speciosa Blanco Fl. Filip. (1837) 356, ed. 2 (1845) 251, ed. 3, 2: 100, non Jacq.

Luzon, Province of Cagayan, *Cuming 1297* in Herb. Kew.: Province of Zambales, *For. Bur. 11038 Zschokke:* Province of Laguna, *Wilkes Expedition* in U. S. Nat. Herb. (type), *For. Bur. 10053 Curran:* Province of Batangas, *For. Bur. 7629 Curran & Merritt:* Province of Bataan, *Whitford s. n.:* Province of Rizal, *Merrill 1861, 2674, For. Bur. 2883 Ahern's collector, Bur. Sci. 3336 Ramos.*

Native names: *Dila-dila, cabilian* (Rizal); *palanapoy* (Zambales); *balitbitan*, ex Blanco.

Endemic?

This species has been reported from the Malay Peninsula by Baker[23] and Prain,[24] but from the extended description given by the latter it seems to me that the form from the Malay Peninsula is distinct from that of Luzon, that is, true *Cynometra inaequifolia* A. Gray. The species is very closely allied to *C. bijuga* Spanoghe, and seems to be distinguishable only by comparatively trivial characters, larger, rather more coriaceous leaves which are somewhat pale beneath, their apices obscurely broad-acuminate and somewhat retuse, the veins and reticulations prominent, not obscure as stated by Prain for this species, and its nearly smooth or only slightly rugose pods.

3. **Cynometra bijuga** Spanoghe in Linnaea 15 (1841) 201, nomen; Miq. Fl. Ind. Bat. 1[1] (1855) 78; Perk. Frag. Fl. Philip. (1904) 7.

Cynometra ramiflora subsp. *bijuga* Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 198.

Luzon, Province of Zambales, *Hallier s. n.* Leyte, *For. Bur. 12727 Rosenbluth.* Palawan, *For. Bur. 3785 Curran.*

Var. **mimosoides** (Wall.).

Cynometra mimosoides Wall. Cat. (1832) No. 5817.

Cynometra ramiflora var. *mimosoides* Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 267; Prain l. c.

Panay, *Cuming 1652.* Mindanao, *For. Bur. 11555 Whitford*, leaves only.

What I take to be typical *Cynometra bijuga* Spanoghe (*C. ramiflora* var. *heterophylla* Thwaites) extends, according to Prain, from Ceylon to the Andaman Islands, Johore, Perak, Singapore, Sumatra, Java, Borneo, and Timor. As to the specific name, Prain suggests that *Cynometra mimosoides* Wall. should be taken up according to strict priority, but like the original publication of *C. bijuga*, *C. mimosoides* was a *nomen nudum*. *C. bijuga* Spanoghe was, however, described in 1855, but I have found no record of a printed description of *C. mimosoides* Wall. before the year 1878, and then only as a variety of *C. ramiflora*. The var. *mimosoides* extends from Ceylon to India and the Andaman Islands.

[22] Meded. 's Lands Plantent. 11 (1894) 271.
[23] Hook. f. Fl. Brit. Ind. 2 (1878) 267.
[24] Journ. As. Soc. Beng. 66[2] (1897) 199.

4. **Cynometra ramiflora** Linn. Sp. Pl. (1753) 382, excl. syn. Rheede Hort. Malabar. 4: 65, *t. 31;* Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 267; F.-Vill. Nov. App. (1880) 71; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 197, var. *genuina.*

Luzon, Province of Cagayan, *For. Bur. 16967 Curran:* Province of Bulacan, *For. Bur. 7214 Curran:* Province of Tayabas (Infanta), *Whitford 847.*

Native name: *Comon* (Cagayan).

Ceylon to Java, Ceram, Amboina, and (?) northern Australia.

From an examination of the available Philippine and the scanty extra-Philippine material available here, I am inclined to consider this form specifically distinct from *C. bijuga* Spanoghe, its leaves apparently always being 1-jugate, while in the latter species they are 2-jugate. The specimens cited above are a very close match for *t. 63* of Rumphius's "Herbarium Amboinense," the first figure cited by Linnaeus in establishing the species. The typical and allied forms have been fully discussed by Prain, *l. c.*

5. **Cynometra warburgii** Harms in Notizbl. Kgl. Bot. Gart. Berlin 3 (1902) 187.

Luzon, Province of Cagayan, *Warburg 12427, 12086* in Herb. Berol.

Endemic.

Characterized by its 1-jugate, comparatively small leaflets.

6. **Cynometra luzoniensis** Merr. in Philip. Journ. Sci. 4 (1909) Bot. 266.

Luzon, Province of Tayabas, *Merrill 2128.*

Characterized by its simple leaves, the solitary leaflet sharply acuminate at the apex, the base broad, rounded and subcordate.

Endemic.

7. **Cynometra simplicifolia** Harms in Notizbl. Kgl. Bot. Gart. Berlin 3 (1902) 186; Merr. in Philip. Journ. Sci. 1 (1908) Suppl. 63.

Luzon, Province of Ilocos Sur, *Cuming 1134* (type number): Povince of Nueva Ecija, *For. Bur. 6035 Zschokke:* Province of Bataan, *For. Bur. 1737 Borden, Whitford s. n., For. Bur. 6390 Curran:* Province of Batangas, *For. Bur. 7628 Curran & Merritt:* Province of Tayabas, *For. Bur. 10351 Curran.* Mindoro, *Bur. Sci. 1537 Bermejos, For. Bur. 9908 Merritt.* Mindanao, District of Davao, *For. Bur. 11549 Whitford.* Basilan, *Hallier s. n.*

Native names: *Malatumbaga* (Nueva Ecija); *macanit* (Tayabas); *lanis* (Davao); *betis* (Batangas).

Endemic.

Var. **oblongata** var. nov.

Differt a typo foliis longioribus, oblongo-lanceolatis ad oblongo-ellipticis, sensim acuminatis, usque ad 14 cm longis.

The leaves are subcoriaceous, not pale beneath as is usually the case with *C. simplicifolia,* shining on both surfaces, gradually narrowed above to the apex, not blunt-acuminate, the base acute. The fruits are about 3 cm long and 2.2 cm wide, compressed, wrinkled when dry. Flowers unknown.

Luzon, Province of Rizal, *For. Bur. 2978 Ahern's collector, Bur. Sci. 3349, 5216 Ramos.* Locally known as *dila-dila.*

The specimens are all in fruit, and it seems probable that when flowers are collected that it will be found to be specifically distinct from *C. simplicifolia* Harms.

16. KINGIODENDRON Harms.

1. **Kingiodendron alternifolium** (Elmer) Merr. & Rolfe in Philip. Journ. Sci. 4 (1909) Bot. 267.

Cynometra alternifolia Elmer Leafl. Philip. Bot. 1 (1907) 223.

Hardwickia alternifolia Elmer l. c. 362.

Luzon, Province of Cagayan, *For. Bur. 14722 Darling:* Province of Tayabas, *For. Bur. 10327, 10354 Curran, Bath s. n.:* Province of Camarines, *For. Bur. 10671 Curran:* Province of Sorsogon, *For. Bur. 10624 Curran:* Province of Albay, *For. Bur. 15082 Rosenbluth.* Masbate, *Merrill 2761, Whitford 1679, For. Bur. 12668 Rosenbluth.* Ticao, *For. Bur. 12546 Rosenbluth, For. Bur. 1084 Clark.* Samar, *For. Bur. 12851 Rosenbluth.* Panay, *Vidal 2468* in Herb. Kew. Leyte. *For. Bur. 12711 Rosenbluth, Elmer 7366* (type number). Mindanao, District of Zamboanga, *For. Bur. 9007, 9301 Whitford & Hutchinson, For. Bur. 11036 Whitford, For. Bur. 6567 Hutchinson;* District of Davao. Samal Island, *For. Bur. 11550 Whitford.*

Native names: *Batete* (Ticao, Masbate); *dangay* (Tayabas, Camarines, Albay, Masbate); *magbalogo* (Samar); *salalangin* (Sorsogon); *duca* (Leyte); *palina* (Davao); *palo maria, bitanhol* (Zamboanga).

A genus of two known species, one in British India, and one in the Philippines. Endemic.

17. SINDORA Miq.

1. **Sindora supa** Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 198.

Sindora wallichii F.-Vill. Nov. App. (1880) 71; Vid. Sinopsis Atlas (1883) *t. 43, fig. C*, Rev. Pl. Vasc. Filip. (1886) 118, non Benth.

Luzon, Province of Tayabas, *For. Bur. 23 Ware, Whitford 910, For. Bur. 859, 860 Bath, Merrill 1010, 2021, 2596, 2611, For. Bur. 7098 Kobbe, For. Bur. 10232, 10240, 10332 Curran:* Province of Camarines, *For. Bur. 4533 Barredo, For. Bur. 10653 Curran:* Province of Albay, *For. Bur. 6678 Pray, For. Bur. 10592 Curran.* Mindoro, *For. Bur. 9863 Merritt.*

Almost universally known as *supa*, less commonly, and more especially the oil, as *manapo;* in Albay also known as *pauna.*

Endemic.

Very closely allied to *Sindora wallichii* Benth. of the Malay Peninsula.

As to the generic name, the question has been fully discussed by Prain,[25] who calls attention to the fact that the earliest figure and description of any species in the genus is *Caju Galedupa* of Rumph. Herb. Amboinense 2: 59, *t. 13*, on which, with *Pongam* of Rheede Hort. Malabar. 6: *t. 3*, Lamarck in 1786 based his genus *Galedupa*. The first citation given by Lamarck is to Rumphius's plate, from which also the generic name was taken. Technically, according to strict priority, the generic name for the species now placed under *Sindora* should be *Galedupa*, as Rumphius's figure is apparently a *Sindora*, and by no means the same as *Pongam* of Rheede. To complicate the matter, however, Lamarck's description both of the genus *Galedupa*, and the species *G. indica*, applies to *Pongam* of Rheede, as noted by Prain, and not at all to *Caju Galedupa* of Rumphius. In consideration of this fact I am of the opinion that *Galedupa* Lam., should be referred to *Pongamia* Vent., and that *Sindora* should be retained for the present genus. The case is not directly covered by the list of *nomina conservanda* of the Vienna Botanical Congress.

[25] Journ. As. Soc. Beng. 66 [2] (1897) 202, 479.

18. **CRUDIA** Schreb.

Leaflets 5 to 9, 4 to 8 or 9 cm long..... 1. *C. blancoi*
Leaflets 1 or 2, 11 to 13 cm long..... 2. *C. subsimplicifolia*

1. **Crudia blancoi** Rolfe in Journ. Linn. Soc. Bot. **21** (1884) 309; Vid. Phan. Cuming. Philip. (1886) 118.

Crudia spicata Blanco Fl. Filip. ed. 2 (1845) 261, ed. 3, 2: 121; Naves l. c. ed. 3, *pl. 244;* F.-Vill. Nov. App. (1880) 71; Vid. Sinopsis Atlas (1883) *t. 43, fig. B,* non Willd.

Apalatoa blancoi Merr. in Govt. Lab. Publ. (Philip.) **35** (1906) 19.

Luzon, Province of Pangasinan, *Merrill s. n.:* Province of Laguna, *For. Bur. 10082 Curran:* Province of Rizal, *For. Bur. 2661, 2956, 3074, 3136 Ahern's collector, Bur. Sci. 2142, 3559 Ramos, Merrill 2658:* Province of Camarines, *For. Bur. 10775 Curran:* Province of Bulacan, *Mrs. Templeton.*

Native name: *Malatumbaga* (Rizal, Laguna); *calatumbaga* (Bulacan).

Endemic.

Blanco's description is imperfect, and in some respects erroneous, probably due to a mixture of material, as suggested by F.-Villar.

2. **Crudia subsimplicifolia** sp. nov.

Arbor glabra, usque ad 10 m alta; foliis alternis, uni- vel bifoliolatis, foliolis oblongis vel elliptico-oblongis, subcoriaceis, usque ad 13 cm longis, basi acutis, apice admodum abrupte acute acuminatis; racemis axillaribus, solitariis vel binis, quam folia brevioribus.

A glabrous tree about 10 m high. Branches terete, light-grayish-brown. Leaves alternate, pinnate, sometimes with one leaflet, sometimes with two, but the leaflets when two never opposite. Petiole and rachis rather stout, about 1 cm long. Leaflets oblong or elliptic-oblong, subcoriaceous, slightly shining when dry and paler beneath than on the upper surface, the base acute, the apex rather abruptly and sharply acuminate, the acumen 1 to 1.5 cm long; nerves 7 or 8 on each side of the midrib, anastomosing, the reticulations distinct; petiolules stout, about 3 mm long. Racemes axillary, solitary or in pairs, 6 cm long or less (young), glabrous, or with very few short hairs; pedicels short, about 1 mm long, each subtended by a small, slightly ciliate-hairy bracteole. Sepals 4, in bud 2 to 2.5 mm long. Stamens 10. Ovary densely hairy.

Luzon, Province of Cagayan, San Vicente, *For. Bur. 4287 Klemme,* June, 1906, a specimen with immature flowers, altitude about 10 m. Locally known to the Negritos as *Tambali.*

A species manifestly closely allied to **Crudia bantamensis** (Hassk.) (*Touchiroa bantamensis* Hassk.; *Pryona bantamensis* Miq.), differing in its sharply acuminate, smaller leaflets, and glabrous or nearly glabrous racemes which are shorter than the leaves.

The oldest names for the genus are *Apalatoa* Aubl. and *Touchiroa* Aubl., but *Crudia* is here retained, following the list of *nomina conservanda* of the Vienna Botanical Congress. Prain notes that *Apalatoa* was based on a mixture of flowers of this genus and fruits of *Pterocarpus.*

19. TAMARINDUS Linn.

1. **Tamarindus indica** Linn. Sp. Pl. (1753) 34; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 273; Blanco Fl. Filip. (1837) 29, ed. 2 (1845) 20, ed. 3, 1: 39, Naves l. c. ed. 3, *pl. 14;* Vid. Sinopsis Atlas, *t. 43, fig. D.*

Widely distributed in the Philippines, especially in and about towns, apparently not indigenous in the Philippines, but introduced in prehistoric times. Probably a native of tropical Africa; planted throughout the tropics.

Native names: Tagalog *sampaloc;* Ilocano *salomague, salumagul;* Bicol *sambac;* Visayan *sambagui, sambag, sambalagui.* The Tamarind.

20. INTSIA Thouars.

Leaflets 4-jugate, sometimes 3-jugate, distinctly but shortly acuminate, mostly less than 8 cm long, rather firmly coriaceous ..... 1. *I. acuminata*

Leaflets usually 2-jugate, sometimes 3-jugate, apex broad, rounded and retuse, or broadly acuminate, up to 14 cm in length, often much smaller, subcoriaceous or chartaceous ..... 2. *I. bijuga*

1. **Intsia acuminata** Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 20.

Luzon, Province of Cagayan, *For. Bur. 7063, 11318 Klemme:* Province of Tayabas, *Merrill 1108* (Infanta), *2584, 2594, For. Bur. 1413 Klemme.*

Native names: *Balahian* (Cagayan); *tindalo, ipil* (Tayabas).

Manifestly closely allied to the next, and like it a seacoast plant, but usually distinguishable by its more numerous, smaller, and thicker leaflets.

Endemic.

2. **Intsia bijuga** (Colebr.) O. Kuntze Rev. Gen. Pl. (1891) 192; Prain in Sci. Mem. Med. Off. Ind. Army 12 (1901) 12; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 63, 3 (1908) Bot. 409.

Macrolobium bijugum Colebr. Trans. Linn. Soc. 12 (1817) 359, *t. 17.*

Afzelia bijuga A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 467, *t. 51;* Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 274; F.-Vill. Nov. App. (1880) 72; Vid. Sinopsis Atlas (1883) *t. 42, fig. B;* Prain ex King in Journ. As. Soc. Beng. 66^2 (1897) 208.

Eperua decandra Blanco Fl. Filip. (1837) 368, ed. 2 (1845) 259, ed. 3, 2: 118.

Baruyanes Islands, Camiguin, *Bur. Sci. 4036 Fénix.* Luzon, Province of Cagayan, *For. Bur. 17267 Curran:* Province of Zambales, *Merrill 1750:* Province of Bataan, *Whitford 1318, For. Bur. 5953 Curran:* Province of Tayabas, *Merrill 1054, 1986, For. Bur. 840 Hagger, For. Bur. 10205, 10347 Curran:* Province of Camarines, *For. Bur. 10663, 10684 Curran:* Province of Sorsogon, *For. Bur. 10595 Curran.* Mindoro, *For. Bur. 5373, 8537, 9877 Merritt, Merrill 2184, 2250.* Palawan, *For. Bur. 3496, 4522, 5181 Curran, Bur. Sci. 801 Foxworthy.* Masbate, *For. Bur. 12821, 12593, 12598 Rosenbluth.* Ticao, *For. Bur. 12527 Rosenbluth, For. Bur. 1078 Clark.* Panay, *Copeland s. n.* Leyte, *For. Bur. 7133 Everett, For. Bur. 12634 Rosenbluth.* Guimaras, *For. Bur. 215 Gammill.* Negros, *For. Bur. 7306, 5605, 5622 Everett, For. Bur. 12414, 15037 Danao.* Dinagat, *For. Bur. 15054 Sample.* Mindanao, *For. Bur. 3954, 9497, 9522, 12370 Hutchinson.* Basilan, *For. Bur. 6093 Hutchinson.*

Widely distributed along the seacoast throughout the Philippines; a very important timber tree, universally known as *ipil.* Madagascar, Seychelles, Andaman and Nicobar Islands, throughout Malaya to New Guinea, the Fiji and Caroline Islands.

For a complete synonymy of *Intsia bijuga,* and discussion of the allied genera,

see Prain's valuable paper "On the Characters and Relationships of Afzelia (Smith)," Scientific Memoirs by Medical Officers of the Indian Army 12 (1901) 1–17, *platc.*

EXCLUDED SPECIES.

AFZELIA PALEMBANCIA (Miq.) Baker; F.-Vill. Nov. App. (1880) 72.

A Malayan species, not known from the Philippines. Probably an erroneous identification for some form of *Intsia bijuga*, or *I. acuminata*.

21. PAHUDIA Miq.

1. **Pahudia rhomboidea** (Blanco) Prain in Sci. Mem. Med. Off. Ind. Army 12 (1901) 14; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 63.

Eperua falcata Blanco Fl. Filip. (1837) 369, non Aubl.

Eperua rhomboidea Blanco l. c. ed. 2 (1845) 260, ed. 3, 2: 119; Naves l. c. ed. 3, *pl. 281.*

Afzelia rhomboidea Vid. Cat. Pl. Prov. Manila (1880) 28, Phan. Cuming. Philip. (1885) 110, Sinopsis Atlas (1883) *t. 42, fig. A*, Rev. Pl. Vasc. Filip. (1886) 117; F.-Vill. Nov. App. (1880) 72.

LUZON, Province of Cagayan, *For. Bur. 16926, 17276, 17043, 17297 Curran, For. Bur. 18511, 18515 Alvarez:* Province of Isabela, *For. Bur. 6639, 6642 Klemme:* Province of Zambales, *For. Bur. 5898 Curran:* Province of Pangasinan, *For. Bur. 8386 Curran & Merritt:* Province of Rizal, *For. Bur. 3263 Ahern's collector, Decades Philip. Forest Fl. no. 211 Ahern's collector, Merrill 2651:* Province of Bataan, *For. Bur. 2046, 2570 Borden, For. Bur. 2591 Meyer, For. Bur. 5450 Curran:* Province of Tayabas, *For. Bur. 10315 Curran, Merrill 2001, For. Bur. 18 Ware:* Province of Camarines, *Ahern 146, For. Bur. 10661 Curran:* Province of Sorsogon, *For. Bur. 6686 Pray, For. Bur. 15079 Rosenbluth, For. Bur. 5161 Bridges.* POLILLO, *Bur. Sci. 6982 Robinson.* MINDORO, *For. Bur. 6735, 6739 Merritt, For. Bur. 12241 Rosenbluth.* MARINDUQUE, *For. Bur. 12164, 12185 Rosenbluth.* CULION, *Ahern 704.* TICAO, *For. Bur. 1089 Clark.* MASBATE, *Merrill 3077, For. Bur. 12575, 12609, 12663 Rosenbluth.* LEYTE, *For. Bur. 12788 Rosenbluth.* CEBU, *For. Bur. 6453 Everett.* MINDANAO, District of Zamboanga, *For. Bur. 9427, 9483 Whitford & Hutchinson;* Province of Surigao, *For. Bur. 7557 Hutchinson.*

Widely known in the Philippines as *tindalo, balayong,* or *balarong;* other local names are, in Cagayan, *ipil* (erroneously), *balayao, magahao;* in Isabela, *magalayao;* in Camarines, *sangay;* in Surigao, *bayung, bayadgung.*

A widely distributed endemic species and a timber tree of great importance. Mature pods are sometimes 20 cm long and 10 cm wide. It varies greatly in the size of the leaflets, one specimen having them about 12 cm long (*For. Bur. 12788 Rosenbluth*), but the specimen was taken from a sprout, which accounts for the abnormal size. The average size of normal leaflets is about one-half the above. *Pahudia javanica* Miq., is apparently closely allied.

The synonymy and relationship of *Pahudia, Intsia,* and *Sindora* is very fully discussed by Prain in his paper entitled "On the Characters and Relationships of Afzelia (Smith)."[26] In this paper he shows that *Afzelia* Sm. (1798) is congeneric with *Pahudia* Miq. (1855), and has adopted the latter name for the genus. I have followed Prain, for I consider *Afzelia* Sm. (1798) to be invalidated by *Afzelia* J. F. Gmel. (1791), the latter being the oldest valid generic name for *Scymeria* Pursh (*Scrophulariaccae*), in spite of the fact that Pursh's name is included in the list of *nomina conservanda* of the Vienna Botanical Congress.

[26] Sci. Mem. Med. Off. Ind. Army 12 (1901) 1–17, *platc.*

22. BAUHINIA Linn.

Fertile stamens 10.

Leaves more or less cleft, or at least retuse, or of two entirely distinct leaflets.

Leaflets entirely distinct; an erect or subscandent shrub..... 1. *B. binata*

Leaflets connate; erect trees or shrubs.

Flowers small, in many-flowered racemes; calyx with a short tube and a spathaceous, 5-cleft limb; leaves broader than long, glaucous beneath, only slightly cleft § PILIOSTIGMA..... 2. *B. malabarica*

Flowers large, showy; leaves deeply cleft, not glaucous beneath, longer than broad § PAULETIA.

Lobes of the leaves rounded; flowers solitary or in axillary pairs; pods puberulous, not ribbed along the upper suture..... 3. *B. tomentosa*

Lobes of the leaves acute; flowers pure white, racemose; pods glabrous, ribbed along each side of the upper suture..... 4. *B. acuminata*

Leaves entire, acuminate, not at all cleft or divided; pod large, dehiscent, with about two large seeds..... 5. *B. dolichocalyx*

Fertile stamens 3; scandent shrubs § PHANERA.

Leaves entire, acuminate ..... 6. *B. leptopus*

Leaves cleft.

All parts of the flower glabrous except the ovary and style.... 7. *B. subglabra*

Calyx-tubes and lobes pubescent.

Calyx-limb in bud elliptic or ovate, about 5 mm long; tube very slender, short.

Lobes of the leaves strongly divaricate, strongly acuminate, the leaves about 15 cm long..... 8. *B. whitfordii*

Lobes of the leaves somewhat obtusely acuminate, overlapping, the lower surface with scattered, appressed, short hairs, ultimately glabrous or nearly so ..... 9. *B. cumingiana*

Lobes of the leaves rounded, the lower surface densely and softly pubescent, at least on the nerves, with rather long, reddish-brown hairs. 10. *B. nymphaeifolia*

Calyx-limb in bud oblong, 1 to 2 cm long, the tube thickened.

Petals 2.5 cm long or less.

Leaves ample, wider than long, up to 16 cm in width, beneath softly ferruginous-pubescent, especially on the nerves, with long, soft, hairs; lobes broad, rounded; nerves 11..... 11. *B. perkinsae*

Leaves longer than wide, not exceeding 8 cm in length, glabrous or subglabrous.

Petals about 2.5 cm long.

Leaves 9- to 11-nerved..... 12. *B. ahernniana*

Leaves 13- to 15-nerved..... 13. *B. antipolana*

Petals 1.2 cm long or less.

Lobes rounded; nerves 9; branches and inflorescence densely pubescent with long ferruginous hairs; racemes dense, the pedicels about 1 cm long..... 14. *B. merrilliana*

Lobes acute; nerves 9 to 11; branches and inflorescence pubescent with short appressed hairs; racemes lax; pedicels 2 cm long. 15. *B. pinchotiana*

Petals 3.5 to 4 cm long..... 16. *B. warburgiana*

Fertile stamen one only § CASPARIA..... 17. *B. monandra*

1. **Bauhinia binata** Blanco Fl. Filip. (1837) 331, ed. 2 (1845) 231, ed. 3, 2: 66 (err. typ. *binnata*).

Bauhinia pinnata Walp. in Linnaea 16 (1842) Litt.-ber. 53.

Phanera blancoi Benth. Pl. Jungh. (1852) 264; Miq. Fl. Ind. Bat. 1[1] (1855) 70.

Bauhinia blancoi Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 278; Hemsl. Bot. Challenger Exped. 1[4] (1884) 146; F.-Vill. Nov. App. (1880) 72; Vid. Phan. Cuming. Philip. (1885) 110, Rev. Pl. Vasc. Filip. (1886) 117, Perk. Frag. Fl. Philip. (1904) 8.

Luzon, Province of Tayabas, *Merrill 1972*. Mindoro, *Cuming 1518*, in Herb. Kew. Palawan, *For. Bur. 3545 Curran*. Negros, *For. Bur. 13705 Curran*. Panay, *Copeland s. n.* Sibutu (Sulu Archipelago), *Merrill 5294*.

Siam (fide Baker); Timor Laut (fide Hemsely).

I can see no valid reason for displacing Blanco's specific name *binata* in favor of *blancoi* although it was misspelled *binnata;* that it was a typographic error for *binata* and not *pinnata,* is shown at once by the phrase immediately following the name," *Bauhinia de hojas hermanadas.*" In placing the species in the key, I have followed Baker, who states that the plant has 10 stamens. None of the specimens before me have flowers, and Blanco does not describe them. Suberect or scandent, confined to the seashore. The only known Philipine species with entirely free leaflets.

2. **Bauhinia malabarica** Roxb. Hort. Beng. (1814) 31, nomen, Fl. Ind. 2 (1832) 321; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 277; F.-Vill. Nov. App. (1880) 72.

Bauhinia acida Reinw. in Flora 31 (1848) 578.

Piliostigma acidum Benth. Pl. Jungh. (1852) 261; A. Gray Bot. Wilkes Explor. Exped. (1854) 470; Naves in Blanco Fl. Filip. ed. 3, *pl. 118.*

Bauhinia tomentosa Blanco Fl. Filip. (1837) 330, ed. 2 (1845) 230, ed. 3, 2: 65, non Linn.

Bauhinia purpurea Vid. Sinopsis Atlas (1883) *t. 43, fig. A,* non Linn.

Luzon, Province of Bontoc, *For. Bur. 17026 Curran:* Province of Ilocos Norte, *For. Bur. 13938 Merritt & Darling:* Province of Tarlac, *For. Bur. 5148 Curran, Merrill 3618:* Province of Pangasinan, *Merrill s. n.:* Province of Rizal, *For. Bur. 1835 Ahern's collector, Decades Philip. Forest Fl. no. 30 Ahern's collector:* Province of Cavite, *For. Bur. 7617 Rosenbluth:* Province of Laguna, *Wilkes Expedition* in U. S. Nat. Herb., *Elmer, Hallier s. n., For. Bur. 12709 Rosenbluth & Tamesis.*

Most usually known by the name *alibanban,* signifying butterfly, from the shape of the leaves, the name frequently also applied to other species of the genus; in Laguna *calibangbang.* Other names given by Blanco are *livas, balibanban, marulinao, diss, ahihiro, alambihor,* and *alibihil.*

Widely distributed in the Philippines at low altitudes, a characteristic tree of open grass lands; British India to Tenasserim; Java and Timor, but not reported from the Malay Peninsula.

3. **Bauhinia tomentosa** Linn. Sp. Pl. (1753) 375; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 275; F.-Vill. Nov. App. (1880) 72.

Bauhinia binata Naves in Blanco Fl. Filip. ed. 3, *pl. 119,* non Blanco.

Luzon, Manila, *Cuzner 36,* cultivated.

Certainly not a native of the Philippines; India to Ceylon and tropical Africa; probably only cultivated in Malaya.

4. **Bauhinia acuminata** Linn. Sp. Pl. (1753) 375; Baker l. c. 276; F.-Vill. Nov. App. (1880) 72; Perk. Frag. Fl. Philip. (1904) 8; Merr. in Philip. Journ. Sci. 2 (1907) Bot. 433; Naves in Blanco Fl. Filip. ed. 3, *pl. 111.*

Luzon, Manila. *Merrill 4103:* Province of Rizal, *Bur. Sci. 1038 Ramos, Merrill 2689:* Province of Tayabas, *Whitford 855, For. Bur. 7474 Reyes.* Marinduque, collector unknown.

India to Indo-China and southern China, the Malay Peninsula and Archipelago.

Bauhinia grandiflora Blanco Fl. Filip. (1837) 332, ed. 2 (1845) 231, ed. 3, 2: 67, non Juss., may or may not be referable here. The description applies better than to any other Philippine species known to me, but there are some discrepancies.

5. **Bauhinia dolichocalyx** Merr. in Philip. Journ. Sci. 3 (1908) Bot. 231.

Luzon, Province of Batangas, *For. Bur. 7756 Curran & Merritt.*

Native name: *Malabanot.*

Endemic.

This species was placed by me in the section *Lysiphyllum*, an error on my part, as the entire leaves are quite incompatible with the section. It may be referable to the section *Pauletia.*

6. **Bauhinia leptopus** Perk. Frag. Fl. Philip. (1904) 10.

Bauhinia bidentata F.-Vill. Nov. App. (1880) 72; Vid. Phan. Cuming. Philip. (1885) 110, Rev. Pl. Vasc. Filip. (1886) 117, non Benth.

Phanera bidentata Benth. Pl. Jungh. (1852) 263, pro parte, quoad no. 1744 Cuming.

Bauhinia copelandii Merr. in Philip. Journ. Sci. 3 (1908) Bot. 230.

Luzon, Province of Tayabas, *Warburg 12824* in Herb. Berol. (type). Leyte, *Cuming 1744.* Negros, *For. Bur. 19073 Curran.* Mindanao, Lake Lanao, *Mrs. Clemens 1059, s. n.:* District of Davao, *Copeland 1429.*

Endemic.

This species is manifestly very closely allied to *Bauhinia bidentata* Jack of the Malay Peninsula and Sumatra, but is readily distinguished by its much shorter calyx-tube. It is also closely allied to *B. pyrrhaneura* Korth. of Sumatra. *B. copelandii* does not appear to be distinct from *B. leptopus* Perk.

7. **B. subglabra** Merr. in Philip. Journ. Sci. 3 (1908) Bot. 230.

Palawan, *Bur. Sci. 821 Foxworthy.*

Endemic.

8. **Bauhinia whitfordii** Elmer Leafl. Philip. Bot. 1 (1907) 229.

Luzon, Province of Benguet, *Elmer 8897*, type number: Province of Zambales, *For. Bur. 6009 Curran.*

Native name: *Agpoi* (Zambales).

Endemic.

9. **Bauhinia cumingiana** (Benth.) F.-Vill. Nov. App. (1880) 73; Vidal Rev. Pl. Vasc. Filip. (1885) 110, Rev. Pl. Vasc. Filip. (1886) 116; Perk. Frag. Fl. Philip. (1904) 9; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 63.

Phanera cumingiana Benth. Pl. Jungh. (1852) 263; Miq. Fl. Ind. Bat. 1[1] (1855) 68.

Bauhinia scandens Blanco Fl. Filip. (1837) 332, ed. 2 (1845) 232, ed. 3, 2: 68, non Linn.

Bauhinia vahlii F.-Vill. Nov. App. (1880) 72, non W. & A.

Phanera vahlii Naves in Blanco Fl. Filip. ed. 3, *pl. 76*, non Benth.

Luzon, Province of Cagayan, *For. Bur. 5256 Klemme, Bolster 193:* Province of Union. *Elmer 5702:* Province of Zambales, *Hallier s. n.:* Province of Pampanga, *For. Bur. 9614 Zschokke:* Province of Rizal, *Merrill 2712, Bur. Sci. 6762 Robinson, Decades Philip. Forest Fl. no. 98 Ahern's collector:* Province of Bataan, *For. Bur. 2721 Borden, For. Bur. 187 Barnes, For. Bur. 1442 Ahern's collector, For. Bur. 7227, 7369 Curran, For. Bur. 12938 Alvarez, Williams 563:* Province of Tayabas, *Bur. Sci. 9469 Robinson, For. Bur. 9647 Curran:* Province of Camarines, *Bur. Sci.*

6329 Robinson, For. Bur. 12280 Curran. MASBATE, *For. Bur. 1712 Clark.* PANAY, *Copeland s. n.* CEBU, *Bur. Sci. 1714 McGregor.* NEGROS, *For. Bur. 5234, 5624 Everett, For. Bur. 5232 Aspillera.* MINDANAO, District of Zamboanga, *For. Bur. 9016 Whitford & Hutchinson.*

Native names: *Banot* (Rizal, Bataan); *unpic* (Cagayan); *agqui* (Pampanga); *agpoi* (Bataan); *impid* (Camarines); *calibambang, salibangbangan* (Negros); *balagon* (Zamboanga).

Endemic. The bast fiber of this vine is very strong, and is used by the Negritos of Bataan Province for making bowstrings.

10. **Bauhinia nymphaeifolia** Perk. Frag. Fl. Philip. (1904) 11.

Bauhinia fulva F.-Vill. Nov. App. (1880) 72, non Blume?

LUZON, Province of Ilocos Sur, *Cuming 1180* (type) in Herb. Berol., *1181* in Herb. Kew. & Herb. Bur. Sci.

This species is exceedingly closely allied to *Bauhinia fulva* Blume, (*Phanera fulva* Korth.) of Java, to which, indeed Bentham referred the above number (1181) of Cuming's Philippine plants.[27] It is doubtful if the two are specifically distinct, but I have not sufficient material at hand for comparison to determine the point.

Endemic?

11. **Bauhinia perkinsae** Merr. in Govt. Lab. Publ. 17 (1904) 21.

Bauhinia ferruginea Perk. Frag. Fl. Philip. (1904) 9, non Roxb.

PALAWAN, *Merrill 731, For. Bur. 3552 Curran, Bur. Sci. 822 Foxworthy.* In thickets at low altitudes.

The validity of this species is somewhat doubtful, although it is quite certain that it is not the plant Roxburgh described as *Bauhinia ferruginea.* The original description of *B. ferruginea* is very short, but Prain, who undoubtedly has correctly interpreted Roxburgh's species, gives a full description,[28] which does not apply to the plants here referred to *B. perkinsae.* The type number of the latter, however, agrees very closely with some of the specimens in the Kew Herbarium that are named *B. ferruginea* Roxb.

Endemic.

12. **Bauhinia aherniana** Perk. Frag. Fl. Philip. (1904) 8.

MINDORO, *Merrill 1237, For. Bur. 12007 Merritt, McGregor 256.* CEBU, *For. Bur. 6445 Everett.* MINDANAO, Lake Lanao, *Mrs. Clemens 228, s. n.*

Native names: *Banot* (Mindoro); *banlut* (Cebu).

Endemic.

13. **Bauhinia antipolana** Perk. l. c. 9.

LUZON, Province of Rizal, *Merrill 1317, 1873, For. Bur. 1997 Ahern's collector.*

Native name: *Banot.*

Endemic.

14. **Bauhinia merrilliana** Perk. l. c. 10.

PALAWAN (Paragua), *Merrill 694, For. Bur. 3554 Curran, Bur. Sci. 192 Bermejos.*

In thickets at low altitudes; endemic.

15. **Bauhinia pinchotiana** Perk. l. c. 12.

Bauhinia semibifida Vid. Sinopsis Atlas (1883) *t. 43, fig. 1?;* F.-Vill. Nov. App. (1880) 73, non Roxb.

Phanera semibifida Benth. Pl. Jungh. (1852) 265, pro parte, quoad no. 1119 Cuming.

LUZON, Province of Ilocos Sur, *Cuming 1119* (type number).

Endemic; allied to *B. semibifida* Roxb., but apparently distinct.

[27] Pl. Jungh. (1852) 263.

[28] Journ. As. Soc. Beng. 66 [2] (1907) 184.

16. **Bauhinia warburgii** Perk. l. c. 12.

Luzon, Province of Tayabas, *Warburg 12823* (type) in Herb. Berol.: Province of Camarines, *For. Bur. 11338 Curran.*

Endemic.

17. **Bauhinia monandra** Kurz in Journ. As. Soc. Beng. **42**[2] (1873) 73, Forest Fl. Brit. Burma 1 (1877) 395; Merr. in Philip. Journ. Sci. 4 (1909) Bot. 265; Prain in Journ. As. Soc. Beng. **66**[2] (1897) 505.

Bauhinia richardiana Wall. in Voigt Hort. Suburb. Calcut. (1845) 255, non DC.

Bauhinia krugii Urban Ber. Deutsch. Bot. Ges. **3** (1885) 83.

Bauhinia kappleri Sagot in Ann. Sci. Nat. VI **13** (1882) 317; Perk. Frag. Fl. Philip. (1904) 13.

Bauhinia subrotundifolia F.-Vill. Nov. App. (1880) 72; Naves in Blanco Fl. Filip. ed. 3, *pl. 82*, non Cav.

I have very recently discussed this species and its synonymy[29] citing also the Philippine specimens that represent the species. It is not a native of the Philippines, but its original home is not definitely known, although it was probably derived from tropical America. Prain says that it is not a native of India, but was introduced from Madagascar. It is at once distinguished from all other Philippine species by its single perfect anther. To the synonymy I have added here *B. subrotundifolia* of F.-Villar and of Naves (not of Cavanilles); Naves's plate fairly well represents the species.

DOUBTFUL AND EXCLUDED SPECIES.

BAUHINIA LUNARIA Cav. Icon. **5** (1799) 4, *t. 407;* Vid. Rev. Pl. Vasc. Filip. (1886) 117; F.-Vill. Nov. App. (1880) 72.

The type of this species was collected by Née, the localities given by Cavanilles being "Habitat in Calávan et Acapulco viciniis," the former in the Province of Laguna, Luzon, and the latter in Mexico. The species belongs in the section *Casparia*, which is entirely American (one species now cultivated in the tropics of the world). The species is undoubtedly Mexican, and should be excluded from the Philippine flora.

BAUHINIA SUBROTUNDIFOLIA Cav. l. c. *t. 406;* Vidal l. c.; F.-Vill. l. c.

"Habitat in Calávan duodecim leucis a Manila, et etiam in Acapulco viciniis." Like the preceding, a species of the section *Casparia*, and undoubtedly Mexican, and not Philippine; to be excluded.

BAUHINIA ? LATISILIQUA Cav. l. c., *t. 408*, based on Philippine material, the leaves of a *Bauhinia*, but the fruit of *Mezoneurum*. (=*Mezoneurum latisiliquum* (Cav.) Merr.)

BAUHINIA CASTRATA Blanco Fl. Filip. (1837) 331, reduced in the second edition (1845) to *B. purpurea* Linn., and considered by F.-Villar (Nov. App. (1880) 73), to represent the Linnean species. The identification may be correct, as Blanco's material was from a cultivated specimen. No recent collector has found *B. purpurea* in the Philippines.

BAUHINIA VARIEGATA Linn.; F.-Vill. Nov. App. 73.

BAUHINIA RUFA Grah.; F.-Vill. l. c. 72.

BAUHINIA KHASIANA Baker; F.-Vill. l. c. 73.

BAUHINIA ELONGATA Korth.; F.-Vill. l. c. 73.

BAUHINIA RACEMOSA Lam.; F.-Vill. l. c. 72.

BAUHINIA RETUSA Ham.; F.-Vill. l. c. 72.

[29] Philip. Journ. Sci. 4 (1909) Bot. 265.

The above six species were credited to the Philippines by F.-Villar, probably all being admitted on erroneous identifications. None of the species are known to extend to the Archipelago.

BAUHINIA INERMIS Perr. Mém. Soc. Linn. Paris 3 (1824); C. B. Rob. in Philip. Journ. Sci. 3 (1908) Bot. 304. A *nomen nudum*.

23. CASSIA Linn.

Trees, shrubs, or stout herbs with large leaflets and obtuse sepals.

Stamens 10, all fertile.

Lowest 2 or 3 stamens much exceeding the rest; pods cylindric, indehiscent (§ FISTULA).

Flowers yellow, in elongated, lax racemes; bracts small, deciduous; leaflets up to 14 cm in length ..... 1. *C. fistula*

Flowers pink and white, in short racemes or corymbs; bracts large, persistent; leaflets 7 cm long or less ..... 2. *C. javanica*

Stamens equal or subequal; pods flat, dehiscent.

Peduncles 2- or 3-flowered; pods 7 to 9 mm wide ..... 3. *C. divaricata*

Peduncles subumbellately or racemosely many-flowered; pods 1.3 to 1.5 cm wide ..... 4. *C. glauca*

Stamens 10, 7 fertile, the 3 upper ones reduced to staminodes (§ SENNA); pods dehiscent, usually more or less compressed.

Leaves with glands on the common rachis; suffrutescent herbs.

Glands between the bases of two opposed leaflets; leaflets obtuse; pods with oblique dissepiments; seeds rhombohedral ..... 5. *C. tora*

Glands far below the leaflets and near the base of the petiole; leaflets acute; pods with transverse dissepiments; seeds ovate, compresed.

Most parts of the plant hirsute or pubescent ..... 6. *C. hirsuta*

All parts of the plant glabrous.

Leaflets usually more numerous; pods turgid ..... 7. *C. sophera*

Leaflets 3 to 6 pairs; pods flattened ..... 8. *C. occidentalis*

Leaves with the rachis channeled above, barred transversely between the leaflets, but without glands.

Suffrutescent; flowers in strobilate subspicate racemes; pods winged along the valves; leaflets large, reaching 15 cm in length ..... 9. *C. alata*

Trees or shrubs; flowers in corymbose panicles; pods not winged; leaflets not exceeding 5 cm in length.

Stipules large, persistent; pod thin-valved, flexible, with narrow sutures; young parts, inflorescence and leaves yellow-pubescent. 10. *C. timoriensis*

Stipules small, deciduous; pod with coriaceous, rigid valves, sutures thickened; inflorescence somewhat gray-pubescent, leaves glabrous or nearly so ..... 11. *C. siamea*

Slender herbs or undershrubs with very small leaflets and acute sepals (§ CHAMAECRISTA) ..... 12. *C. mimosoides*

1. **Cassia fistula** Linn. Sp. Pl. (1753) 377; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 261; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 156; F.-Vill. Nov. App. (1880) 70; Vid. Sinopsis Altas (1883) *t. 42, fig. E;* Naves in Blanco Fl. Filip. *pl. 120.*

LUZON, Province of Cagayan, *Bur. Sci. 7876 Ramos:* Province of Rizal, *For. Bur. 2991 Ahern's collector:* Province of Laguna, *For. Bur. 10046 Curran.* MINDORO, *For. Bur. 8581 Merritt, For. Bur. 11325 Rosenbluth, Ritchie s. n.*

Native names: *Cañafistula, cañapistola, apostala.* In Mindoro sometimes, but erroneously, called *balayong* and *tindalo* which belong properly to *Pahudia rhomboidea* Prain.

This species is certainly an introduced one in the Philippines, as indicated by its native names, which are of Spanish origin, or corruptions of Spanish names. It is a native of British India, and is now widely distributed in tropical countries in cultivation; Prain expresses the opinion that it is not entitled to be considered an indigenous tree in Malaya.

2. **Cassia javanica** Linn. Sp. Pl. (1753) 379; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 267; Koord. & Valet. Meded. 's Land Plantent. 14 (1895) 8; Vidal Sinopsis Atlas (1883) *t. 42, fig. D;* F.-Vill. Nov. App. (1880) 70.

Cassia fistula Blanco Fl. Filip. (1837) 339, ed. 2 (1845) 237, ed. 3. 2: 76, saltem pro maxima parte, non Linn.

Cassia nodosa Auct. Philip., non Ham.

Luzon, Province of Isabela, *For. Bur. 11265 Klemme:* Province of Union, *Elmer 5661:* Province of Zambales, *Merrill 2958, Hallier s. n., For. Bur. 5902 Curran, For. Bur. 6020 Aguilar, For. Bur. 13206 Cortes:* Province of Pangasinan, *For. Bur. 13504 Medina, Cuming 1028:* Province of Nueva Ecija, *For. Bur. 14321 Saroca, For. Bur. 8467 Curran:* Province of Batangas, *For. Bur. 7686, 7713 Curran:* Province of Rizal, *For. Bur. 6632, 7030, 10031 Curran:* Province of Tayabas, *Merrill 2057:* Province of Camarines, *For. Bur. 10458 Curran:* Province of Sorsogon, *For. Bur. 5749 Pray.* Polillo, *Bur. Sci. 9296 Robinson.* Mindoro, *For. Bur. 9688 Merritt.* Palawan, *For. Bur. 7440 Manalo, Merrill 809, Bur. Sci. 760 Foxworthy, For. Bur. 15038 Danao, For. Bur. 3856 Curran.* Balabac, *Bur. Sci. 403 Mangubat.* Burias, *For. Bur. 1718 Clark.* Leyte, *Elmer 7122.* Mindanao, Lake Lanao, *Mrs. Clemens 613.*

Native names: *Dulaueng* (Isabela); *tualing baculao* (Zambales); *anahuhan* (Tayabas); *malatagum* (Camarines); *baguiroro* (Sorsogon, Burias); *lombayong, ibabao, balayong,* ex Blanco. The names most commonly used, however, are *cañafistula,* and corruptions of it, which properly belong to the preceding species.

Widely distributed in the Philippines at low altitudes; Perak, Sumatra, Java, Timor, Celebes, and Amboina.

Var. **pubifolia** var. nov.

Differt a typo partibus junioribus, subtus foliis, rhachidibusque densissime molliter pubescentibus.

Luzon, Province of Ilocos Sur, *For. Bur. 5239 Klemme:* Province of Rizal, *Merrill 1313, 2639, For. Bur. 1173 Ahern's collector, Decades Philip. Forest Fl. no. 37 Ahern's collector.*

This form, in its extreme development, is quite distinct from the species, and is readily recognizable by its dense soft pubescence, which persists on old leaves; I do not, however, consider it to be specifically distinct, as intergrading forms are represented by *1173 Ahern's collector,* cited here, and *10031 Curran* cited under the species.

What is here interpreted as *Cassia javanica* has been variously identified as *C. javanica* L., *C. nodosa* Ham., and, by pure error, as *C. fistula.* The latter species is very different, and should not be confused with the present one in any stage. While there is some variation in the numerous specimens here referred to *C. javanica,* I am of the opinion that but a single species is represented. The material agrees well with the very short original description of *C. javanica,* with

Javan material so named in our herbarium, and with the complete description given by Koorders and Valeton. The leaflets vary in shape, and their apices are sometimes rounded and retuse, sometimes acute, and even slightly acuminate. The flowers agree in size with those of *C. javanica*, rather than with those of *C. nodosa*, although the petals appear to be indifferently acute, or rounded, while the inflorescence is sometimes terminal, and sometimes from the older branchlets, in the latter respect approaching *Cassia nodosa* Ham. Whether or not the latter is constantly distinct from *C. javanica* seems to be an open question.

3. **Cassia divaricata** Nees & Blume Syll. Ratisb. 1 (1824) 94; Miq. Fl. Ind. Bat. 1[1] (1855) 97; Benth. in Trans. Linn. Soc. 27 (1871) 554; Vidal Rev. Pl. Vasc. Filip. (1886) 116; Koord. & Valet. Meded. 's Lands Plantent. 14 (1895) 17.

Luzon, Province of Benguet, *Loher 2219, Vidal 1246* in Herb. Kew., *Elmer 5996:* District of Lepanto, *For. Bur. 10928 Curran.*

Java.

4. **Cassia glauca** Lam. Encycl. 1 (1785) 647; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 265; F.-Vill. Nov. App. (1880) 71; Miq. Fl. Ind. Bat. 1[1] (1855) 96; Naves in Blanco Fl. Filip. ed. 3, *pl. 426bis;* Vid. Rev. Pl. Vasc. Filip. (1886) 115.

Luzon, Manila (*Vidal 280, 281*); without locality, *Loher 2218.*

India to southern China and Formosa, south to Malaya, but in many localities perhaps only cultivated.

This species probably has no proper place in the Philippine flora, as Vidal's specimens were from Manila, doubtless from cultivated trees, while F.-Villar's reference is based on trees cultivated in the old botanic garden, where they no longer exist. Loher's specimen may also have been from cultivated plants, but the distributed material of his collection is not localized. The much earlier *Cassia surattensis* Burm. Fl. Ind. (1768) 97, is referred here by Bentham, but I have not been able to verify it.

5. **Cassia tora** Linn. Sp. Pl. (1753) 376; Blanco Fl. Filip. (1837) 337, ed. 2 (1845) 235; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 263; F.-Vill. Nov. App. (1880) 70; Naves in Blanco Fl. Filip. ed. 3, *pl. 122;* Benth. Trans. Linn. Soc. 27 (1871) 535.

Batanes Islands, *Bur. Sci. 3641 Fénix.* Luzon, Province of Cagayan, *Bur. Sci. 7873 Ramos:* Province of Pangasinan, *Bur. Sci. 4859 Ramos:* Province of Pampanga, *Parker 34:* Manila, *Merrill 82, McGregor 49:* Province of Rizal, *For. Bur. 3357 Ahern's collector:* Province of Bataan, *Williams 126, For. Bur. 1944 Borden, Merrill 3170.* Mindoro, *For. Bur. 5519 Merritt.* Cebu, *Barrow 18.* Mindanao, District of Davao, *DeVore & Hoover 178:* Lake Lanao, *Mrs. Clemens s. n.*

Widely distributed in the Philippines, and exceedingly abundant about towns and settlements; tropics of the World.

Native names: *Andadasi* (Ilocano); *balatong aso* (Rizal, Batangas); *manimanihan, mongomongohan, catandang aso,* ex Blanco.

By some authors *Cassia obtusifolia* Linn. is held distinct from *C. tora.* The gland characters appear to be the most valid ones for distinguishing the two, *Cassia tora* supposedly having a gland between each of the two lower pairs of leaflets, and *C. obtusifolia* having a gland between the lowermost pair of leaflets only. Both are represented in the material cited above; there are also some specimens that on at least some of their leaves show no glands at all. In connection with this matter a great number of living specimens were examined, and the occurrence of leaves without glands was found to be frequent.

6. **Cassia hirsuta** Linn. Sp. Pl. (1753) 378; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 263; F.-Vill. Nov. App. (1880) 70.

Cassia longisiliqua Blanco Fl. Filip. (1837) 338, non Linn.

Cassia sulcata Blanco l. c. ed. 2 (1845) 236, non DC.

Luzon, Province of Rizal, *Bur. Sci. 6525 Robinson, For. Bur. 1978, 3428 Ahern's collector:* Manila, *Merrill 4099.*

Native names: *Balbalatungan* (Manila); *tighiman*, ex Blanco.

A native of tropical America, now widely distributed in the tropics of the world. The Philippine specimens cited above have much shorter hairs than Indian and Malayan material in our herbarium, so named, and the peduncles are mostly more than two-flowered.

7. **Cassia sophera** Linn. Sp. Pl. (1753) 379; Baker l. c. 262; F.-Vill. Nov. App. (1880) 70; Vidal Rev. Pl. Vasc. Filip. (1886) 116.

Luzon, Province of Union, *Elmer 5604:* Province of Laguna, *Elmer:* Province of Ilocos Norte, *For. Bur. 13802 Merritt & Darling.*

Originally an American weed, now cosmopolitan in the tropics; similar to and closely allied to the next, which, however, is much more common and widely distributed in the Philippines.

8. **Cassia occidentalis** Linn. Sp. Pl. (1753) 377; Baker l. c. 262; Blanco Fl. Filip. (1837) 338, ed. 2 (1845) 236; F.-Vill. l. c.; Naves in Blanco Fl. Filip. ed. 3, *pl. 73.*

Luzon, Province of Cagayan, *For. Bur. 16482 Bacani:* Province of Isabela, *Bur. Sci. 8101 Ramos:* Province of Ilocos Sur, *For. Bur. 14015 Merritt & Darling:* Province of Bataan, *For. Bur. 1943 Borden:* Manila, *Elmer 5516, McGregor 48, Topping 3, Merrill 391:* Province of Tayabas, *Whitford 541:* Province of Albay, *Bur. Sci. 6304 Robinson.* Polillo, *Bur. Sci. 9169 Robinson.* Mindoro, *For. Bur. 5496 Merritt, Merrill 3339.* Tablas, *McGregor 340.* Panay, *Yoder 27.* Mindanao, Province of Surigao, *Allen 143:* Lake Lanao, *Mrs. Clemens 472:* District of Davao, *DeVore & Hoover 150.*

Native names: *cabalcabalan, tambalisa* (Mindoro); *tighiman*, ex Blanco.

A weed in waste places at low altitudes throughout the Philippines; probably originally American, but now cosmopolitan in the tropics.

9. **Cassia alata** Linn. Sp. Pl. (1753) 378; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 264; F.-Vill. Nov. App. (1880) 70; Blanco Fl. Filip. (1837) 339, ed. 2 (1845) 237, ed. 3, 2: 77; Naves l. c. ed. 3, *pl. 124bis.*

Herpetica alata Raf. Sylva Tellur. (1838) 123; W. F. Wight ex Safford in Contr. U. S. Nat. Herb. 9 (1905) 293.

Luzon, Province of Abra, *For. Bur. 14565 Darling:* Province of Union, *Elmer 5597:* Manila, *Topping 4, Merrill 3427:* Province of Rizal, *For. Bur. 3427 Ahern's collector:* Province of Bataan, *Williams 318, For. Bur. 2198, 2583 Meyer, Elmer 7015:* Province of Tayabas, *Ritchie 76:* Province of Albay, *Bur. Sci. 6245 Robinson.* Mindoro, *Merrill 1256.* Busuanga, *Merrill 434.* Balabac, *Bur. Sci. 475 Mangubat.* Panay, *Copeland s. n.* Negros, *For. Bur. 4204 Everett.* Cebu, *Bur. Sci. 1743 McGregor.* Mindanao, District of Zamboanga, *For. Bur. 9202 Whitford & Hutchinson:* Province of Surigao, *Bolster 202:* Lake Lanao, *Mrs. Clemens s. n.* Basilan, *For. Bur. 3957 Hutchinson.*

Native names: *Acapulco, capurco* (Manila, Zamboanga); *palochina* (Busuanga, Negros); *bicas-bicas* (Marinduque); *bayabasan* (Tayabas); *sunting* (Surigao); *pacagoncon* (Bataan); *andadasi, adadasi* (Union, Abra); *sonting, catanda, casitas, gamot sa buni, pacayomcom castila*, ex Blanco.

Widely distributed in the Philippines in waste places about settlements, etc., and undoubtedly of American origin; now cosmopolitan in the tropics of the world.

10. **Cassia timoriensis** DC. Prodr. 2 (1825) 499; Miq. Fl. Ind. Bat. 1 [1] (1855) 99; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 265; F.-Vill. Nov. App. (1880) 71; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 63.

Cassia arayatensis Llanos Frag. (1851) 71; Blanco Fl. Filip. ed. 3, 4 [1] (1880) 55.

Cassia montana Naves in Blanco Fl. Filip. ed. 3, *pl. 452*, non Heyne.

LUZON, Province of Ilocos Sur, *Fur: Bur. 5660 Klemme:* Province of Pangasinan, *For. Bur. 14199 Merritt, For. Bur. 8342 Curran & Merritt:* Province of Tarlac, *Merrill 3639:* Province of Nueva Ecija, *For. Bur. 8472, 8423 Curran:* Province of Pampanga, *Merrill 1400:* Province of Rizal, *For. Bur. 2292 Ahern's collector, Decades Philip. Forest Fl. no. 261 Ahern's collector:* Province of Bataan, *Williams 390, Merrill 1494, For. Bur. 2339 Borden, For. Bur. 2238 Meyer, For. Bur. 361 Barnes.*

Native names: *Bagauac, balacbac* (Bataan); *bayacbac* (Pampanga); *malacaturay, malapatpat* (Nueva Ecija); *isar* (Ilocos Sur).

In thickets at low altitudes; India to Indo-China, the Malay Peninsula and Archipelago.

The Philippine material is apparently all referable to var. *xanthocoma* Miq. Fl. Ind. Bat. 1 [1] (1855) 99 (*Cassia xanthocoma* Miq. Analecta 1 (1850) 10), which is apparently not specifically distinct from *C. timoriensis* DC.

11. **Cassia siamea** Lam. Encycl. 1 (1785) 648; Benth. Trans. Linn. Soc. 27 (1871) 549; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 264; F.-Vill. Nov. App. (1880) 71.

Cassia florida Vahl Symb. 3 (1794) 57; Miq. Fl. Ind. Bat. 1 [1] (1855) 98.

Cassia arayatensis Naves in Blanco Fl. Filip. ed. 3, *pl. 426*, non Llanos.

LUZON, Manila, *Ahern 711, For. Bur. 12475, 19024 Curran:* Province of Rizal, Morong, *Bur. Sci. 1365 Ramos.*

Introduced and cultivated only, now extensively used as a shade tree in Manila; India to Indo-China, the Malay Peninsula and Archipelago; widely distributed in the tropics in cultivation.

12. **Cassia mimosoides** Linn. Sp. Pl. (1753) 379; Miq. Fl. Ind. Bat. 1 [1] (1855) 101; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 266; Blanco Fl. Filip. (1837) 340, ed. 2 (1845) 237, ed. 3, 2: 78; F.-Vill. Nov. App. (1880) 71.

LUZON, Province of Cagayan, *Bur. Sci. 7814 Ramos:* Province of Benguet, *For. Bur. 15946 Bacani, Williams 994, 995, Bur. Sci. 3509 Mearns:* Province of Rizal, *Bur. Sci. 1045, 1488, 1835, 1843 Ramos.* MINDORO, *For. Bur. 9754 Merritt.* NEGROS, *For. Bur. 13715 Curran.* MINDANAO, Lake Lanao, *Mrs. Clemens 4:* District of Davao, *Copeland 1304.*

Widely distributed in the Philippines at medium and higher altitudes; India and southern China through Malaya to New South Wales.

EXCLUDED SPECIES.

CASSIA MONTANA Heyne; F.-Vill. Nov. App. (1880) 71. Probably admitted on an erroneous identification; the species is unknown from the Philippines.

24. GLEDITSIA Linn.

1. **Gleditsia rolfei** Vid. Rev. Pl. Vasc. Filip. (1886) 115; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 63.

Gleditsia celebica Koord. Meded. 's Lands Plantent. 19 (1898) 433; Merr. Forest. Bureau (Philip.) Bull. 1 (1903) 24.

LUZON, Province of Pampanga, Mount Arayat, *Merrill 5026:* Province of Bataan, *For. Bur. 326 Barnes, Williams 564, For. Bur. 7345, 17320 Curran:* Province of

Nueva Ecija, *Vidal 1826* in Herb. Kew. (type): Province of Batangas, *Copeland s. n.:* Province of Tayabas, *For. Bur. 10335 Curran:* Province of Camarines, *Ahern 62.* CELEBES, *Koorders*, cultivated in the Botanical Garden, Buitenzorg, Java.

Native name (Tayabas), *Tahid-labuyo*, meaning cock's spur, from the spines.

A species allied to those of southern China; known only from Luzon and Celebes.

A second species is apparently represented by sterile material collected in Cebu by Espinosa, *For. Bur. 6488*, locally known as *Matagum*. It differs from *G. rolfei* in having entire leaflets which are prominently and inequilaterally retuse at the apex.

The generic name is in honor of Gleditsch, latinized and simplified *Gleditsia;* Taubert prefers the spelling *Gleditschia.*

25. PTEROLOBIUM R. Br.

1. **Pterolobium membranulaceum** (Blanco) Merr. in Govt. Lab. Publ. (Philip.) 35 (1906) 22.

Mimosa membranulacea Blanco Fl. Filip. (1837) 739.

Reichardia pentapetala Blanco l. c. ed. 2 (1845) 233, ed. 3, 2: 71.

Pterolobium indicum F.-Vill. Nov. App. (1880) 70; Vidal Sinopsis Atlas (1883) *t. 42, fig. G*, Rev. Pl. Vasc. Filip. (1886) 114, non A. Rich.

LUZON, Province of Rizal, *For. Bur. 1837, 1984 Ahern's collector:* Province of Bataan, *Vidal 1285:* Province of Union, *Vidal 1299*, in Herb. Kew.: without locality, *Loher 2183, 2188, 2189*, in Herb. Kew.

Endemic.

Blanco's description is imperfect, and in some respects does not apply especially well to the specimens here referred to it; I am confident, however, that the identification is correct.

26. DELONIX Raf.

1. **Delonix regia** (Boj.) Raf. Fl. Tellur. 2 (1836) 92; W. F. Wight ex Safford in Contr. U. S. Nat. Herb. 9 (1905) 256.

Poinciana regia Boj. ex Hook. Bot. Mag. 56 (1829) *t. 2884;* F.-Vill. Nov. App. (1880) 70; Naves in Blanco Fl. Filip. ed. 3, *pl. 451.*

LUZON, Province of Union, *Elmer 5656:* Manila, *For. Bur. 19026 Curran, Cordova 482:* Province of Pampanga, *Parker.* PALAWAN, *For. Bur. 3561 Curran.* BASILAN, *For. Bur. 3466 Hutchinson.*

Native names: *Arbol del fuego; caballero.* The "fire tree" or "flamboyant."

A native of Madagascar, now widely distributed in the tropics of the world in cultivation; commonly cultivated in towns in the Philippines.

Following strict rules, the proper generic name for this well-known and widely distributed species is *Delonix* Raf., as the genus *Poinciana* Linn. was based solely on what is now generally known as *Caesalpinia pulcherrima* (L.) Sw. The genus *Poinciana* has page preference over *Caesalpinia*, and hence by strict interpretation of the rules of nomenclature, those species now referred to *Caesalpinia*, generic limits retained as defined by Bentham & Hooker, should be treated as *Poinciana*, the genus *Caesalpinia* falling into synonymy. This extreme interpretation has been followed by some recent botanists, but at the same time they have raised some of the sections of *Caesalpinia*, as interpreted by Bentham & Hooker, and by Taubert, to generic rank. It seems doubtful to me if any representative botanical congress will sanction the transfer of *Caesalpinia* bodily to *Poinciana*,

on account of the confusion in nomenclature that such a course of procedure will entail. *Delonix* is here adopted for the present genus, as under no rules at present in force can *Poinciana* be retained for it.

27. CAESALPINIA Linn.

Pods armed with abundant wiry prickles; petals narrow; scandent spiny shrubs (§ GUILANDINA).

Leaves with large foliaceous stipules; leaflets mostly less than 2.5 cm in length; pods 5 to 7 cm long ..... 1. *C. crista*

Leaves without stipules; leaflets 3 to 5 cm long; pods about 10 cm long. 2. *C. glabra*

Pods unarmed; petals broad.

Leaflets coriaceous, few, 2 or 3 pairs on each pinna, 2 to 6 cm long, acute; pods short, the seeds solitary, rarely 2 (§ NUGARIA) ..... 3. *C. nuga*

Leaflets membranaceous or subcoriaceous, many, 8 or more pairs on each pinna, mostly less than 2 cm long, rounded; pods with from 5 to 8 seeds.

Petals distinctly clawed; stamens long-exserted, several times as long as the petals; pods about 2 cm wide (§ CAESALPINARIA) ..... 4. *C. pulcherrima*

Petals not or but slightly clawed; stamens short, not or but slightly exserted (§ SAPPANIA).

An erect tree; stipules none; pods 3 to 4 cm wide; with a stout spreading beak at the upper angle of the obtuse apex ..... 5. *C. sappan*

Scandent spiny shrubs; pods oblong or linear-oblong, less than 3 cm in width; stipules present, deciduous ..... 6. *C. sepiaria*

1. **Caesalpinia crista** Linn. Sp. Pl. (1753) 380, (excl. syn. Fl. Zeyl. 157, pro parte, Herm. zeyl. 12), non ed. 2 (1762) 544, nec aliorum; Urban Symb. Antill. 2 (1900) 269.

Guilandina bonduc Linn. l. c. 381, non ed. 2 (1762) 545.

Guilandina bonducella Linn. l. c. ed. 2 (1762) 545; Blanco Fl. Filip. (1837) 343, ed. 2 (1845) 239, ed. 3, 2: 81.

Caesalpinia bonducella Flem. As. Res. 11 (1810) 159; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 254; F.-Vill. Nov. App. (1880) 69; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 226.

Guilandina crista Small Fl. Southeast. U. S. (1903) 591; W. F. Wight ex Safford in Contr. U. S. Nat. Herb. 9 (1905) 288.

LUZON, Province of Union, *Elmer 5723, Fénix 11:* Province of Pangasinan, *Bur. Sci. 4969 Ramos:* Province of Bataan, *Williams 332, Elmer 7002, Merrill 3284.* MINDORO, *For. Bur. 5535 Merritt.* CEBU, *Barrow 8.* MINDANAO, District of Davao, *DeVore & Hoover 155, Copeland 345.*

Native names: *Calambibit* (widely used); *dauer* (Union); *bangbang* (Cebu); *dalagdag* (Mindoro); *dalugdug* ex Blanco.

Widely distributed in the Philippines near the seashore; cosmopolitan in the tropics of the world.

The synonymy of this species is rather complicated, but it has been cleared up by Urban.[30] The first citation given by Linnaeus is to his Flora Zeylanica no. 157, but this is only in part (*Pluk. alm. 4. t. 2. f. 2*) referable to the present species, the reference to *Herm. zeyl. 12* being an error, for Trimen [31] calls attention to the fact that the specimen in Hermann's Herbarium is *Caesalpinia nuga* (L.) Ait., and not *C. crista*. *Guilandina bonduc* and *G. bonducella* Linn., as cited above, are certainly identical with *C. crista* Linn.

[30] Symb. Antill. 2 (1900) 269–271.

[31] Fl. Ceyl. 2 (1894) 99.

2. **Caesalpinia glabra** (Mill.) comb. nov.

Guilandina glabra Mill. Gard. Dict. ed. 8 (1768) no. 3.

Caesalpinia bonduc Roxb. Hort. Beng. (1814) 32, Fl. Ind. 2 (1832) 362; Baker in Fl. Brit. Ind. 2 (1878) 255; F.-Vill. Nov. App. (1880) 69; Urban Symb. Antill. 2 (1900) 272, non *Guilandina bonduc* Linn. Sp. Pl. (1753) 381.

Guilandina bonduc Linn. Sp. Pl. ed. 2 (1762) 545, pro parte, non ed. 1 (1753) 381.

Caesalpinia crista Perk. Frag. Fl. Philip. (1904) 15, non Linn.

Guilandina bonduc var. *majus* DC. Prodr. 2 (1825) 480.

Guilandina major Small Fl. Southeast. U. S. (1903) 591.

Palawan, *Merrill 842, Bur. Sci. 228 Bermejos.* Mindanao, Lake Lanao, *Mrs. Clemens 755, 863, 1182:* District of Davao, *Copeland s. n.* One of the specimens from Lake Lanao (*Clemens 863*) has comparatively few and weak spines on the pod, but I do not consider it specifically distinct from the more common form with stout spines.

Cosmopolitan in the tropics.

I consider the specific name *bonduc* to be invalid in the genus, as the species as originally described under *Guilandina* is a synonym of *C. crista* Linn. What is apparently the earliest valid name is here adopted.

3. **Caesalpinia nuga** (Linn.) Ait. Hort. Kew. ed. 2, 3 (1811) 32; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 255; F.-Vill. Nov. App. (1880) 69; Naves in Blanco Fl. Filip. ed. 3, *pl. 150.*

Guilandina nuga Linn. Sp. Pl. ed. 2 (1762) 546; Blanco Fl. Filip. (1837) 344. ed. 2 (1845) 240, ed. 3, 2: 81.

Caesalpinia laevigata Perr. Mém. Linn. Soc. Paris 3 (1824) 104.

Luzon, Province of Cagayan, *Bur. Sci. 7418 Ramos:* Province of Pangasinan, *Bur. Sci. 4879 Ramos:* Province of Zambales, *Hallier, s. n., For. Bur. 5909 Curran:* Province of Bulacan, *McGregor 96:* Manila, *Marave 68:* Province of Bataan, *For. Bur. 2272 Meyer, For. Bur. 1952, 2492 Borden, Elmer 7009, Whitford 1264:* Province of Tayabas, *Whitford 842,* in part: Province of Camarines, *Ahern 252.* Polillo, *Bur. Sci. 9139 Robinson.* Lubang, *Merrill 962.* Mindoro, *Merrill 1294, 1225, 3341, For. Bur. 5517 Merritt.* Palawan, *Bur. Sci. 610 Foxworthy.* Panay, *Copeland 108.* Negros, *For. Bur. 7330 Everett.* Mindanao, Province of Surigao, *Bolster 367:* District of Davao, *Williams 2740.*

Native names: *Sapnit, sapinit,* or *sagmit,* in most provinces; sometimes *camatcabag;* in Mindoro sometimes *calauinit; bacaig* (Polillo).

Widely distributed in the Philippines along the seashore; throughout the tropics of the world in littoral districts.

4. **Caesalpinia pulcherrima** (Linn.) Sw. Obs. (1791) 166; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 255; F.-Vill. Nov. App. (1880) 69; Naves in Blanco Fl. Filip. ed. 3, *pl. 112.*

Poinciana pulcherrima Linn. Sp. Pl. (1753) 380; Blanco Fl. Filip. (1837) 333, ed. 2 (1845) 232, ed. 3, 2: 69; W. F. Wight ex Safford in Contr. U. S. Nat. Herb. 9 (1905) 358.

Almost universally known in the Philippines by the Spanish name "*caballero,*" rarely as "*maravilla;*" according to Blanco sometimes "*flores*" or "*rosas,*" all names of Spanish origin. Undoubtedly originating in tropical America; now widely distributed in the tropics of the world. It is extensively cultivated, and also spontaneous in the Philippines, and is represented by numerous specimens from all parts of the Archipelago, from the Batanes Islands to Palawan and southern Mindanao.

This species is the type of the genus *Poinciana* Linn., and is the only one cited by him under this genus in the first edition of his "Species Plantarum." According to strict priority *Poinciana* would be the proper generic name for the species now placed in *Caesalpinia*. See page 52.

5. **Caesalpinia sappan** Linn. Sp. Pl. (1753) 381; Blanco Fl. Filip. (1837) 335, ed. 2 (1845) 234, ed. 3, 2: 72; Naves l. c. ed. 3, *pl. 121;* Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 255; F.-Vill. Nov. App. (1880) 69; Vid. Sinopsis Atlas (1883) *t. 42, fig. C.*

Biancaca sappan Todaro Hort. Bot. Panorm. (1876) 3; W. F. Wight ex Safford in Contr. U. S. Nat. Herb. 9 (1905) 198.

LUZON, Province of Ilocos Norte, *Bur. Sci. 2292 Mearns:* Province of Ilocos Sur, *For. Bur. 14073 Merritt & Darling:* Province of Union, *Elmer 5547:* Province of Zambales, *Merrill 2959:* Province of Bulacan, *Bur. Sci. 6127 Robinson & Merritt:* Province of Rizal, *For. Bur. 3286 Ahern's collector:* Province of Bataan, *For. Bur. 13376 Cortes, For. Bur. 5984 Curran, Ahern 771:* Province of Tayabas, *Merrill 2420, 2131.* MINDORO, *Merrill 887, For. Bur. 9822 Merritt.* GUIMARAS, *For. Bur. 48 Ritchie, For. Bur. 4541 Villar.* NEGROS, *For. Bur. 5577 Everett.* BANTAYAN, *Bur. Sci. 1699 McGregor.* MINDANAO, *Mrs. Clemens 1177.*

Universally known in the Philippines as *sappan* or *sappang*, and *sibucao.*

India to Indo-China, the Malay Peninsula and Archipelago; probably not a true native of the Philippines, but introduced in ancient times.

6. **Caesalpinia sepiaria** Roxb. Hort. Beng. (1814) 32, nomen, Fl. Ind. 2 (1832) 360; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 256; F.-Vill. Nov. App. (1880) 69; Vidal Rev. Pl. Vasc. Filip. (1886) 114; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 229; Urban Symb. Antill. 2 (1900) 277.

Caesalpinia benguetensis Elmer Leafl. Philip. Bot. 1 (1907) 226.

Mezoneurum benguetense Elmer l. c. (1908) 362.

LUZON, Province of Rizal, (*Vidal 268*); without locality, *Loher 2194, 2195* in Herb. Kew.: Province of Benguet, *Elmer 5888, 8720* (type number of *C. benguetensis*), *Williams 1206:* Province of Isabela, *Bur. Sci. 8094 Ramos.*

I am unable to distinguish *Caesalpinia benguetensis* Elm. from the widely distributed *C. sepiaria* Roxb. Mr. Elmer states that his species is distinguished by its smaller leaves, obsolete stipules, and pods not beaked; the former character is exceedingly variable, while my specimen of the type number has a single pod bearing a 5 mm long beak, and the stipules, although smaller than in typical *Caesalpinia sepiaria,* and early deciduous, are present. The stipules on *Elmer 5888* are very distinct. The transfer to *Mezoneurum* was primarily due to a suggestion made by myself, and apparently without additional study on the part of Mr. Elmer.

It correctly reduced, *Reichardia ? decapetala* Roth Nov. Pl. Sp. (1821) 212; DC. Prodr. 2 (1825) 484, supplies the earliest specific name for the species, as Roxburgh's original reference to *Caesalpinia sepiaria* is a *nomen nudum.*

India to southern China and Japan, south to Malaya; introduced in tropical America, Australia, and Africa.

EXCLUDED SPECIES.

CAESALPINIA MIMOSOIDES Lam.; F.-Vill. Nov. App. (1880) 69. A species of India and Ceylon, not known from the Philippines, and doubtless admitted by F.-Villar on an erroneous identification.

28. MEZONEURUM Desf.

Calyx deeply cleft, with a wide short tube and a basal disk, the anterior lobe deeply cucullate (§ EUMEZONEURUM).

Leaflets opposite, large, ovate, acute or acuminate, about 10 cm long. 1. *M. cucullatum*

Leaflets alternate or subopposite, small, elliptic to elliptic-oblong, broad and rounded at the apex, 1.5 to 3.5 cm long.

Leaflets beneath and calyx externally rather densely pubescent. 2. *M. pubescens*

Leaflets and calyx glabrous.

Leaflets about 1.5 cm long; pods 1-seeded ..... 3. *M. mindorense*

Leaflets 2.5 to 3.5 cm long; pods 5- to 7-seeded ..... 4. *M. latisiliquum*

Calyx shallowly cleft, with a narrow, elongated tube, the disk extending above the base, the anterior lobe shallowly hooded. (Leaflets alternate, obovate-oblong, obtuse, 5 to 7 cm long) (§ TUBICALYX) ..... 5. *M. sumatranum*

1. **Mezoneurum cucullatum** (Roxb.) Wight & Arn. Prodr. (1834) 283; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 258; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 232.

Caesalpinia cucullata Roxb. Hort. Beng. (1814) 32, Fl. Ind. 2 (1832) 358.

Mezoneurum macrophyllum Bl. ex Miq. Fl. Ind. Bat. 1[1] (1855) 104.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 922*, February, 1907.

India to Yunnan (*Henry 12215*), south to Cochin-China, the Andaman Islands and Java; not previously reported from the Philippines.

Mezoneurum macrophyllum Bl., was reduced to *M. cucullatum* W. & A. by Baker, and the description of Blume's species seems to apply rather closely to the latter.

2. **Mezoneurum pubescens** Desf. in Mém. Mus. Paris 4 (1818) 245, *t. 11;* F.-Vill. Nov. App. (1880) 70; Vidal Rev. Pl. Vasc. Filip. (1886) 114.

Caesalpinia ignota Blanco Fl. Filip. (1837) 336, ed. 2 (1845) 235, ed. 3, 2: 72.

Mezoneurum hymenocarpum W. & A. Prodr. 1 (1834) 283; Prain in Journ. As. Soc. Beng. 66[2] (1897) 233, 472 ?

LUZON, Province of Rizal, *For. Bur. 1477, 3370 Ahern's collector, Dec. Philip. Forest Fl. no. 206 Ahern's collector;* near Manila, *Marave 69, McGregor 79, Llana 229, Merrill.*

Native names: *Camat-cabag, dauag* (Rizal).

Timor.

There is some doubt as to the additional range of this species, as Baker records it from Burma, but Prain states that the Burman, Ceylon, and Andaman Island material is *Mezoneurum hymenocarpum* W. & A., which species has alternate leaflets, much fewer in number than those of *M. pubescens* Desf. Fragments of three of the above numbers, representing flowers, immature and mature pods, were sent to the Paris Museum for comparison with Desfontaines' type. Doctor Lecomte, who kindly made the comparison, writes as follows: "Il résulte de cette étude que l'un des échantillons envoyés correspond aussi bien que possible à *M. hymenocarpum* W. et A., et l'autre à *M. pubescens* Desf., type. I, *M. hymenocarpum* W. & A., *coll. Llana 229,* 2, *M. pubescens* Desf., *coll. Ramos 1477, Marave 69.* De la première espèce nous possedons un échantillon envoyé par King absolument semblable à celui qui vous nous avez communiqué. De la deuxième nous avons pu faire la comparaison avec le type." After a careful examination of a full series of specimens, however, I am convinced that but a single species is represented by the material cited above. The specimen collected by Llana, examined by Doctor Lecomte, has very thin, immature fruit, but in all

other respects the plant agrees with the others cited above. The species is common in thin poor soil over volcanic tuff on open hills near Manila.

3. **Mezoneurum mindorense** Merr. in Philip. Journ. Sci. 3 (1908) Bot. 232.

MINDORO, *For. Bur. 5383 Merritt.*

Native name: *Sapinit.*

Var. **inerme** Merr. l. c.

MINDORO, *Bur. Sci. 1514 Bermejos.*

Endemic.

4. **Mezoneurum latisiliquum** (Cav.) Merr. in Philip. Journ. Sci. 4 (1909) Bot. 268.

Bauhinia ? latisiliqua Cav. Icon. 5 (1799) 5, *t. 408*, in part, excl. description and figure of the leaves.

Mezoneurum glabrum Desf. in Mém. Mus. Paris 4 (1818) 245, *t. 10;* DC. Prodr. 2 (1825) 484; F.-Vill. Nov. App. (1880) 70; Miq. Fl. Ind. Bat. 1[1] (1855) 103; Vidal Phan. Cuming. Philip. (1885) 110, Rev. Pl. Vasc. Filip. (1886) 114; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 64.

Caesalpinia torquata Blanco Fl. Filip. (1837) 336.

Mezoneurum procumbens Blanco l. c. ed. 2 (1845) 235, ed. 3, 2: 73.

Represented by numerous specimen cited by myself, *l. c.*, with the addition of *Bur. Sci. 7737 Ramos*, Province of Ilocos Norte, Luzon.

Native names: *Camut-pusa*, literally "cat's claw," (Pampanga, Mindoro, Bataan, Rizal); *sampinit* (Mindoro, Basilan); *sokit* (Basilan); *sagnit, sapnit, cabitcabag, tugabang, ugabang*, ex Blanco.

At low altitudes, northern Luzon to southern Mindanao; Timor.

The *Mezoneurum glabrum* of Baker in the Flora of British India is not Desfontaines' species, but is *M. furfuraceum* Prain.

5. **Mezoneurum sumatranum** (Roxb.) Wight & Arn. Prodr. 1 (1834) 283; Miq. Fl. Ind. Bat. 1[1] (1855) 105, 1081; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 259; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 235.

Caesalpinia sumatrana Roxb. Hort. Beng. (1814) 32, nomen, Fl. Ind. 2 (1832) 366.

Mezoneurum rubrum Merr. in Govt. Lab. Publ. (Philip.) 6 (1904) 7.

PALAWAN, *Merrill 805.*

The above specimen, on which *Mezoneurum rubrum* was based, is in fruit, and was referred by Perkins[32] to *M. glabrum* Desf. (=*M. latisiliquum* (Cav.) Merr.). Comparison with authentic material of *M. sumatranum* shows it to be the same as that species, and it is here accordingly reduced.

Malacca, Perak, Singapore, and Sumatra.

29. PELTOPHORUM Vogel.

1. **Peltophorum inerme** (Roxb.) Naves in Blanco Fl. Filip. ed. 3, *pl. 335*, ex F.-Vill. Nov. App. (1880) 69, as syn.

Caesalpinia inermis Roxb. Hort. Beng. (1814) 90, Fl. Ind. 2 (1832) 367.

Poinciana roxburghii G. Don Gen. Syst. 2 (1832) 433.

Caesalpinia ferruginea Decne. Nouv. Ann. Mus. 3 (1834) 462.

Caesalpinia arborea Zoll. Nat. en Geneesk. Archief 3 (1846) 65; Miq. Fl. Ind. Bat. 1[1] (1855) 112.

Peltophorum ferrugineum Benth. Fl. Austral. 2 (1864) 279; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 257; F.-Vill. Nov. App. (1880) 69; Vidal Rev. Pl. Vasc. Filip. (1886) 114; Prain ex King in Journ. As. Soc. Beng 66[2] (1897) 224.

[32] Frag. Fl. Philip. (1904) 15.

Baryxylum inerme Pierre Fl. Forest. Cochinch. (1899) *t. 390.*

Luzon, Province of Pangasinan, *For. Bur. 8307 Curran & Merritt:* Province of Batangas, *For. Bur. 7739 Curran & Merritt:* Manila, *Merrill 4087, For. Bur. 19053, 19054 Curran*, cultivated. Mindoro, *For. Bur. 9735, 9823 Merritt.* Palawan, *For. Bur. 3498 Curran, For. Bur. 7427 Manalo.* Balabac, *Bur. Sci. 484 Mangubat.*

A tree of low altitudes, mostly confined to the seashore; extensively cultivated in Manila as a shade tree. Malay Peninsula and the Andaman Islands to Borneo, Java, Timor, and northern Australia.

The oldest specific name is here adopted, and the generic designation *Peltophorum* is retained in accordance with the action of the Vienna Botanical Congress, although *Baryxylum* Lour. is much older.

30. ORMOSIA Jacks.

Flowers about 2 cm long, whitish; leaves softly pubescent, the nerves very distinct ..... 1. *O. paniculata*

Flowers about 1 cm long, purplish; leaves glabrous, shining, the nerves obscure ..... 2. *O. calavensis*

1. **Ormosia paniculata** Merr. in Govt. Lab. Publ. (Philip.) **35** (1906) 21, Philip. Journ. Sci. 1 (1906) Suppl. 64.

Luzon, Province of Bataan, *For. Bur. 2028* Borden, October, 1904.

Endemic.

2. **Ormosia calavensis** Azaola ex Blanco Fl. Filip. ed. 2 (1845) 230, ed. 3, **2**: 64; F.-Vill. Nov. App. (1880) 69; Vidal Rev. Pl. Vasc. Filip. (1886) 113, Phan. Cuming. Philip. (1885) 109, Sinopsis Atlas (1883) *t. 41, fig. H;* Perk. Frag. Fl. Philip. (1904) 15; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 64; Prain in Journ. As. Soc. Beng. **69**[2] (1900) 180.

Luzon, Province of Cagayan, *For. Bur. 16985 Bacani:* Province of Ilocos Norte, (*Cuming 1219*): Province of Rizal, *Merrill 1724, 2661, For. Bur. 447, 2963 Ahern's collector, Bur. Sci. 3362 Ramos:* Province of Bataan, *Decades Philip. Forest Fl. no. 223 Borden:* Province of Laguna, *For. Bur. 7760 Curran & Merritt:* Province of Tayabas, *Merrill 2600, For. Bur. 10367, 10750 Curran, For. Bur. 214 Van Wickle:* Province of Albay, *Cuming 916.* Masbate, *Merrill 2752.* Leyte, *For. Bur. 12423 Danao.* Mindanao, District of Zamboanga, *Ahern 595, For. Bur. 9475 Whitford & Hutchinson:* Lake Lanao, *Mrs. Clemens 1144, s. n.*

Native name: *Bahay* (Laguna, Tayabas, Bataan).

Endemic.

The generic name is antedated by *Toulichiba* Adans. but is here retained following the list of *nomina conservanda* of the Vienna Botanical Congress.

31. SOPHORA Linn.

1. **Sophora tomentosa** Linn. Sp. Pl. (1753) 373; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 249; Blanco Fl. Filip. (1837) 238, ed. 2 (1845) 229, ed. 3, **2**: 63; F.-Vill. Nov. App. (1880) 69; Vidal Sinopsis Atlas (1883) *t. 41, fig. G*, Rev. Pl. Vasc. Filip. (1886) 113.

Sophora heptaphylla Blanco l. cc., F.-Vill. l. c., non Linn.

Batanes Islands, Sabtan, *Bur. Sci. 3737 Fénix.* Luzon, Province of Pangasinan, *For. Bur. 8350 Curran & Merritt:* Province of Tayabas, *Merrill 1119, 2034, 1971, For. Bur. 10249 Curran:* Province of Camarines, *Ahern 213.* Polillo, *Bur. Sci. 9011 Robinson, Bur. Sci. 10763 McGregor.* Mindoro, *Merrill 1664, 2384, For. Bur. 9824 Merritt.* Palawan, *For. Bur. 3818 Curran.* Masbate, *Merrill*

3041. NEGROS, *For. Bur. 5612 Everett.* JOLO, *Williams 3118.* MINDANAO, District of Davao. *Copeland 1322.*

Native names: *Tambalisa* (Negros, Masbate, Mindoro, Tayabas); *cápon* (Batanes Islands); *sandalaitan* (Tayabas); *cabaicabai*, ex Blanco.

Throughout the Philippines along the seashore; widely distributed in the tropics of the world.

32. CROTALARIA Linn.

Leaves simple.

Pod not longer than the calyx, which is shaggily pubescent with long, soft, brown hairs; leaves linear, 5 to 15 cm long.

Flowers blue, sessile or subsessile ..... 1. *C. sessiliflora*

Flowers yellow, their pedicels stout, 5 to 8 mm long ..... 2. *C. calycina*

Pod as long as the calyx or sometimes slightly exceeding it, turgid, ovoid. (Calyx pubescent with short, appressed, gray or brown hairs; leaves linear or linear-oblong, usually less than 6 cm long) ..... 3. *C. linifolia*

Pod exserted, one-half to many times longer than the calyx, oblong.

Pods small, about 1 cm long, less than twice as long as the calyx.

Leaves linear to oblong; stems, leaves and calyces pubescent with short, appressed hairs; stipules none ..... 4. *C. albida*

Leaves orbicular-ovate to elliptic; stems, leaves and calyces pubescent with long, soft, brown, spreading hairs; stipules acicular. 5. *C. acicularis*

Pods 2 cm long or more, twice to many times as long as the calyx.

Pods glabrous; flowers yellow.

Stems diffuse; racemes lateral ..... 6. *C. ferruginea*

Stems erect; racemes terminal.

Leaves broad, rounded and retuse at the apex ..... 7. *C. retusa*

Leaves acute at the apex ..... 8. *C. assamica*

Pods pubescent; flowers blue or yellow.

Flowers yellow; branches terete; stipules none or minute; leaves linear to oblong ..... 9. *C. juncea*

Flowers blue; branches prominently angled; stipules large, persistent, semilunar; leaves ovate ..... 10. *C. verrucosa*

Leaves compound.

Leaves 3-foliolate.

Pedicels 5 mm long or less.

Inflorescence mostly terminal, the racemes elongated; leaflets elliptic-obovate or obovate, broad at the apex.

Leaflets retuse, and usually with a small mucro at the apex; calyx-segments pale-greenish when dry; pods glabrous or nearly so. 11. *C. saltiana*

Leaflets manifestly apiculate-acuminate at the apex, not retuse; calyx-segments brownish-purple when dry; pods hirsute ..... 12. *C. incana*

Inflorescence mostly axillary, the racemes rather short; leaflets gradually narrowed to the slender, acute or acuminate apex; pods densely pubescent ..... 13. *C. bracteata*

Pedicels 1.5 mm long, bibracteolate below the middle with very slender, 4 to 5 mm long bracteoles; calyx-segments nearly free, narrowly-lanceolate, acuminate, 1 cm long, equaling the corolla ..... 14. *C. radiata*

Leaves usually 5-foliolate, varying from 3- to 7-foliolate; leaflets linear to narrowly oblanceolate ..... 15. *C. quinquefolia*

1. **Crotalaria sessiliflora** Linn. Sp. Pl. ed. 2 (1763) 1004; Benth. in Hook. Lond. Journ. Bot. 2 (1843) 565; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 73; F.-Vill. Nov. App. (1880) 57; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 390; Vidal Phan. Cuming. Philip. (1885) 107.

Crotalaria pallida Blanco Fl. Filip. (1837) 570 (?), non Dryand.

Crotalaria pumila Blanco l. c. ed. 2 (1845) 397, ed. 3, 2: 365 (?), non Schrank.

Luzon, Province of Cagayan, (*Cuming 1258*): District of Bontoc, *For. Bur. 16540 Curran & Merritt:* Province of Benguet, *Williams 1422:* Province of Nueva Ecija, *Bur. Sci. 5282 McGregor:* Province of Laguna, *Wilkes Expedition,* in U. S. Nat. Herbarium.

Following F.-Villar, the synonyms *Crotalaria pallida* Blanco, *non* Dryand., and *C. pumila* Blanco, *non* Schrank, are placed here. It is, however, impossible to determine from Blanco's short description whether or not he had this plant, but from a knowledge of the region from which he secured his material (Mandaloyan, near Manila), and from his description, it seems more probable that he had a depauperate specimen of *C. linifolia* Linn.

India to southern China and Japan, the Malay Peninsula, Andaman Islands, and Java.

2. **Crotalaria calycina** Schrank Pl. Rar. Monac. (1819) *t. 12;* DC. Prodr. 2 (1825) 129; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 72; F.-Vill. Nov. App. (1880) 57; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 390; Vidal Phan. Cuming. Philip. (1885) 107.

Luzon, Province of Isabela, *Bur. Sci. 8099 Ramos:* District of Lepanto, *Merrill 4474:* Province of Benguet, *For. Bur. 15805 Curran, Elmer 6477, Williams 924:* Province of Pangasinan, *Bur. Sci. 4873 Ramos:* Province of Bulacan, *Yoder 137.* Mindoro, *Bur. Sci. 1519 Bermejos.* Mindanao, *Mrs. Clemens 32, Copeland 361.*

India and Ceylon to southern China, Malaya, northern Australia, and tropical Africa.

3. **Crotalaria linifolia** Linn. f. Suppl. (1781) 322; DC. Prodr. 2 (1825) 128; Blanco Fl. Filip. (1837) 570; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 72; F.-Vill. Nov. App. (1880) 57; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1886) 151; Vidal Phan. Cuming. Philip. (1885) 107; Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 350.

Crotalaria stenophylla Vog. Nov. Act. Nat. Cur. 19 (1843) Suppl. 1:7; Benth. in Hook. Lond. Journ. Bot. 2 (1843) 568.

Quirosia secunda Blanco Fl. Filip. ed. 2 (1845) 398, ed. 3, 2:366; Naves l. c. *pl. 268.*

Crotalaria formosana Matsum. in Journ. Coll. Sci. Imper. Univ. Tokyo 12 (1900) 395; Matsum. & Hayata l. c. 22 (1906) 103, *tab. 10.*

Luzon, Province of Cagayan, *Bur. Sci. 7472 Ramos, For. Bur. 16746 Curran:* Province of Benguet, *Bur. Sci. 5759 Ramos, Williams 945:* Province of Nueva Vizcaya, *Merrill 403:* Province of Pangasinan, *Bur. Sci. 4901, 4929 Ramos:* Province of Tarlac, *Merrill 3637:* Province of Rizal, *Bur. Sci. 1447 Ramos:* Manila, *Hallier s. n., Abella 52:* Province of Tayabas, *For. Bur. 11114 Curran.* Mindanao, Lake Lanao, *Mrs. Clemens 742.*

India to China and Formosa, south to New Guinea, northern Australia, and the Caroline Islands.

The Philippine material here referred to *Crotalaria linifolia* is rather uniform in its narrow leaves, in this character matching specimens in our herbarium from Formosa and from the Caroline Islands (*Kawakami & Kobayashi 1519; Volkens 324, 467*); this narrow-leaved form was described by Vogel from Phil-

ippine material as *C. stenophylla*, which Bentham[33] considered to be distinct from *C. linifolia* Linn. f., distinguished from the latter by its narrow leaves, slightly smaller flowers, and broader upper calyx-lobes. Baker,[34] working with more abundant material, reduced *C. stenophylla* to *C. linifolia* Linn. f., and I have followed him in this matter. I consider *C. formosana* Matsum. to be unquestionably identical with *C. stenophylla* Vog., and here reduce it with the latter to *C. linifolia* Linn. f.

4. **Crotalaria albida** Heyne ex Roth Nov. Sp. Pl. (1821) 333; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 71; F.-Vill. Nov. App. (1880) 57; Vidal Phan. Cuming. Philip. (1885) 106, Rev. Pl. Vasc. Filip. (1886) 105.

Luzon, Province of Cagayan, *Bur. Sci. 7414 Ramos, For. Bur. 16486 Bacani:* District of Bontoc, *For. Bur. 16539 Curran & Merritt:* Province of Ilocos Norte, *Bur. Sci. 2337 Mearns, For. Bur. 15504 Merritt & Darling:* Province of Benguet, *Elmer 6616, Merrill 4406:* Province of Pangasinan, *Bur. Sci. 4817 Ramos.*

India to southern China, Formosa, and the Malay Peninsula.

5. **Crotalaria acicularis** Ham. in Wall. Cat. (1832) no. 5390; Benth. in Hook. Lond. Journ. Bot. 2 (1843) 476; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 68; F.-Vill. Nov. App. (1880) 57.

Crotalaria prostrata Ceron Cat. Pl. Herb. (Manila) (1892) 60, nec Roxb. nec Rottl.

Luzon, Province of Benguet, *Merrill 4266, Williams 1419, Elmer 5826:* Province of Rizal, *Bur. Sci. 1838 Ramos:* without locality, *Vidal 2645, Loher 2399*, in Herb. Kew. Mindanao, *Mrs. Clemens 210.*

Bengal to Ava, Tenasserim, and Java; not reported from southern China or from the Malay Peninsula.

This form has been identified at Kew both as *Crotalaria humifusa* Grah. (*Merrill 4266*), and as *C. prostrata* Roxb. (*Elmer 5826, Loher 2399, Vidal 2645*), but there seems to be a single species represented, which, from the original descriptions, agrees most closely with *C. acicularis* Ham. The presence of acicular stipules on the Philippine material at once excludes the possibility of it being referable to *C. prostrata* Roxb., which is described as being without stipules; the sessile pods, containing about 15 seeds, apparently would place the specimens with *C. acicularis*, rather than with *C. humifusa*, as the latter species is said to have a short-stalked pod containing but 6 to 8 seeds.

6. **Crotalaria ferruginea** Grah. in Wall. Cat. (1832) no. 5398; Benth. in Hook. Lond. Journ. Bot. 2 (1843) 476; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 68; F.-Vill. Nov. App. (1880) 57; Vidal Phan. Cuming. Philip. (1885) 107.

Crotalaria ferruginea var. *major* Benth. l. c. 477.

Luzon, Province of Cagayan, *For. Bur. 16476, 16480 Bacani:* Province of Benguet, *Williams 1410, 1411, For. Bur. 15734 Curran & Merritt, Bur. Sci. 4452 Mearns:* Province of Zambales, *For. Bur. 5864 Curran:* Province of Nueva Vizcaya, *Merrill 319.* Mindanao, District of Davao, *Copeland 590:* Province of Cotabato, *Mrs. Clemens s. n.:* Lake Lanao, *Mrs. Clemens s. n.:* Province of Misamis, *Cuming 1628* (cotype of the var. *major* Benth.).

India to China and Formosa, south to the Malay Peninsula and Archipelago.

Both the typical form and the var. *major* are represented in the material cited above under this species; the latter apparently intergrades, judging from the material at present available for comparison.

Crotalaria chinensis Linn. has been reported from the Philippines by Bentham,[35]

[33] Hook. Lond. Journ. Bot. 2 (1843) 568.

[34] Hook. f. Fl. Brit. Ind. 2 (1878) 72.

[35] Hook. Lond. Journ. Bot. 2 (1843) 566.

(*Cuming 1604*), in which he has been followed by later authors, Baker, F.-Villar, and Vidal. I have examined the specimen in the Kew Herbarium, and it seems to be comparable with *Merrill 319*, cited above. Unfortunately my specimen is in flower, but identical forms bearing both flowers and fruits, have the latter much exceeding the calyx, while *C. chinensis* has a short pod, which is not exserted. It seems probable that Cuming's specimen is really referable to *C. ferruginea*, and that typical *C. chinensis* Linn. has not been as yet found in the Philippines.

7. **Crotalaria retusa** Linn. Sp. Pl. (1753) 715; Miq. Fl. Ind. Bat. 1[1] (1855) 330; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 75; F.-Vill. Nov. App. (1880) 57; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 38; Perk. Frag. Fl. Philip. (1904) 16.

Luzon, Province of Tayabas, *Bur. Sci. 3101 Mearns, For. Bur. 9579 Curran.* Palawan, *Bur. Sci. 297 Bermejos.* Guimaras, *For. Bur. 28 Ritchie.* Negros, *For. Bur. 4272 Everett.* Mindanao, District of Davao, *DeVore & Hoover 219, Williams 2689, Copeland 576.*

Native name: *Calogealog* (Negros).

Cosmopolitan in the tropics.

8. **Crotalaria assamica** Benth. in Hook. Lond. Journ. Bot. 2 (1843) 481; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 75; F.-Vill. Nov. App. (1880) 57; Vidal Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 105.

Luzon, Province of Abra, *Bur. Sci. 7255 Ramos:* Province of Bataan, *For. Bur. 2021 Borden:* Province of Zambales, *Hallier s. n.:* without locality, (*Cuming 1886*).

British India.

9. **Crotalaria juncea** Linn. Sp. Pl. (1753) 714; DC. Prodr. 2 (1825) 125; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 79.

Luzon, Province of Ilocos Norte, *Bur. Sci. 7608 Ramos, Bur. Sci. 2287 Mearns:* Manila, *Merrill 6233* (cultivated), *Cuzner 58* (cultivated).

A native of British India, and there cultivated for its fiber; extending through Malaya to northern Australia. Apparently spontaneous in northern Luzon. The sunn hemp.

10. **Crotalaria verrucosa** Linn. Sp. Pl. (1753) 715; Baker in Hook. f. Brit. Ind. 2 (1876) 77; F.-Vill. Nov. App. (1880) 57; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 64.

Crotalaria angulosa Lam. Encycl. 2 (1786) 197; Cav. Ic. 4 (1797) 10, *pl. 321.*

Phascolus bulai Blanco Fl. Filip. (1837) 572.

Quirosia anceps Blanco l. c. ed. 2 (1845) 398, ed. 3, 2: 367.

Luzon, Province of Bataan, *Merrill 3308, Elmer 6741, For. Bur. 2181 Meyer:* Province of Tayabas, *For. Bur. 11117 Curran.* Mindoro, *Merrill 911.* Masbate, *Merrill 3396.* Negros, *For. Bur. 5592 Everett.* Cebu, *Hallier s. n.* Mindanao, District of Zamboanga, *Copeland s. n.*

Native names: *Gulung-gulung* (Negros); *calayacai* (Mindoro); *bulai lava*, ex Blanco.

Widely distributed in the Philippines at low altitudes; tropics of the world.

11. **Crotalaria saltiana** Andr. Bot. Rep. (1811) *t. 648;* Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 41, 353.

Crotalaria striata DC. Prodr. 2 (1825) 131; Miq. Fl. Ind. Bat. 1[1] (1855) 346; Perk. Frag. Fl. Philip. (1904) 16; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 84.

Panay, *Merrill 2414, Yoder 35.*

Native names: *Gorung-gorung, colung-colung* (Panay).

Widely distributed in the tropics of the world.

12. **Crotalaria incana** Linn. Sp. Pl. (1753) 716; Miq. Fl. Ind. Bat. 1[1] (1855) 347; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 83; Naves in Blanco Fl. Filip. ed. 3, *pl. 160;* F.-Vill. Nov. App. (1880) 58; Vidal Rev. Pl. Vasc. Filip. (1886) 104; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 409.

Babuyanes Islands, Camiguin, *Bur. Sci. 4085 Fénix.* Luzon, Province of Cagayan, *For. Bur. 17103 Curran:* Manila, *Merrill 20, Cuzner 43, Elmer 5526, McGregor 56:* Province of Rizal, *Bur. Sci. 1405 Ramos.* Mindoro, *Bur. Sci. 928 Mangubat, Merrill 1275, 1666.*

Native names: *Latuc-latucan* (Manila); *bulailaua* (Rizal); *bolelaua, potoc-potocan* (Mindoro).

A native of tropical America; now widely distributed in the tropics of the world; very abundant in waste places about towns in the Philippines.

13. **Crotalaria bracteata** Roxb. Fl. Ind. 3 (1832) 278; Benth. in Hook. Lond. Journ. Bot. 2 (1843) 586; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 83; F.-Vill. Nov. App. (1880) 58; Vidal Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 104.

Luzon, Province of Benguet, *Merrill 4316, For. Bur. 15707 Merritt & Darling, Bur. Sci. 5334 Ramos:* Province of Pangasinan, (*Cuming 1009*).

British India, and, according to Baker, the Malay Archipelago; not reported from the Malay Peninsula.

14. **Crotalaria radiata** sp. nov.

Herba erecta, ramosa, circiter 40 cm alta, omnibus partibus leviter pilosis; foliis trifoliolatis, stipulis nullis; foliolis parvis, ellipticis vel obovato-ellipticis, 1 ad 2 cm longis, apice late rotundatis, brevissime apiculatis; racemis axillaribus terminalibusque, circiter 10 cm longis; pedicellis 1.5 cm longis, bibracteolatis; floribus, ut videtur, flavis; calycis segmentis anguste lanceolatis, 1 cm longis, subaequalibus, persistentibus, radiatis, corollam aequantibus; leguminibus junioribus pilosis, anguste oblongis, stipitatis, acuminatis; seminibus 25 ad 30.

An annual, erect, much branched herb, at least 40 cm high, all parts sparingly pubescent with scattered, rather soft, whitish hairs, or the mature leaflets glabrous or nearly so. Branches terete, slender, greenish. Leaves trifoliolate, the petiole 1.5 to 2 cm long; stipules none; leaflets elliptic to obovate-elliptic, membranaceous, 1 to 2 cm long, about 1 cm wide, all very shortly petiolulate, the base broadly cuneate, the apex rounded, very shortly apiculate, when young with scattered hairs on both surfaces, when mature glabrous on the upper surface. Racemes terminal and axillary, about 10 cm long; pedicels slender, 1.5 cm long, each with two setaceous stipules below the middle 4 to 5 mm in length. Calyx cleft nearly to the base into five narrowly lanceolate, acuminate, subequal segments, about 10 mm long, 2.5 mm wide, which are persistent in fruit, slightly accrescent, and radiately disposed, becoming ultimately quite free. Corolla apparently yellow, as long as the calyx-segments. Ovary pubescent. Young pods narrowly oblong, 1.5 cm long, pilose, stipitate, the apex long and slenderly acuminate, straight or somewhat curved, each containing from 25 to 30 seeds. Mature pods unknown.

Luzon, Province of Nueva Vizcaya, Dupax, in agricultural lands near the river, *Bur. Sci. 8244 Ramos*, May, 1909.

A species well characterized by its small, trifoliolate leaves, absence of stipules, its long-pedicelled flowers, each pedicel with a pair of elongated, very narrow bracteoles below the middle, and more especially by its narrowly lanceolate, subequal calyx-lobes equal to the corolla in length, which are persistent, ultimately quite free, and radiately arranged at the base of the pod.

15. **Crotalaria quinquefolia** Linn. Sp. Pl. (1753) 716; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 84; Blanco Fl. Filip. (1837) 569, ed. 2 (1845) 397, ed. 3, 2: 365; Naves l. c. *pl. 159;* F.-Vill. Nov. App. (1880) 58; Vog. Nov. Act. Acad. Nat. Cur. 19 (1843) Suppl. 1: 9.

Luzon, Province of Cagayan, *Bur. Sci. 7888 Ramos:* Province of Ilocos Norte, *Bur. Sci. 2315 Mearns:* Province of Pampanga, *Bolster 39:* Province of Rizal, *Guerrero 26, For. Bur. 3297, 3277 Ahern's collector, Manotok 53:* Province of Tayabas, *Gregory 40, Whitford 743, For. Bur. 7470 Reyes.* Polillo, *Bur. Sci. 9237 Robinson.* Cebu, *Lyon s. n.* Mindanao, *Mearns s. n.*

Native names: *Putucan* (Tayabas); *palpatoc* (Union); *patoc-patocan, bulailaua* (Rizal): *catanda, susoi, susosusoyan, balatong-aso,* ex Blanco.

Widely distributed in the Philippines at low altitudes, frequent as a rice-paddy weed; India to the Malay Peninsula and Archipelago.

EXCLUDED SPECIES.

Crotalaria laburnifolia Linn.; F.-Vill. Nov. App. (1880) 58.

This species was first credited to the Philippines by Baker,[36] possibly on an erroneously localized plant of Cuming's collection. F.-Villar states that he saw living specimens in Luzon and Panay. The species is not represented by any extant Philippine material known to me.

Crotalaria sericea Retz.; F.-Vill. l. c. 57. Probably an erroneous identification for *C. retusa* Linn. *C. sericea* Retz. is not represented by any extant Philippine material known to me.

33. MEDICAGO Linn.

1. **Medicago denticulata** Willd. Sp. Pl. 3 (1803) 1414; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 90; Britt. & Br. Ill. Fl. Northern U. S. 2 (1897) 272, *fig. 2066.*

Luzon, Province of Benguet, *Bur. Sci. 2722, 3473 Mearns.*

A species undoubtedly of recent introduction which may or may not persist; Europe and Asia to China and Japan; naturalized in North America.

Medicago sativa Linn., alfalfa, has been introduced a number of times by the Philippine Bureau of Agriculture, and has been cultivated in numerous places from sea level to an altitude of 2,000 m (Pauai, Province of Benguet, Luzon, *Merrill 4798*). It does not appear to be adapted to conditions in the Philippines and rapidly dies out.

Trifolium Linn. Four species of *Trifolium* have been found in the Philippines, all apparently of recent introduction, either purposely for cultivation as forage plants, or accidentally in hay. All of them have produced flowers at altitudes of from 800 to 2,000 m, but it is very doubtful if any of them will persist. *T. hybridum* Linn., "Alsike clover" is represented by *Bur. Sci. 4344 Mearns*, cultivated at Pauai, Province of Benguet, Luzon. *T. incarnatum* Linn., "crimson clover," by *Bur. Sci. 8399 McGregor*, cultivated at the same place as the preceding. *T.*

[36] Hook. f. Fl. Brit. Ind. 2 (1876) 84.

pratense Linn., "red clover," *Merrill 4323*, cultivated at Baguio, Province of Benguet, Luzon, and by an unnumbered specimen collected by *Mrs. Clemens* at Camp Keithley, Mindanao. *T. repens* Linn., "white clover," *Merrill 4319*, near construction camps on the Benguet Road, Province of Benguet, Luzon.

34. INDIGOFERA Linn.

Leaves simple; pods globose, small, 1-seeded (§ SPHAERIDIOPHORA).. 1. *I. linifolia*
Leaves simple, trifoliolate, or pinnate; pods oblong or linear, seeds several to many (§ EUINDIGOFERA).
Leaves simple ..... 2. *I. unifoliolata*
Leaves trifoliolate ..... 3. *I. trifoliata*
Leaves pinnate.
An erect shrub or tree 3 to 8 m high; calyx shortly toothed; pods ascending or spreading, not reflexed ..... 4. *I. zollingeriana*
Herbaceous, suffrutescent, or shrubby, less than 1 m high; calyx deeply cleft; pods reflexed.
Stems, leaves and inflorescence densely pubescent; pods straight, densely hirsute with spreading, usually brown hairs..... 5. *I. hirsuta*
Glabrous or subglabrous, if at all pubescent, then the hairs short, scattered, appressed; pods straight or curved.
Racemes elongated, 13 to 20 cm long; pods laxly arranged, straight. 6. *I. nigrescens*
Racemes short, 3 to 5, rarely 10 cm in length.
Pods short, much curved, 1 to 1.5 cm long, 6- to 8-seeded; leaves acute or subacute, acuminate ..... 7. *I. suffruticosa*
Pods straight, or curved only near the apex, 2 to 3 cm long, 8- to 12-seeded; leaves usually rounded at the apex, acuminate. 8. *I. tinctoria*

1. **Indigofera linifolia** Retz. Obs. 4 (1786) 29; DC. Prodr. 2 (1825) 222; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 92; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 195.

Sphaeridiophorum linifolium Desv. Journ. Bot. 3 (1813) 125, *t. 6, fig. 35.*

LUZON, Province of Ilocos Norte, *For. Bur. 15506 Merritt & Darling:* Province of Benguet, *Merrill 4387.*

Abyssinia and Afghanistan through India to southern China, the Malay Archipelago and northern Australia; not reported from the Malay Peninsula.

2. **Indigofera unifoliolata** sp. nov. § *Euindigofera, Simplicifoliae.*

Erecta, suffruticosa, circiter 40 cm alta, ramis ramulisque tenuibus, teretibus, adpresse pubescentibus; foliis simplicibus, breviter petiolatis, anguste oblongis, usque ad 3 cm longis, obtusis, leviter adpresse pubescentibus, stipulis nullis; racemis axillaribus, brevibus, congestis, 5- ad 8-floris; leguminibus anguste oblongis, 1 ad 1.5 cm longis, reflexis, 4-angulatis.

An erect perennial from a stout woody root, about 40 cm high, sparingly branched, the stems and branches slender, terete, reddish-brown, slightly pubescent with short appressed hairs. Leaflet one, narrowly oblong, 1.5 to 3 cm long, 3 to 5 mm wide, chartaceous, somewhat pubescent with short appressed hairs on both surfaces, the apex

obtuse, sometimes apiculate, the base acute, the lower surface somewhat paler than the upper, not glandular; petioles about 2 mm long; stipules none. Racemes axillary, usually solitary, slightly exceeding the petiole in length, each with from 5 to 8 densely disposed pinkish flowers. Flowers about 4 mm long, the calyx-teeth very slenderly acuminate. Pods few, usually one or two in each raceme, reflexed, narrowly oblong, straight, acuminate, 10 to 15 mm long, strongly 4-angled, ridged along one side, about 1.8 mm thick, sparingly pubescent with short appressed hairs, each containing from 5 to 8 seeds.

Luzon, Province of Rizal, Morong, along the borders of Lake Bay, *Bur. Sci. 1411 Ramos*, August, 1906.

A species with much the appearance of, and certainly allied to *Indigofera trifoliata* Linn., differing from that species in its simple leaves, which are not at all glandular beneath, and absence of stipules.

3. **Indigofera trifoliata** Linn. Amoen. Acad. 4 (1759) 327; Sp. Pl. ed. 2 (1763) 1062; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 96; F.-Vill. Nov. App. (1880) 58; Vid. Rev. Pl. Vasc. Filip. (1886) 106; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 411.

Batanes Islands, Sabtan, *Bur. Sci. 3724 Fénix*. Luzon, Province of Cagayan, *For. Bur. 16487, 16507 Bacani, Bur. Sci. 7878 Ramos:* Province of Pangasinan, *Bur. Sci. 4906, 4851 Ramos:* Province of Rizal, *For. Bur. 3288 Ahern's collector.*

India and Ceylon to southern China, Malaya, and northern Australia; rather variable in vegetative characters.

4. **Indigofera zollingeriana** Miq. Fl. Ind. Bat. 1[1] (1855) 310.

Indigofera teysmanni Miq. l. c. (1858) 1083; Prain & Baker in Journ. Bot. 40 (1902) 143; Merr. in Forestry Bureau (Philip.) Bull. 1 (1903) 24; Perk. Frag. Fl. Philip. (1904) 16.

Indigofera galegoides Vid. Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 105; F.-Vill. Nov. App. (1880) 59, non DC.

Indigofera benthamiana Hance in Ann. Sci. Nat. IV 18 (1862) 219.

Batanes Islands, Batan, *Bur. Sci. 3190 Mearns.* Luzon, Province of Ilocos Norte. *For. Bur. 15508 Merritt & Darling:* Province of Benguet, *Merrill 4416, Williams 1288:* Province of Pangasinan, *For. Bur. 8310 Curran & Merritt:* Province of Rizal, *Merrill 5043:* Province of Camarines, *For. Bur. 10666 Curran, Ahern 234, 235.* Mindanao, Province of Surigao, *Ahern 434.*

Southern China and Formosa to Cochin-China, the Malay Peninsula and Archipelago to New Caledonia.

Indigofera zollingeriana Miq., has not only page priority over *I. teysmanni*, but the part of the volume containing the description of it antedates the part containing the description of *I. teysmanni* by about three years. This is much the largest of our Philippine species, sometimes reaching a height of about 8 m. It extends from sealevel to an altitude of at least 1000 m. It differs from all the other Philippine species in its short calyx-teeth, and in its pods being pointed forward in the direction of the main axis of the raceme, or more or less spreading, but not reflexed.

5. **Indigofera hirsuta** Linn. Sp. Pl. (1753) 751; DC. Prodr. 2 (1825) 228; Miq. Fl. Ind. Bat. 1[1] (1855) 304; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 98; F.-Vill. Nov. App. (1880) 58; Prain & Baker in Journ. Bot. 40 (1902) 136.

Indigofera angustifolia Blanco Fl. Filip. (1837) 596, ed. 2 (1845) 415, ed. 3, 2: 394, non Linn.

Luzon, Province of Cagayan, *For. Bur. 18612 Klemme, Bur. Sci. 7802 Ramos:* Province of Abra, *Bur. Sci. 7120 Ramos:* Province of Benguet, *Williams 944, 1417:* Province of Pangasinan, *Alberto 32:* Province of Zambales, *For. Bur. 5852 Curran:* Province of Rizal, *Bur. Sci. 1413 Ramos, Merrill 2718:* Manila, *Merrill 3466, Cuzner 57.* Mindanao, Lake Lanao, *Mrs. Clemens 206.*

Native name: Tayom-tayom, tayom-tayoman (Manila).

A weed in waste places at low altitudes, widely distributed in the Philippines; tropics of the world.

6. **Indigofera nigrescens** Kurz ex Prain in Journ. As. Soc. Beng. 67[2] (1898) 286; C. B. Robinson in Philip. Journ. Sci. 3 (1908) Bot. 183.

Luzon, Province of Benguet, *Williams 925, 1413, Bur. Sci. 3462, 4273, 4396, 4458 Mearns, Elmer 6582, Merrill 6395, For. Bur. 16225 Curran, Merritt, & Zschokke.*

Khasia Mountains and southwestern China.

7. **Indigofera suffruticosa** Mill. Gard. Dict. ed. 8 (1768) no. 2; Prain & Baker in Journ. Bot. 40 (1902) 137, 138, sub *I. anil* Linn.

Indigofera anil Linn. Mant. 2 (1771) 272; Miq. Fl. Ind. Bat. 1[1] (1855) 307; F.-Vill. Nov. App. (1880) 58; Vidal Phan. Cuming. Philip. (1885) 107; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 410; Prain in Journ. As. Soc. Beng. 66[2] (1897) 81.

Indigofera tinctoria Blanco Fl. Filip. (1837) 591, ed. 2 (1845) 413, ed. 3, 2:393, saltem pro parte, non Linn.

Batanes Islands, Batan, *Bur. Sci. 3596 Fénix.* Babuyanes Islands, Camiguin, *Bur. Sci. 3965 Fénix;* Dalupiri, *Bur. Sci. 10116 McGregor.* Luzon, Province of Cagayan, *For. Bur. 16465 Bacani, Bur. Sci. 7854 Ramos:* Province of Ilocos Norte, *Bur. Sci. 7621 Ramos, For. Bur. 13884, 15528 Merritt & Darling:* Province of Tayabas, *Whitford 601, Gregory 66.* Mindoro, *Merrill 872, 1261, For. Bur. 5477 Merritt, Bur. Sci. 6661 Robinson.* Masbate, *Merrill 3403.* Cebu, *Barrow 1.* Guimaras, *For. Bur. 27 Ritchie.* Panay, *Copeland s. n.* Mindanao, District of Davao, *Williams 2753.*

Native names: *Tayom, tayung, tayum, tagum* in most islands and provinces; *pauay* (Batanes Islands). Indigo.

Widely distributed in the Philippines, formerly extensively cultivated for extraction of indigo. A native of tropical America, now widely distributed in the tropics of the world.

8. **Indigofera tinctoria** Linn. Sp. Pl. (1753) 751; Miq. Fl. Ind. Bat. 1[1] (1855) 306; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 99; F.-Vill. Nov. App. (1880) 58; Prain & Baker in Journ. Bot. 40 (1902) 63.

Indigofera argentea Blanco Fl. Filip. ed. 2 (1845) 415, ed. 3, 2: 394 (?) non Linn.

Luzon, Province of Pangasinan, *For. Bur. 4897 Curran:* Province of Camarines, *Ahern 227, Bur. Sci. 6321 Robinson.* Cebu, *Hallier s. n.* Mindanao, District of Davao, *DeVore & Hoover 156.*

Native names: the same as for the preceding species, also *tagung-tagung* (Davao); *tayong-tayongan* (Camarines).

Like the preceding species, formerly cultivated for indigo; widely distributed in the tropics of the world.

35. PSORALEA Linn.

1. **Psoralea badocana** Blanco Fl. Filip. ed. 2 (1845) 416, ed. 3, 2: 395; F.-Vill. Nov. App. (1880) 58; Vidal Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 105.

Liparia badocana Blanco Fl. Filip. (1837) 597.

Meladenia densiflora Turcz. in Bull. Soc. Nat. Mosc. 21[1] (1848) 576.

LUZON, Province of Abra, *Bur. Sci. 7240 Ramos:* District of Bontoc, *Bur. Sci. 7011 Ramos:* Province of Ilocos Sur, *Cuming 1149:* Province of Ilocos Norte, *Bur. Sci. 2234 Mearns:* Province of Pangasinan, *Bur. Sci. 4907 Ramos.* PANAY, (*Cuming 1649*).

Endemic.

36. PAROSELA Cav. (*Dalea* Linn.)

1. **Parosela glandulosa** (Blanco) comb. nov.

Amorpha glandulosa Blanco Fl. Filip. (1837) 555.

Dalea alopecuroides Blanco l. c. ed. 2 (1845) 389, ed. 3, 2: 351; F.-Vill. Nov. App. (1880) 58, non Willd.

Dalea nigra Mart. & Gal. in Bull. Acad. Brux. 10[2] (1843) 43; Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 309; Vidal Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 105; Perk. Frag. Fl. Philip. (1904) 16.

Dalea glandulosa Merr. in Govt. Lab. Publ. (Philip.) 27 (1905) 37, Philip. Journ. Sci. 1 (1906) Suppl. 64.

Parosela nigra Rose in Contr. U. S. Nat. Herb. 10 (1906) 105.

LUZON, Province of Abra, *Bur. Sci. 7128 Ramos:* Province of Ilocos Norte, *For. Bur. 15546 Merritt & Darling:* Province of Benguet, *Merrill 4351, For. Bur. 16226 Curran, Merritt, & Zschokke:* Province of Union, *Elmer 5601:* Province of Pangasinan, *Bur. Sci. 4888 Ramos:* Province of Bataan, *Whitford s. n.:* Province of Rizal, *Bur. Sci. 1844 Ramos, Merrill 1349, Hidalgo 366, Nieva 266.*

Native names: *Agogo, sampaloc-sampalocan, chaang-parang* (Rizal): *duran-parang, camangi,* ex Blanco.

A native of tropical America, introduced into the Philippines at an early date, and now locally very abundant in many localities. First described from Philippine material.

The reasons for taking up the generic name *Parosela* for the species generally known as *Dalea* are given by Rose, *l. c.,* 8 (1903) 302, and the case is not covered by the list of *nomina conservanda* of the Vienna Botanical Congress. In connection with Doctor Rose's argument, it may be well, perhaps, to call attention to the fact that *Dalea* Gaertner (1788), antedates the restoration of the Linnean *Dalea,* which was first taken up after the establishment of the binomial system by Jussieu (1789) followed by Ventenat, Cramer, and Willdenow. According to strict priority *Dalea* Gaertner is the oldest name for the plants usually placed in the genus *Microdon* Choisy (1823), and as this case is not covered by the list of *nomina conservanda* of the Vienna Botanical Congress, then according to the principle of priority adopted by that Congress, *Dalea* Gaertn. must displace *Microdon* Choisy, and in thus becoming a "valid" genus must of necessity invalidate the use of the same name for a different genus.

37. TEPHROSIA Pers.

Pods about 8 cm long, densely covered with rather long, brown hairs; leaflets elliptic or narrowly elliptic, 3 to 4 cm long..... 1. *T. vestita*

Pods 2 to 3.5 cm long, gray-puberulent or subglabrous; leaflets less than 2.5 cm in length.

Racemes elongated, lax, much exceeding the leaves, 10 to 15 cm long; pods 6- to 8-seeded ..... 2. *T. purpurea*

Racemes short, congested, less than 5 cm in length.

Leaflets narrowly oblong, 5- to 10-jugate; pods 8- to 10-seeded, usually densely arranged, their pedicels 2 to 3 mm long..... 3. *T. dichotoma*

Leaflets obovate or narrowly obovate, 4- or 5-jugate; pods 5- to 8-seeded, few, laxly arranged, their pedicels 5 to 7 mm long..... 4. *T. obovata*

1. **Tephrosia vestita** Vog. in Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 15; Rolfe in Journ. Bot. **23** (1885) 212; Forbes & Hemsl. in Journ. Linn. Soc. Bot. **23** (1886) 158; Vidal Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 106; Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 353.

MINDANAO, Province of Misamis, *Cuming 1621:* Lake Lanao, Camp Keithley, *Mrs. Clemens s. n.*

Southern China, Java, New Guinea.

2. **Tephrosia purpurea** (Linn.) Pers. Syn. Pl. **2** (1807) 329; Baker in Hook. f. Fl. Ind. **2** (1876) 112; Trimen Fl. Ceyl. **2** (1894) 31; Prain ex King in Journ. As. Soc. Beng. **66**[2] (1897) 85.

Cracca purpurea Linn. Sp. Pl. (1753) 752.

LUZON, Province of Cavite, *Bur. Sci. 1315 Mangubat*, August, 1906.

This species, as interpreted by most authors, is exceedingly variable, and includes a number of forms; what I take to be the typical form, that is, the Ceylon plant, for the type of the species was from that island, seems to extend from India and Ceylon to southern China, more or less throughout Malaya, to northern Australia; some authors give its range as the tropics of the world.

3. **Tephrosia dichotoma** Desv. Ann. Sci. Nat. **9** (1826) 415; Miq. Fl. Ind. Bat. **1**[1] (1855) 298.

Tephrosia luzoniensis Vog. Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 15; Miq. l. c. 299; F.-Vill. Nov. App. (1880) 59; Perk. Frag. Fl. Philip. (1904) 17.

Indigofera hirsuta Blanco Fl. Filip. (1837) 591, non Linn.

Indigofera senegalensis Blanco l. c. ed. 2 (1845) 412, ed. 3, **2**: 392; Naves l. c. *pl. 162*, non Lam.

Tephrosia piscatoria A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 407, quoad pl. Philip., non Pers.

LUZON, Province of Abra, *Bur. Sci. 7121 Ramos:* Province of Ilocos Norte, *For. Bur. 15545 Merritt & Darling, Bur. Sci. 2296 Mearns:* Province of Zambales, *Merrill 327, For. Bur. 5851 Curran:* Manila, *Merrill 369, Elmer 5535, Millares 58, Milaor 328:* Province of Rizal, *Bur. Sci. 1397 Ramos:* Province of Laguna, *Williams 2044, Hallier s. n.*

This is undoubtedly the form credited to the Philippines by Vidal[37] as *Tephrosia purpurea* Pers. It seems, however, to be distinct from that species, and is well characterized by its short, rather dense racemes, usually densely arranged pods, and more numerous seeds. The type of *Tephrosia luzoniensis* Vog., in the Berlin Herbarium, has been examined by me and found to agree with the specimens above cited. The identification of *T. dichotoma* Desv. is based on the description, which applies closely, except that the leaflets are described as being 4-jugate, while in the material before me they vary from 5- to 10-jugate.

4. **Tephrosia obovata** sp. nov. § *Reineria, Pinnatae.*

Fruticosa, diffusa, 20 ad 40 cm alta, ramulis junioribus, subtus foliolis, inflorescentiisque plus minus adpresse argenteo-pubescentibus; foliis 1.5

[37] Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 106.

ad 2 cm longis; foliolis 4- vel 5-jugatis, obovatis vel anguste obovatis, apice truncatis vel retusis, apiculatisque, supra glabris, 7 ad 10 mm longis; racemis terminalibus axillaribusque, paucifloris, folia subaequantibus; folliculis anguste oblongis, puberulis, 2 ad 2.5 cm longis, longe pedicellatis, seminibus 5 ad 8.

A rather diffuse shrubby plant 20 to 40 cm high, the young branchlets, under surface of the leaves and inflorescence more or less silvery pubescent with appressed, short hairs. Stems brown or gray, strongly lenticellate, glabrous, the branches slender. Leaves 1.5 to 2 cm long, the leaflets rather crowded, 4- or 5-jugate, obovate or narrowly obovate, 7 to 10 mm long, 5 to 7 mm wide, the apex truncate or retuse, apiculate, the base acute, the upper surface glabrous, the lower more or less silvery-pubescent, the petiolules very short; stipules linear, about 2 mm long. Racemes mostly terminal, about as long as the leaves, silvery-pubescent, few-flowered. Flowers purplish, about 8 mm long, the calyx-teeth slenderly acuminate. Pods 2 to 2.5 cm long, 3 to 4 mm wide, rather densely puberulent, straight or nearly so, acuminate, flat, each containing from 5 to 8 seeds; pedicels 5 to 7 mm long.

Luzon, Province of Cagayan (Palaui Island), *For. Bur. 16939 Curran*, March, 1909: Province of Ilocos Norte, *Bur. Sci. 2341 Mearns*, January, February, 1907. Locally known on Palaui Island as *Carcardis*.

This species is well characterized by its obovate or narrowly obovate, rather small, crowded leaflets, its short terminal racemes, and its long-pedicelled pods, differing from other Philippine forms in these characters. It is manifestly allied to *Tephrosia dichotoma* Desv., and also, but less strongly, to *T. purpurea* (L.) Pers.

As for the generic name, *Cracca* Linn. (non Benth.), is manifestly the oldest one. *Tephrosia* Pers., has, however, been included in the list of *nomina conservanda* of the Vienna Botanical Congress, and is accordingly here retained.

38. MILLETTIA W. & A.

Branchlets brown-pubescent; leaflets 1- or 2-jugate; inflorescence paniculate, rusty-puberulous, longer than the leaves ..... 1. *M. longipes*

Branchlets glabrous or subglabrous; leaflets 2- to 5-jugate; inflorescence of simple, glabrous racemes which are usually shorter than the leaves.

Pods up to 22 cm long, 2.5 to 3 cm wide; leaflets 3- or 4-jugate, frequently 10 cm long, the veins distinct ..... 2. *M. ahernii*

Pods less than 15 cm in length, and less than 2 cm in width.

Leaves 15 to 20 cm long.

Leaflets firmly coriaceous, 3-jugate, blunt-acuminate, 6 to 9 cm long. 3. *M. canariifolia*

Leaflets membranaceous or chartaceous mostly sharp-acuminate.

Leaflets 4- or 5-jugate; flowers 1 cm long, the standard entire or only slightly cleft at the apex ..... 4. *M. merrillii*

Leaflets 2- or 3-jugate; flowers 2 cm long, the standard strongly cleft at the apex ..... 5. *M. cavitensis*

Leaves less than 10 cm long; leaflets 2- or 3-jugate; flowers 1.5 cm long, the standard somewhat cleft at the apex ..... 6. *M. foxworthyi*

1. **Millettia longipes** Perk. Frag. Fl. Philip. (1904) 80.

Luzon, Province of Isabela, Malunu, *Warburg 12094, 12095, 12112,* in Herb. Berol.

Endemic.

2. **Millettia ahernii** Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) Bot. 103.

The type of this species is *For. Bur. 3373 Ahern's collector,* Bosoboso, Province of Rizal, Luzon. I am disposed to refer to it also the following specimens: Luzon, Province of Ilocos Sur, *For. Bur. 5655 Klemme:* Province of Rizal, *Bur. Sci. 5221 Ramos.* Leyte, *For. Bur. 12436 Danao.*

The species is manifestly allied to *M. merrillii,* but differs in its larger pods, and much larger leaflets which have prominent nerves.

Native names: *Baloc, baloc-baloc* (Rizal); *bani* (Ilocos).

Endemic.

3. **Millettia canariifolia** sp. nov.

Arbor glabra circiter 8 m alta; foliis 18 ad 20 cm longis; foliolis 3-jugatis, coriaceis, ovatis vel oblongo-ovatis, usque ad 9 cm longis, in sicco nitidis, subtus pallidioribus, basi late rotundatis, apice breviter late acuminatis, nervis utrinque 6 vel 7, vix prominentibus; folliculis usque ad 13 cm longis, 1.8 cm latis, planis, leviter falcatis, basi angustatis, apice longe acuminatis.

A glabrous tree about 8 m high. Branches terete, reddish-brown, lenticellate. Leaves 18 to 20 cm long, odd-pinnate; leaflets 3-jugate, ovate or oblong-ovate, coriaceous, rather pale and shining when dry, the lower surface paler than the upper, 6 to 9 cm long, 2 to 4 cm wide, the base rather broad, rounded, the apex shortly and obtusely blunt-acuminate; nerves 6 or 7 on each side of the midrib, not distinct, irregular, obscurely anastomosing, the reticulations lax, indistinct; petiolules 5 to 8 mm long. Flowers unknown. Pods rather woody, flat, narrowly oblong, 9 to 13 cm long, 1.5 to 1.8 cm wide, obscurely wrinkled when dry, not lenticellate, slightly curved, rather gradually narrowed below, the apex strongly and slenderly acuminate, the acumen curved, 1 to 1.5 cm long.

Luzon, Province of Zambales, Candelaria, *Bur. Sci. 4711, 4727 Ramos,* December 7, 1907, locally known as *Malapatpat.*

The leaves, and especially the leaflets, although smaller, are suggestive of those of *Canarium luzonicum* A. Gray, whence the specific name.

4. **Millettia merrillii** Perk. Frag. Fl. Philip. (1904) 81; Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 18.

Millettia xylocarpa Naves in Blanco Fl. Filip. ed. 3, *pl. 79;* Vidal Sinopsis Atlas (1883) *t. 41, fig. B,* non Miq.

Millettia caerulea F.-Vill. Nov. App. (1880) 59, non Baker.

Luzon, Province of Isabela, *Bur. Sci. 8061 Ramos:* Province of Cagayan, *For. Bur. 18539 Alvarez:* Province of Union, *Elmer 6166:* Province of Pampanga, *Merrill 1387, 1437, 3831, Topping 482, Villegas 453:* Province of Bulacan, *For. Bur. 7194, 7196 Curran:* Province of Rizal, *Merrill 1633, 2801, 2673, For. Bur. 1147, 2890 Ahern's collector, Decades Philip. Forest Fl. no. 156 Ahern's collector, Bur. Sci. 2178 Ramos, Topping 752.* Mindoro, *For. Bur. 9821 Merritt.*

Native names: *Baloc, baloc-baloc* (Rizal); *bani, malabay* (Pampanga).

An endemic species, common at low altitudes; according to Prain, *in lit.*, very closely allied to *M. decipiens* Prain of the Malay Peninsula.

5. **Millettia cavitensis** sp. nov. § *Eumillettia.*

Arbor glabra circiter 8 m alta; foliis imparipinnatis, usque ad 20 cm longis; foliolis 2- vel 3-jugatis, ovatis, oblongo-ovatis, vel elliptico-ovatis, submembranaceis vel chartaceis, basi rotundatis vel subacutis, apice valde acuminatis, utrinque nitidis; racemis elongatis, foliis subaequilongis, multifloris; floribus atropurpureis, 2 cm longis.

A glabrous tree about 8 m high. Branches terete, rather slender, gray or brownish, sometimes lenticellate. Leaves odd-pinnate, 16 to 20 cm long. Leaflets 2- or 3-jugate, ovate, oblong-ovate, or elliptic-ovate, 6 to 10 cm long, 2 to 4 cm wide, submembranaceous or chartaceous, shining on both surfaces, the base rounded or subacute, the apex rather strongly and slenderly acuminate; nerves about 5 on each side of the midrib, somewhat ascending, not prominent, very obscurely anastomosing, the ultimate reticulations very fine, dense; petiolules 3 to 5 mm long. Racemes solitary, in the upper axils, about 15 cm long, many-flowered. Flowers dark-purple, their pedicels slender, 1 to 1.2 cm long. Calyx cup-shaped, truncate, about 6 mm high, 7 to 8 mm in diameter. Standard somewhat pubescent outside, about 22 mm long, 16 mm wide, broadly ovate, the apex broad, rather strongly cleft, the base of the lamina with two cartilaginous callosities 2 mm wide and 1 mm long, the claw stout, 4 mm long. Ovary rather distinctly pubescent, containing about 6 ovules. Vexillary filament free at the base, then united with the others for about two-thirds its length. Pods (immature) 10 cm long, 1.5 cm wide, flat, somewhat wrinkled, gradually narrowed toward the base, the apex strongly acuminate, the acumen curved.

Luzon, Province of Cavite, Maragondong, *Merrill 4181*, July, 1905, in forested ravines along a small stream, altitude about 250 m.

Manifestly allied to the preceding species, differing in its less numerous, larger, more strongly acuminate leaflets, and by having flowers twice as large.

6. **Millettia foxworthyi** sp. nov. § *Eumillettia.*

Arbor glabra circiter 15 m alta; foliis imparipinnatis, circiter 8 cm longis; foliolis 3-jugatis, oblongo-ellipticis, chartaceis, 2 ad 4 cm longis, acutis vel obscure acuminatis, subtus pallidioribus; racemis axillaribus, foliis subaequalibus vel brevioribus; floribus circiter 1.5 cm longis.

A glabrous tree about 15 m high. Branches reddish-brown, lenticellate. Leaves odd-pinnate, about 8 cm long; leaflets 2- or 3-pinnate, oblong-elliptic, chartaceous, 2 to 4 cm long, 1.2 to 1.7 cm wide, the base acute or rounded, the apex acute or somewhat acuminate, the lower surface much paler than the upper, both dull or only slightly shining when dry; nerves about 5 on each side of the midrib, not distinct, the reticulations subobsolete; petiolules about 4 mm long. Racemes in the upper axils, shorter than the leaves, rather many-flowered. Flowers

light-purple, their pedicels about 8 mm long. Calyx cup-shaped, truncate, about 4 mm high. Standard elliptic-obovate, about 1.5 cm long, 1.2 cm wide, slightly pubescent outside, the apex rounded, somewhat cleft, the basal callosities prominent, subcartilaginous, 2.5 to 3 mm wide, 1 mm high, the claw stout, about 2 mm long. Vexillary filament free at the base, then united with the rest for most of its length. Ovary glabrous, or with a very few scattered hairs.

PALAWAN, Mount Victoria, *Bur. Sci. 740 Foxworthy*, March, 1906, along river banks, altitude about 250 m.

As to the genus, Prain[38] calls attention to the fact that F. von Mueller has shown that *Millettia* is not distinct from *Wistaria*, and that Otto Kuntze[39] has proposed the adoption of *Phaseoloides* Mill., in the modified form *Phaseolodes*, to include the various species of both *Millettia* and *Wistaria*. This is, however, inadmissible under generally accepted rules, as Miller's name is pre-Linnean, dating from 1737, and seems not to have been used in the interval. *Kraunhia* Raf. (1809), is noted by Prain as the earliest unobjectional name, but this was excluded by the Vienna Botanical Congress in favor of *Wistaria*. Small[40] has taken up the name *Bradlea* Adans. (1763), for the American species of *Wistaria*, but it seems doubtful if this suggestion will meet with general approval. Under the Vienna rules, *Wistaria* Nutt. (1816), which is older than *Millettia* W. & A. (1834), would be the proper name for the species now placed in *Millettia*, if the two genera are to be combined. Pending a revision of the entire group, *Millettia* is retained.

EXCLUDED SPECIES.

MILLETTIA PULCHRA Benth.; F.-Vill. Nov. App. (1880) 59.

MILLETTIA SERICEA W. & A.; F.-Vill. l. c.

MILLETTIA SPLENDENS W. & A.; F.-Vill. l. c.

None of the above species are definitely known from the Philippines, and all were doubtless admitted on erroneous identifications on the part of F.-Villar.

39. GLIRICIDIA H. B. K.

1. **Gliricidia sepium** (Jacq.) Steud. Nomencl. (1821) 688; Urban Symbol. Antill. 2 (1900) 288; Perk. Frag. Fl. Philip. (1904) 17; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 64.

Robinia sepium Jacq. Enum. (1760) 28.

Gliricidia maculata H. B. K. Nov. Gen. 6 (1823) 393, in nota, ex Ind. Kew.; F.-Vill. Nov. App. (1880) 59; Merr. in Forestry Bureau (Philip.) Bull. 1 (1903) 22.

Galedupa pungam Blanco Fl. Filip. (1837) 558, ed. 2 (1845) 390, ed. 3, 2: 352, Naves l. c. ed. 3, *pl. 250*, non Gmel.

Millettia ? luzonensis A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 456; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 82.

Millettia splendidissima Vid. Cat. Pl. Prov. Manila (1880) 25, non Bl.

LUZON, Province of Ilocos Norte, *Bur. Sci. 2314 Mearns, For. Bur. 14690 Darling:* Province of Zambales, *Merrill 2913:* Province of Laguna, *For. Bur.*

[38] Journ. As. Soc. Beng. 66 [2] (1897) 86.

[39] Rev. Gen. Pl. (1891) 201.

[40] Fl. Southeastern U. S. (1903) 612, as *Bradleia*.

10989 Curran: Manila, *Merrill Decades Philip. Forest Fl. 289:* Province of Bataan, *Ahern 767, For. Bur. 2593 Meyer, Merrill 1523:* Province of Rizal, *For. Bur. 2464 Ahern's collector:* Province of Tayabas, *Merrill 1913, For. Bur. 6596 Kobbe.* Mindoro, *Merrill 894, For. Bur. 8532 Merritt.* Palawan, *For. Bur. 3607 Curran, Bur. Sci. 263 Bermejos.* Guimaras, *For. Bur. 294 Gammill.* Bohol, *Bur. Sci. 1237 McGregor.* Mindanao, *Ahern 309.*

Native names: *Madre cacao; cacauate,* the former of Spanish, the latter of Mexican origin.

A native of tropical America, introduced into the Philippines in the eighteenth century, according to F.-Villar, and now cultivated and subspontaneous more or less throughout the Archipelago; very abundant in many provinces and islands.

40. SESBANIA Scop.

Flowers small, bud straight; annual suffrutescent herbs (§ Eusesbania).

Flowers 2 cm long; pod twisted, pendulous ..... 1. *S. roxburghii*

Flowers 1 cm long; pod not twisted, usually ascending..... 2. *S. cannabina*

Flowers large, 7 to 8 cm long, the buds falcately recurved; pod not twisted, pendulous (§ Agati) ..... 3. *S. grandiflora*

1. **Sesbania roxburghii** Merr. in Philip. Journ. Sci. 4 (1909) Bot. 269.

Aeschynomene paludosa Roxb. Hort. Beng. (1814), nomen, Fl. Ind. 3 (1832) 333, non *Sesbania paludosa* Jacq.

Coronilla emerus Blanco Fl. Filip. (1837) 582, non Linn.

Sesbania paludosa Prain in Journ. As. Soc. Beng. 66[2] (1897) 82, 367, non Jacq.

Sesbania cannabina Blanco Fl. Filip. ed. 2 (1845) 418, ed. 3, 2: 400, non Pers.

Sesbania grandiflora Miq. Fl. Ind. Bat. 1[1] (1855) 288, non Pers.

Sesbania cochinchinensis Kurz in Journ. As. Soc. Beng. 45[2] (1876) 271, non DC.

Sesbania aculeata var. *paludosa* Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 115, in part, and excluding the synonym *Aeschynomene uliginosa.*

Sesbania aculeata F.-Vill. Nov. App. (1880) 59, non Pers.

Luzon, Province of Laguna, *Bur. Sci. 6530 Robinson, For. Bur. 10098 Curran,* in shallow water in Lake Bay.

Native names: *Balacla* (Laguna); *malacaguios,* ex Blanco.

Bengal to Burma, southern China, Formosa, and Java.

2. **Sesbania cannabina** (Retz.) Pers. Syn. 2 (1807) 316; DC. Prodr. 2 (1825) 265; Prain in Journ. As. Soc. Beng. 66[2] (1897) 83, 368.

Aeschynomene cannabina Retz. Obs. 5 (1789) 26.

Agati cannabina Desv. Journ. Bot. 1 (1813) 120.

Sesbania aegyptiaca F.-Vill. Nov. App. (1880) 59; Naves in Blanco Fl. Filip. ed. 3, *pl. 405,* non Pers.

Sesbania aculeata F.-Vill. l. c. 59, non Pers.

Sesbania picta Vid. Cat. Pl. Prov. Manila (1880) 26, non Pers.

Luzon, Province of Isabela, *Bur. Sci. 8086 Ramos:* Province of Ilocos Norte, *Bur. Sci. 2233 Mearns, Bur. Sci. 7648 Ramos:* Province of Ilocos Sur, *For. Bur. 15695 Merritt & Darling:* Province of Union, *Fénix 2:* Province of Pangasinan, *Alberto 28, Bur. Sci. 4850 Ramos:* Province of Pampanga, *Merrill 1444:* Manila, *Burgos 57, McGregor 73:* Province of Rizal, *Bur. Sci. 1370 Ramos:* Province of Laguna, *Elmer, Hallier s. n.* Mindanao, District of Cotabato, *For. Bur. 3938 Hutchinson.*

Native names: *Rubao* (Union); *balacbac* (Rizal); *bayacbac-buquit* (Pampanga).

India to Burma, the Malay Peninsula and Java.

3. **Sesbania grandiflora** (Linn.) Pers. Syn. 2 (1807) 316; Blanco Fl. Filip. (1837) 599, ed. 2 (1845) 418, ed. 3, 2: 399; Naves l. c. *pl. 291;* Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 115; F.-Vill. Nov. App. (1880) 60; Vidal Sinopsis Atlas (1883) *t. 40, fig. F.;* Perk. Frag. Fl. Philip. (1904) 17.

Robinia grandiflora Linn. Sp. Pl. (1753) 722.

Aeschynomene grandiflora Linn. l. c. ed. 2 (1763) 1060.

Sesban grandiflorus Poir. in Lam. Encycl. 7 (1806) 127.

Agati grandiflora Desv. Journ. Bot. 1 (1813) 120, *t. 4, fig. 6;* Miq. Fl. Ind. Bat. 1[1] (1855) 289; W. F. Wight ex Safford in Contr. U. S. Nat. Herb. 9 (1905) 175.

LUZON, Province of Cagayan, *Bur. Sci. 16464 Bacani:* Province of Union, *Elmer 5667:* Province of Nueva Vizcaya, *Merrill 166:* Province of Pangasinan, *For. Bur. 8404 Curran & Merritt, Bur. Sci. 4939 Ramos:* Manila, *Merrill 647, Decades Philip. Forest Fl. no. 55, Katigbak 241:* Province of Tayabas, *For. Bur. 10336 Curran, Merrill 1895.* GUIMARAS, *For. Bur. 98 Ritchie.* MINDANAO, *Mrs. Clemens 313, Williams 2694.*

Universally known in the Tagalog Provinces as *caturay,* in the Ilocano Provinces as *catuday; gawi-gawi* (Guimaras).

Widely distributed in the Philippines in and about towns, the flowers eaten as a salad and cooked as a pot herb; probably not a true native of the Philippines. Mascarene Islands through India and Malaya to northern Australia; usually planted.

The name *Sesbania* is not the oldest one for this genus, and it is not included in the list of *nomina conservanda* of the Vienna Botanical Congress. At the risk of being considered inconsistent, I have, however, retained it for the present work. Otto Kuntze[41] has adopted the generic name *Emerus* Burm. (1737) for all species usually known as *Sesbania,* but this is inadmissable under all generally accepted rules. In 1763 Adanson proposed two generic names for the species now included in *Sesbania,* the first, having page priority, *Sesban,* which was later changed to *Sesbania* by Scopoli, and the second *Agati,* which was based on *Robinia grandiflora* Linn. The latter name was taken up by Desvaux in 1813, with four species, *A. cannabina* Desv., *A. coccinea* Desv., *A. grandiflora* Desv., and *A. virgata* Desv., in which he has been followed by some recent authors. Small[42] considers *Sesban* and *Agati* to be generically distinct. If strict priority, limited by the date 1753, is to be observed, *Sesban* would then be the proper generic name, in case a single genus is recognized; if two genera are recognized, then *Sesban* would be the proper name for the small-flowered species (§ *Eusesbania*), and *Agati* the proper generic name for the large-flowered species (§ *Agati*).

41. CLIANTHUS Banks & Soland.

1. **Clianthus binnendyckianus** Kurz in Journ. As. Soc. Beng. 40[2] (1871) 51; Koord. Meded. 's Lands Plantent. 19 (1908) 429; Perk. Frag. Fl. Philip. (1904) 20.

MINDANAO, Province of Surigao, *Bolster 381:* Lake Lanao, *Mrs. Clemens 548, 623, s. n.:* District of Davao, *Williams 2745.* POLILLO, *Bur. Sci. 10767 McGregor.*

Celebes and (?) Ceram.

The genus has three known species, two belonging in the subgenus *Euclianthus,* in Australia, and the above species constituting the subgenus *Pseudoclianthus.*

[41] Rev. Gen. Pl. (1891) 180.

[42] Fl. Southeastern U. S. (1903) 614.

The generic name *Donia* G. Don, has page priority over *Clianthus*, both genera having been published in the same work; the latter is retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

42. ORMOCARPUM DC.

1. **Ormocarpum cochinchinense** (Lour.) comb. nov.

Diphaca cochinchinensis Lour. Fl. Cochinch. (1790) 454.

Hedysarum sennoides Willd. Sp. Pl. 3 (1800) 1207.

Ormocarpum sennoides DC. Prodr. 2 (1825) 315; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 152; F.-Vill. Nov. App. (1880) 60; Vidal Rev. Pl. Vasc. Filip. (1886) 106; Perk. Frag. Fl. Philip. (1904) 17.

Luzon, Province of Ilocos Sur, *For. Bur. 5631 Klemme:* Province of Ilocos Norte, *For. Bur. 13956 Merritt & Darling.*

India, Ceylon, tropical Africa; Siam, southern China, Malaya to northern Australia and Polynesia.

Ormocarpum DC. (1825) is antedated by *Diphaca* Lour. (1790), so far as the generic name is concerned, but the former is in the list of *nomina conservanda* of the Vienna Botanical Congress, and is here retained, although necessitating a change in the specific name according to strict priority. Loureiro cites Rumphius' Herbarium Amboinense, 3 (1743) 200, *t. 128*, but the figure apparently represents *Ormocarpum glabrum* T. & B. rather than *O. cochinchinense*. O. Kuntze[43] has taken up Rumphius' name *Solulus* for the species generally known as *Ormocarpum*, but this is inadmissable under all generally accepted rules.

43. AESCHYNOMENE Linn.

1. **Aeschynomene indica** Linn. Sp. Pl. (1753) 713; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 151; Vid. Phan. Cuming. Philip. (1885) 107, Rev. Pl. Vasc. Filip. (1886) 106.

Aeschynomene aspera Vogel in Nov. Act. Acad. Nat. Cur. 19 (1843) Suppl. 1: 26, non Linn.

Aeschynomene roxburghii Spreng.; Llanos Fragm. (1851) 83.

Luzon, Province of Pampanga, *Merrill 4235:* Manila, *Merrill 3410, Hernandez 49:* Province of Rizal, *Bur. Sci. 1423 Ramos.* Polillo, *Bur. Sci. 9024 Robinson.*

A common and widely distributed weed in wet lands, rice paddies, etc.; widely distributed in the tropics, especially in the Old World.

I have seen the Philippine specimen in the Berlin Herbarium determined by Vogel as *A. aspera*, and consider it to be rather *A. indica*.

44. SMITHIA Ait.

Calyx rigid, its veins close, parallel, simple, its lips acute, with few scattered hairs; flowers yellow ..... 1. *S. sensitiva*

Calyx membranaceous, its veins not close and parallel, anastomosing, the upper lip truncate, very broad, prominently ciliate-bristly; flowers pale-blue. 2. *S. ciliata*

1. **Smithia sensitiva** Ait. Hort. Kew. 3 (1789) 496; DC. Prodr. 2 (1825) 323; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 148; Perk. Frag. Fl. Philip. (1904) 18.

Damapana sensitiva O. Kuntze Rev. Gen. Pl. (1891) 179.

Luzon, Province of Benguet, *Williams 969, 1277, Bur. Sci. 5533, 5928 Ramos,*

[43] Rev. Gen. Pl. (1891) 205.

Elmer 6374, Merrill 4393, Bur. Sci. 8764 McGregor: Province of Nueva Vizcaya, *Merrill 111, 296, Bur. Sci. 8227 Ramos:* Province of Pangasinan, *Alberto 79, Bur. Sci. 4902, 4895 Ramos.* MINDANAO, Lake Lanao, *Mrs. Clemens 871.*

In the Philippines mostly at medium altitudes, usually in damp open places; tropical Asia and Africa to China and Formosa, Andaman and Nicobar Islands, and Java.

2. **Smithia ciliata** Royle Ill. (1839) 201, *t. 35, fig. 2;* Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 150; C. B. Robinson in Philip. Journ. Sci. 3 (1908) 184.

Damapana ciliata O. Kuntze Rev. Gen. Pl. (1891) 179.

LUZON, Province of Benguet, *Williams 970, Merrill 4267, Bur. Sci. 5890 Ramos, Bur. Sci. 2502 Mearns.*

In the Philippines growing on dry open slopes in the pine region of northern Luzon; India, Formosa.

Baker states that this species has yellow flowers, but having noted that the Philippine specimens, identified at Kew, and the New York Botanical Garden as *Smithia ciliata,* all had blue flowers, I wrote to Doctor Prain asking that the material be reëxamined, and am indebted to him for the following report made by Mr. Craib: "Royle in his original description (Illustrations of the Botany of the Himalayan Mountains, p. 201) says nothing about the color of the corolla. In a note, however, he says that he is indebted to Mr. W. Saunders for the drawing published. So it appears that up to the time of publication of the work quoted, Royle had not himself seen a living specimen of the plant.

"The following is extracted from manuscript notes on the species cover in the Kew Herbarium: 'The corolla in this plant varies from bluish to whitey-blue nearly white, *never* yellow (as Royle has painted it) copied in the Flora of British India' [signed] C. B. Clarke, Oct., 1899.

"The specimen quoted (Merrill 4267) was correctly identified at Kew as *Smithia ciliata* Royle."

The oldest valid generic name is *Damapana* Adans. (1763), but *Smithia* Ait. (1789) is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

45. ARACHIS Linn.

1. **Arachis hypogæa** Linn. Sp. Pl. (1753) 741; Blanco Fl. Filip. (1837) 567, ed. 2 (1845) 396, ed. 3, 2: 363; Naves l. c. *pl. 157;* Miq. Fl. Ind. Bat. 1[1] (1855) 281; F.-Vill. Nov. App. (1880) 60.

LUZON, Province of Tarlac, *Dizon 364:* Province of Pampanga, *Fcliciano 273:* Province of Rizal, *Loher 2409:* Province of Tayabas, *Merrill 4010.*

Commonly cultivated in the Philippines and in tropical and subtemperate parts of the world. Universally known in the Philippines as *maní.* The peanut.

46. ZORNIA Gmel.

1. **Zornia diphylla** (Linn.) Pers. Syn. 2 (1807) 318; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 147; F.-Vill. Nov. App. (1880) 60; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 65.

Hedysarum diphyllum Linn. Sp. Pl. (1753) 747.

Lupinus angustifolius Blanco Fl. Filip. (1837) 566, non Linn.

Smithia bigeminata Blanco l. c. ed. 2 (1845) 395, ed. 3, 2: 362.

Zornia nuda Vog. in Linnaea 10 (1836) 587.

LUZON, Province of Cagayan, *For. Bur. 16609, 16938 Curran:* Province of Abra, *Bur. Sci. 7235 Ramos:* Province of Benguet, *Williams 1421:* Province of

Zambales, *For. Bur. 5863 Curran:* Province of Bulacan, *Yoder 127:* Province of Rizal, *Bur. Sci. 1846:* Province of Bataan, *Merrill 3787, Williams 80.*

In open grass-lands at low and medium altitudes in the Philippines; cosmopolitan in the tropics.

47. DESMODIUM Desv.

Leaves 3-foliolate.

Pod distinctly divided into several 1-seeded joints which ultimately separate.

Bracts large, orbicular, persistent, foliaceous, inclosing the flowers; an erect shrub ..... 1. *D. pulchellum*

Bracts very small or none.

Flowers arranged in axillary or panicled umbels; shrubs or small trees.

Umbels axillary; leaflets broad at the apex, round, obtuse or very obscurely and broadly acuminate.

Leaflets small, 1 to 1.8 cm long ..... 2. *D. cumingianum*

Leaflets ample, mostly 5 to 10 cm long ..... 3. *D. umbellatum*

Umbels arranged in terminal or axillary panicles; leaflets gradually narrowed upward to the acuminate or acute apex.

4. *D. quinquepetalum*

Flowers not umbellate; shrubs or herbs.

Pods not sinuate, the segments indehiscent, 3 to 5 times as long as broad.

Erect, suffrutescent; leaflets ovate, ample, 7 to 15 cm long, acute or acuminate ..... 5. *D. laxiflorum*

Herbaceous, spreading; leaflets small, 2 to 4 cm long, or in luxuriant forms rarely 6 cm long, elliptic, obtuse, rounded, or retuse.

6. *D. scorpiurus*

Segments of the pods dehiscent or indehiscent, not manifestly longer than broad, or if so, then deeply sinuate.

Pods not stipitate, the segments indehiscent, as broad as long, spirally twisted, both sutures deeply indented; herbaceous.

8. *D. procumbens*

Pods stipitate, the segments longer than broad, the upper suture straight, the lower very deeply sinuate, the constrictions reaching nearly to the upper suture; shrubby.

Leaves quite glabrous; pod long exserted, its stipe usually much longer than the first segment ..... 9. *D. laxum*

Leaves more or less pubescent; stipe shorter than the first segment.

Flowers 8 to 10 mm long; pods with 2 to 4 joints.... 10. *D. scalpe*

Flowers 3 to 4 mm long; pods with 1 or 2 joints.

11. *D. podocarpum*

Pods not stipitate; both sutures slightly indented; calyx-teeth short, deltoid; shrubs.

Plant rather strongly pubescent; leaflets rhomboid-ovate, repand; pod with from 8 to 12 joints ..... 12. *D. sinuatum*

Plant only slightly pubescent; leaflets elliptic-oblong, entire; pod with 4 joints ..... 13. *D. holsteri*

Pods not stipitate; upper suture straight, the lower deeply indented; herbaceous ..... 14. *D. malacophyllum*

Pods not stipitate, the segments as long as broad, the upper suture straight, the lower slightly sinuate, dehiscent.

Racemes dense in both flower and fruit; shrubby, erect or prostrate plants.

Leaflets obovate-cuneate, silvery-pubescent beneath; pedicels always ultimately reflexed; prostrate ..... 15. *D. capitatum*
Leaflets obovate-oblong or obovate-elliptic; pedicels erect or ascending; stems erect ..... 16. *D. heterocarpum*
Racemes lax in both flower and fruit; leaflets 1 to 2.5 or 3 cm long, retuse; spreading or ascending herbs..... 17. *D. buergeri*
Pods not stipitate, slightly sinuate on both sutures or straight on the upper; trailing or prostrate herbs with small leaves.
Flowers 1 to 3 in the axils of the leaves, with no common peduncle.
Pedicels shorter than or hardly exceeding the petioles; leaflets obovate-cuneate, truncate or emarginate; branches glabrescent ..... 20. *D. triflorum*
Pedicels manifestly exceeding the petioles; leaflets oblong, usually rounded at the apex; branches pubescent with spreading hairs ..... 21. *D. heterophyllum*
Flowers in terminal or axillary racemes; leaflets minute, 8 mm long or less ..... 22. *D. microphyllum*
Pods indistinctly jointed, dehiscing in a continuous line along the lower suture; erect undershrubs.
Pods glabrous ..... 23. *D. gyrans*
Pods copiously pubescent ..... 24. *D. gyroides*
Leaves 1-foliolate.
Petioles winged.
Erect, 1 to 2 m high; leaflet at least three times as long as the petiole; pods appressed-hirsute ..... 25. *D. triquetrum*
Branches prostrate, spreading from the woody root; leaflet about twice as long as the petiole; pods ciliate on the margins, otherwise glabrous. 26. *D. pseudotriquetrum*
Petioles not winged.
Segments of the pod 1 to 1.5 cm long, many times longer than broad. 7. *D. ormocarpoides*
Segments of the pod short, not manifestly longer than broad.
Leaflets ovate to oblong-ovate, narrowed to the acute or acuminate apex.
Petioles less than 5 mm long; racemes dense; pods pubescent. 27. *D. virgatum*
Petioles 1 to 2.5 cm long.
Racemes elongated, lax, simple or panicled; pods glabrescent. 28. *D. gangeticum*
Racemes short, simple; pods pubescent with spreading hairs. 19. *D. ovalifolium*
Leaflets orbicular to orbicular-ovate, apex broad.
Leaflets not reflexed; racemes elongated, equaling or exceeding the leaves. 29. *D. lasiocarpum*
Leaflets reflexed; racemes much shorter than the leaves. 18. *D. retroflexum*

§ Phyllodium.

1. **Desmodium pulchellum** (Linn.) Benth. Fl. Hongk. (1861) 83; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 162; F.-Vill. Nov. App. (1880) 61; Vidal Rev. Pl. Vasc. Filip. (1886) 107; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 65.

Hedysarum pulchellum Linn. Sp. Pl. (1753) 747; Blanco Fl. Filip. (1837) 581.

Zornia pulchella Pers. Syn. 2 (1807) 318.

Diocerma pulchellum DC. Ann. Sci. Nat. I 4 (1825) 236, Prodr. 2 (1825) 339; Blanco Fl. Filip. ed. 2 (1845) 407, ed. 3, 2: 383.

Phyllodium pulchellum Desv. Mém. Soc. Linn. Paris 4 (1826) 324; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 431; Miq. Fl. Ind. Bat. 1[1] (1855) 260.

Meibomia pulchella O. Kuntze Rev. Gen. Pl. (1891) 197.

Luzon, Province of Ilocos Norte, *For. Bur. 15524 Merritt & Darling:* Province of Union, *For. Bur. 15709 Merritt & Darling:* Province of Benguet, *Topping 55:* Province of Bataan, *Williams 68, Merrill 3310, Copeland 292, For. Bur. 2185 Meyer:* Province of Rizal, *For. Bur. 1973 Ahern's collector, Merrill 2710, Decades Philip. Forest Fl. 252 Ahern's collector:* Province of Batangas, *Katigbak 280.* Culion, *Merrill 438.* Palawan, *Bur. Sci. 201 Bermejos.* Mindanao, *Mrs. Clemens 748.* Basilan, *DeVore & Hoover 80.*

Native names: *Payang-payang* (Rizal); *calaicai,* ex Blanco (Visayan).

Widely distributed in the Philippines, especially at low altitudes; Ceylon and India to southern China and Formosa, southward through Malaya to New Guinea and the Bismarck Archipelago.

Desmodium elegans (Lour.) Benth., is said by Hemsley[44] to extend from southern China to Cochin-China, Java, and the Philippines. I have, however, seen no Philippine specimens that I consider as referable to this species, and the extension of range of *D. elegans* to the Archipelago may have been based on an erroneously identified specimen of *D. pulchellum.*

§ Dendrolobium.

2. **Desmodium cumingianum** (Benth.) Benth. & Hook. f. ex F.-Vill. Nov. App. (1880) 61; Vidal Phan. Cuming. Philip. (1885) 108, Rev. Pl. Vasc. Filip. (1886) 107.

Dendrolobium cumingianum Benth. Pl. Jungh. (1852) 216; Miq. Fl. Ind. Bat. 1[1] (1855) 263.

Luzon, Province of Batangas, *Cuming 1454.*

This endemic species has not been rediscovered since Cuming's time. The locality is taken from Cuming's own list at Kew. It is manifestly allied to *D. umbellatum,* but at the same time quite distinct from that species.

3. **Desmodium umbellatum** (Linn.) DC. Prodr. 2 (1825) 325; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 161; Vid. Sinopsis Atlas (1883) *t. 41. fig. D.* Rev. Pl. Vasc. Filip. (1886) 106; F.-Vill. Nov. App. (1880) 61.

Hedysarum umbellatum Linn. Sp. Pl. (1753) 747.

Aeschynomene arborea Blanco Fl. Filip. (1837) 581, ed. 2 (1845) 406, ed. 3, 2: 381.

Dendrolobium umbellatum W. & A. ex Benth. Pl. Jungh. (1852) 216; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 431; Miq. Fl. Ind. Bat. 1[1] (1855) 262.

Meibomia umbellata O. Kuntze Rev. Gen. Pl. (1891) 197.

Batanes Islands, Sabtan, *Bur. Sci. 3745 Fénix, Bur. Sci. 10138 McGregor.* Babuyanes Islands, Camiguin, *Bur. Sci. 4115 Fénix.* Luzon, Province of Zambales, *Hallier s. n., Merrill 2093:* Province of Bataan, *For. Bur. 2026 Borden, Decades Philip. Forest Fl. no. 141 Ahern's collector:* Province of Tayabas, *Gregory 95, For. Bur. 7477 Reyes, Whitford 698, 751:* Province of Camarines, *Ahern 222.* Mindoro, *For. Bur. 5396, 9675 Merritt, Merrill 2257.* Culion, *Merrill 550.* Palawan, *For. Bur. 3531, 3777 Curran.* Tablas, *McGregor 338.* Bohol, *Bur. Sci. 1263 McGregor.* Ticao, *For. Bur. 1058, 2531 Clark.* Masbate, *Merrill 3036.* Leyte, *For. Bur. 12449 Danao.* Mindanao, *Mrs. Clemens 1199, Copeland 625, 1326, Ahern 408, DeVore & Hoover 212.* Basilan, *For. Bur. 3468 Hutchinson.*

[44] Journ. Linn. Soc. Bot. 23 (1887) 171.

Native names: *Malacarios* (Zambales); *nagtan-urang* (Masbate); *miagos* (Ticao); *cabay-cabay* (Tayabas).

Along the seashore throughout the Philippines; from the Mascarene Islands through India, southern China, Malaya, northern Australia and Polynesia.

4. **Desmodium quinquepetalum** (Blanco) Merr. in Govt. Lab. Publ. (Philip.) 35 (1906) 20.

Cytisus quinquepetalus Blanco Fl. Filip. (1837) 598.

Glycine cajanoides Walp. in Nov. Act. Acad. Nat. Cur. 19 (1843) Suppl. 1: 324; F.-Vill. Nov. App. (1880) 62.

Cajanus quinquepetalus Blanco Fl. Filip. ed. 2 (1845) 417, ed. 3, 2: 397.

Desmodium cephalotes F.-Vill. Nov. App. (1880) 61, non Wall.

Luzon, Province of Abra, *Bur. Sci. 7256 Ramos:* Province of Ilocos Norte, *For. Bur. 13819, 13912, 13960, 15521 Merritt & Darling:* Province of Ilocos Sur, *For. Bur. 5259 Klemme:* Province of Benguet, *For. Bur. 14118 Merritt & Darling, Williams 930, Bur. Sci. 5573 Ramos:* Province of Nueva Ecija, *Bur. Sci. 5270 McGregor:* Province of Zambales, *Bur. Sci. 5122 Ramos, For. Bur. 5808, 6963, 6958 Curran:* Province of Pangasinan, *Bur. Sci. 4909 Ramos:* Province of Pampanga, *For. Bur. 9613 Zschokke:* Province of Bulacan, *Yoder 113:* Province of Rizal, *For. Bur. 1841, 2154, 3296 Ahern's collector, Bur. Sci. 1498 Ramos.* Without locality (*Vidal 245, 246, 247, 1063; Loher 2368, 2369, 2370*) in Herb. Kew. *fide* Prain in lit.

Native names: *Pangardisan, pangaldisan* (Ilocos, Benguet); *payispis, baquisquis* (Rizal).

Widely distributed in Luzon at low and medium altitudes in open thickets; endemic. I have examined the type of *Glycine cajanoides* Walp. in the Berlin herbarium and find that it is identical with the above species.

§ Scorpiurus.

5. **Desmodium laxiflorum** DC. Prodr. 2 (1825) 335; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 164; F.-Vill. Nov. App. (1880) 61; Perk. Frag. Fl. Philip. (1904) 18; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 65.

Desmodium recurvatum Grah. in Wall. Cat. (1832) no. 5717; Benth. Pl. Jungh. (1852) 225.

Meibomia laxiflora O. Kuntze Rev. Gen. Pl. (1891) 196.

Luzon, Province of Ilocos Sur, *For. Bur. 15685 Merritt & Darling:* District of Lepanto, *Merrill 4464:* Province of Benguet, *For. Bur. 14411 Darling, Merrill 4394:* Province of Bataan, *For. Bur. 2218 Meyer, Williams 269:* Province of Laguna, *Hallier s. n., Bur. Sci. 6025, 6090 Robinson:* Province of Rizal, *Loher 2363, Merrill 1348, For. Bur. 1976 Ahern's collector:* Province of Bulacan, *Yoder 27.* Palawan, *Bur. Sci. 239 Bermejos.* Ticao, *For. Bur. 12556 Rosenbluth.* Negros, *For. Bur. 5608 Everett.* Mindanao, *For. Bur. 9230 Whitford & Hutchinson.* Basilan, *Hallier s. n.*

Native names: *Mangquit* (Rizal); *Manquit-labuyo* (Laguna).

Widely distributed in the Philippines in thickets and ravines from sea level to an altitude of at least 1,000 m; India to Formosa, the Malay Peninsula and Archipelago.

6. **Desmodium scorpiurus** (Sw.) Desv. Journ. Bot. 1 (1813) 122; DC. Prodr. 2 (1825) 333; Perk. Frag. Fl. Philip. (1904) 18; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 65.

Hedysarum scorpiurus Sw. Prodr. (1788) 107.

Meibomia scorpiurus O. Kuntze Rev. Gen. Pl. (1891) 198.

Batanes Islands, Batan, *Bur. Sci. 3699 Fénix.* Luzon, Province of Ilocos Norte, *Bur. Sci. 2242, 2253 Mearns:* Province of Ilocos Sur, *For. Bur. 15692 Merritt & Darling:* Province of Union, *Elmer 5635:* Province of Benguet, *Merrill 4274* (luxuriant form): Province of Laguna, *Bur. Sci. 6098 Robinson:* Province of Batangas, *Marave 164:* Manila, *Carlos 132, Mayor 54, Merrill 385, McGregor 78:* Province of Bataan, *Merrill 3101, Williams 291.* Mindoro, *Bur. Sci. 6645 Robinson.* Balabac, *Bur. Sci. 418 Mangubat.*

Widely distributed in the Philippines at low altitudes along trails, in open grass lands, thickets, etc.; introduced from tropical America.

In a letter written in 1906, Dr. C. B. Robinson states that a specimen from Formosa, *Henry 1176,* in the herbarium of the New York Botanical Garden, is the same as *Williams 291* and *Elmer 5635,* and that comparison with *D. scorpiurus* shows that the American material has consistently narrower leaflets than the Philippine, which is borne out by the single American specimen here, *Sintenis 2971* from Porto Rico.

7. **Desmodium ormocarpoides** (Desv.) DC. Prodr. 2 (1825) 327; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 164; F.-Vill. Nov. App. (1880) 61; Vidal Rev. Pl. Vasc. Filip. (1886) 108; Perk. Frag. Fl. Philip. (1904) 18; Merr. in Philip. Journ. Sci. 2 (1907) Bot. 276.

Hedysarum ormocarpoides Desv. ex DC. l. c. as syn.

Meibomia ormocarpodes O. Kuntze Rev. Gen. Pl. (1891) 198.

Luzon, Province of Tayabas, *Whitford 865.* Mindoro, *Merrill 6223.* Samar, *Merrill 5201.* Cebu, *Bur. Sci. 1731 McGregor.* Mindanao, Lake Lanao, *Mrs. Clemens 632.*

India to the Malay Peninsula and Java.

§ Chalarium.

8. **Desmodium procumbens** (Mill.) A. S. Hitchc. Rept. Mo. Bot. Gard. 4 (1893) 76.

Hedysarum procumbens Mill. Gard. Dict. ed. 8 (1768) no. 10.

Hedysarum spirale Sw. Prodr. (1788) 107.

Desmodium spirale DC. Prodr. 2 (1825) 332; Blanco Fl. Filip. ed. 2 (1845) 408, ed. 3, 2: 385; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 164; F.-Vill. Nov. App. (1880) 61; Perk. Frag. Fl. Philip. (1904) 19.

Desmodium chamissonis Vog. in Linnaea 10 (1836) 588.

Hippocrepis rhomboidea Blanco Fl. Filip. (1837) 585.

Meibomia chamissonis & M. spiralis O. Kuntze l. c. 197.

Luzon, Province of Ilocos Norte, *Bur. Sci. 7623 Ramos:* Province of Ilocos Sur, *For. Bur. 15691 Merritt & Darling:* Province of Abra, *Bur. Sci. 7129 Ramos:* Province of Pangasinan, *Bur. Sci. 4877 Ramos:* Manila, *Merrill 836, Rosario 320.*

Widely distributed as a weed in waste places at low altitudes: tropics of the world, probably a native of tropical America.

§ Podocarpium.

9. **Desmodium laxum** DC. Ann. Sci. Nat. I 4 (1825) 102, Prodr. 2 (1825) 336; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 138.

Desmodium garrdneri Benth. Pl. Jungh. (1852) 226; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 165.

Desmodium leptopus A. Gray ex Benth. l. c., Bot. Wilkes U. S. Explor. Exped.

(1854) 436; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 81, *pl. 1;* F.-Vill. Nov. App. (1880) 61; Miq. Fl. Ind. Bat. 1[1] (1855) 255.

Meibomia leptopus O. Kuntze Rev. Gen. Pl. (1891) 198.

Babuyanes Islands, Camiguin, *Bur. Sci. 4132 Fénix.* Luzon, Province of Benguet, *Elmer 6527, Williams 1409, For. Bur. 15913 Bacani:* Province of Laguna, *Wilkes Expedition,* in U. S. Nat. Herb.: Province of Nueva Vizcaya, *Bur. Sci. 8199 Ramos:* Province of Albay, *Bur. Sci. 6473 Robinson.* Negros, *Bur. Sci. 1152, 1163 Banks.* Mindanao, Lake Lanao, *Mrs. Clemens 84, s. n.:* Province of Misamis, *For. Bur. 4768 Mearns & Hutchinson.*

India to Indo-China, China, the Malay Peninsula and Archipelago.

The Philippine material seems to have rather shorter articulations to the pods than has Asiatic material, but I do not consider the differences sufficient to warrant distinguishing *D. leptopus* from *D. laxum* (*D. gardneri* Benth.). Dr. Prain, *in lit.,* has identified *Elmer 6527* with *D. laxum* DC., stating that *D. gardneri* Benth. is the same as DeCandolle's species. For a full description of *D. laxum* DC. see Prain in King's Materials for a Flora of the Malayan Peninsula.[45]

10. **Desmodium scalpe** (Comm.) DC. Prodr. 2 (1825) 334; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 165; F.-Vill. Nov. App. (1880) 61.

Hedysarum scalpe Comm. ex DC. l. c. as syn.

Luzon, District of Lepanto, *For. Bur. 14493 Darling, For. Bur. 5676 Klemme:* Province of Benguet, *Elmer 5914, Merrill 4835, 4330, Williams 1126, Topping 60, Bur. Sci. 5357 Ramos, For. Bur. 15745 Curran & Merritt, For. Bur. 4937 Curran.*

In the Philippines apparently confined to the high tableland of north central Luzon; Africa, tropical Asia and Malaya.

11. **Desmodium podocarpum** DC. Ann. Sci. Nat. I 4 (1825) 102, Prodr. 2 (1825) 336; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 165; Forbes & Hemsley in Journ. Linn. Soc. Bot. 23 (1887) 174.

Meibomia podocarpa O. Kuntze Rev. Gen. Pl. (1891) 198.

Luzon, Province of Benguet, *Williams 1398, Merrill 4356.*

Northern India to China and Japan; not previously reported from the Philippines.

§ Dollinera.

12. **Desmodium sinuatum** (Miq.) Bl. ex Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 166.

Desmodium strangulatum var. *sinuatum* Miq. Fl. Ind. Bat. 1[1] (1855) 255.

Meibomia sinuata O. Kuntze Rev. Gen. Pl. (1891) 198.

Luzon, District of Lepanto, *Merrill 4642:* Province of Benguet, *Topping 61, Bur. Sci. 5458, 5563, 5791 Ramos, Williams 914, Bur. Sci. 4479, 3518 Mearns, For. Bur. 5130 Curran, For. Bur. 16034 Curran, Merritt, & Zschokke.* Mindanao, Mount Apo, *DeVore & Hoover 315, 354.*

A species confined to high altitudes in the Philippines; India to southern China and Formosa, through Malaya to New Guinea. Not previously reported from the Philippines.

13. **Desmodium bolsteri** Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) Bot. 102.

Luzon, Province of Cagayan, Peña Blanca, *Bolster 181.*

Endemic.

[45] Journ. As. Soc. Beng. 66[2] (1897) 138.

§ Nicholsonia.

14. **Desmodium malacophyllum** (Link) DC. Prodr. 2 (1825) 338. (*malachophyllum*); F.-Vill. Nov. App. (1880) 62.

Hedysarum malacophyllum Link Enum. (1822) 247.

Meibomia malacophylla O. Kuntze Rev. Gen. Pl. (1891) 198.

Luzon, *Chamisso* in herb. Berol.

This species is only known from the type collection, and it is probable that Chamisso secured his material somewhere in Cavite Province, Luzon. I have examined the type, but from my notes and the short original description, was unable to determine with satisfaction the status of the species. Through the kindness of Dr. I. Urban, I have recently been again able to examine fragments of the type specimens, loaned to me for the purpose, as well as a sketch of the fruit made by Doctor Harms. Regarding the species, Doctor Harms, who has kindly reëxamined the type writes as follows: "Chamisso's type of *Desmodium malacophyllum* DC. in the Berlin Herbarium is entirely different from *D. laxiflorum* DC., a common species described in Hooker's 'Flora of British India' as having 'not at all or slightly constricted pods,' whereas in Chamisso's plant the pods are deeply indented on one suture, and nearly straight on the other. The leaflets in *D. laxiflorum* are acute, and in *D. malacophyllum* they are obtuse or subobtuse. *D. malacophyllum* seems to belong to the group of species included in Hook. f. Fl. Brit. Ind. II between nos. 28 and 32."

15. **Desmodium capitatum** (Burm.) DC. Prodr. 2 (1825) 336; Miq. Fl. Ind. Bat. 1[1] (1855) 241; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 170; F.-Vill. Nov. App. (1880) 62; Vid. Phan. Cuming. Philip. (1885) 107; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 65.

Hedysarum capitatum Burm. Fl. Ind. (1768) 167, *t. 64, fig. 1.*

Meibomia capitata O. Kuntze Rev. Gen. Pl. (1891) 195.

Luzon, Province of Pangasinan, *Bur. Sci. 4862, 4880 Ramos:* Province of Pampanga, *Bolster 43:* Province of Bataan, *Merrill 1559:* Province of Rizal, *Katigbak 225:* Province of Cavite, *Tirona 252:* Province of Laguna, *Hallier s. n.* Mindoro, *For. Bur. 5510, 5528 Merritt, Merrill 6224.* Mindanao, District of Cotabato, *Mrs. Clemens 789:* District of Davao, *Copeland 359, DeVore & Hoover 127, 192.* Basilan, *Hallier s. n.*

Native names: *Manimanihan* (Bataan); *mani-parang, mani-mani* (Mindoro). Ceylon and India to the Malay Peninsula and Archipelago.

16. **Desmodium heterocarpum** (Linn.) DC. Prodr. 2 (1825) 337; Trimen Fl. Ceyl. 2 (1894) 53.

Hedysarum heterocarpum Linn. Sp. Pl. (1753) 747.

Hedysarum polycarpon Poir. in Lam. Encycl. 6 (1804) 413.

Desmodium polycarpum DC. Prodr. 2 (1825) 334; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 171; F.-Vill. Nov. App. (1880) 62; Vid. Rev. Pl. Vasc. Filip. (1886) 107; Perk. Frag. Fl. Philip. (1904) 18; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 65.

Meibomia heterocarpa O. Kuntze Rev. Gen. Pl. (1891) 196.

Luzon, District of Lepanto, *Merrill 4458:* Province of Benguet, *Williams 926:* Province of Ilocos Norte, *For. Bur. 12499 Merritt & Darling:* Province of Nueva Ecija, *Bur. Sci. 5269, 5295 McGregor:* Province of Bulacan, *Yoder 186:* Province of Rizal, *Bur. Sci. 1483 Ramos.* Polillo, *Bur. Sci. 6879 Robinson.* Negros, *For. Bur. 4318 Everett.* Samar, *Merrill 5221.* Mindanao, Province of Surigao, *Allen 140;* Lake Lanao, *Mrs. Clemens 368, s. n.*

Native names: *Mani-mani* (Negros); *manimanihan* (Polillo).

Widely distributed in the Philippines at low and medium altitudes; tropical Asia to Japan, Malaya to northern Australia and Polynesia; also in tropical Africa.

17. **Desmodium buergeri** Miq. Ann. Mus. Bot. Lugd.-Bat. 3 (1867) 45.

Luzon, Province of Benguet, *Williams 1400, 1402, Merrill 4374:* Province of Laguna, *Hallier s. n.* Mindanao, Lake Lanao, *Mrs. Clemens s. n.*

This species was placed among the synonyms of *Desmodium heterocarpum* (*D. polycarpum*) by Baker, but the specimens here cited seemed so distinct from that species that request was made of Dr. J. K. Small for comparison of them with the collections in the herbarium of the New York Botanical Garden. He writes that "Williams' specimens nos. 1400 and 1402 agree exactly with specimens of *D. buergeri* from Japan. The latter species seems to be referred to *D. polycarpum*, but judging from apparently authentic material of *D. polycarpum* in our collection, I can not see why the two species are merged." *D. buergeri* is manifestly allied to *D. heterocarpum*, but differs from the typical forms of that species in its very diffuse habit, much smaller and differently shaped leaflets, and its lax racemes.

Japan.

18. **Desmodium retroflexum** (Linn.) DC. Prodr. 2 (1825) 336; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 170; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1887) 176; Merr. in Philip. Journ. Sci. 4 (1909) 267.

Meibomia retroflexa O. Kuntze Rev. Gen. Pl. (1891) 197.

Luzon, Province of Nueva Ecija, *Bur. Sci. 5278 McGregor.*

Himalayan region to Tenasserim and southern China.

19. **Desmodium ovalifolium** Wall. Cat. (1832) no. 5730.

Desmodium polycarpum var. *ovalifolia* Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 141.

Luzon, Province of Bataan, Mount Mariveles, *Whitford 227, For. Bur. 3115 Meyer.*

Penang and Sumatra.

Doctor Prain, who has identified the above specimens, writes me that he considers *D. ovalifolium* to be a good species; it was reduced by Baker to *D. polycarpum* DC. (*D. heterocarpum* (L.) DC.).

§ Sagotia.

20. **Desmodium triflorum** (Linn.) DC. Prodr. 2 (1825) 334; Miq. Fl. Ind. Bat. 1[1] (1855) 238; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 173; F.-Vill. Nov. App. (1880) 62; Vid. Rev. Pl. Vasc. Filip. (1886) 107; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 135.

Hedysarum triflorum Linn. Sp. Pl. (1753) 749.

Hippocrepis humilis Blanco Fl. Filip. (1837) 585.

Desmodium parvifolium Blanco l. c. ed. 2 (1845) 408, ed. 3, 2: 386, non DC.

Meibomia triflora O. Kuntze Rev. Gen. Pl. (1891) 197.

Luzon, Province of Cagayan, *Bur. Sci. 7935, 7465 Ramos, For. Bur. 16610 Curran:* Province of Benguet, *Williams 1278:* Province of Bulacan, *Yoder 112:* Province of Bataan, *Whitford s. n., Williams 263:* Manila, *Garcia 55, Merrill 384, Elmer 5515.* Polillo, *Bur. Sci. 10766 McGregor.* Panay, *Yoder 7.* Mindanao, *Copeland 403, DeVore & Hoover 203.*

Widely distributed in the Philippines at low altitudes; tropics of the world.

21. **Desmodium heterophyllum** (Willd.) DC. Prodr. 2 (1825) 334; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 173; F.-Vill. Nov. App. (1880) 62; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 135.

Hedysarum heterophyllum Willd. Sp. Pl. 3 (1800) 1201.

Meibomia heterophylla O. Kuntze Rev. Gen. Pl. (1891) 196.

Luzon, Province of Tayabas, *Merrill 1964.*

India to China, Malaya, and the Mascarene Islands.

Prain states that "this species is rare in India and common in Malaya, but in the Philippines typical *Desmodium heterophyllum* appears to be rare, and *D. triflorum* common. I have seen but a single specimen that I consider referable to *D. heterophyllum* as construed by Prain."[46]

22. **Desmodium microphyllum** (Thunb.) DC. Prodr. 2 (1825) 337.

Hedysarum microphyllum Thumb. Fl. Jap. (1784) 284.

Desmodium parvifolium DC. Ann. Sci. Nat. I 4 (1825) 100, Prodr. 2 (1825) 334; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 174; F.-Vill. Nov. App. (1880) 62.

Meibomia microphylla O. Kuntze Rev. Gen. Pl. (1897) 198.

Luzon, Province of Benguet, *For. Bur. 15616 Curran, Bur. Sci. 5321 Ramos, Williams 1395, 1396, Bur. Sci. 4446 Mearns, Merrill 4305, Elmer 5849, For. Bur. 18153 Curran, Merritt, & Zschokke.* Mindanao, Lake Lanao, *Mrs. Clemens 38.*

In the Philippines at medium and higher altitudes; India and Ceylon to China and Japan, southward through Malaya to New Guinea.

§ Pleurolobium.

23. **Desmodium gyrans** (Linn.) DC. Prodr. 2 (1825) 326; Baker in Hook. f. Fl. Ind. 2 (1876) 174; F.-Vill. Nov. App. (1880) 62; Vid. Rev. Pl. Vasc. Filip. (1886) 107.

Hedysarum gyrans Linn. f. Suppl. (1781) 332.

Meibomia gyrans O. Kuntze Rev. Gen. Pl. (1891) 196.

Luzon, Province of Cagayan, *Bur. Sci. 7922 Ramos:* Province of Nueva Vizcaya, *Bur. Sci. 8257 Ramos:* Province of Benguet, *Williams 920, 1407, Merrill 4277.*

India to Java and Sumatra, not reported from China or the Malay Peninsula, but found in Formosa.

24. **Desmodium gyroides** (Roxb.) DC. Prodr. 2 (1825) 326; Baker in Hook. f. Fl. Ind. 2 (1876) 175; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 145; Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) Bot. 103.

Hedysarum gyroides Roxb. Hort. Beng. (1814) 57, nomen.

Meibomia gyrodes O. Kuntze Rev. Gen. Pl. (1891) 196.

Mindanao, Lake Lanao, *Mrs. Clemens 369.*

India to southern China and Formosa southward through Malaya to New Guinea.

§ Pteroloma.

25. **Desmodium triquetrum** (Linn.) DC. Prodr. 2 (1825) 326; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 163; F.-Vill. Nov. App. (1880) 61; Perk. Frag. Fl. Philip. (1904) 19; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 143, 390.

Hedysarum triquetrum Linn. Sp. Pl. (1753) 746.

Pteroloma triquetrum Benth. Pl. Jungh. (1852) 220; Miq. Fl. Ind. Bat. 1[1] (1855) 258.

Meibomia triquetra O. Kuntze Rev. Gen. Pl. (1891) 197.

Culion, *Merrill 519, Bur. Sci. 181 Bermejos.* A specimen from Rizal Province, Luzon, *Bur. Sci. 1036 Ramos,* is also probably referable here.

[46] Journ. As. Soc. Beng. 66[2] (1897) 135.

Mascarene Islands, India, southern China, the Malay Peninsula and Archipelago to New Guinea and northern Australia.

26. **Desmodium pseudotriquetrum** DC. Ann. Sci. Nat. I 4 (1825) 100, Prodr. 2 (1825) 326.

Desmodium triquetrum subsp. *pseudotriquetrum* Prain in Journ. As. Soc. Beng. 66[2] (1897) 390.

LUZON, Province of Benguet, *Merrill 4477, Williams 1414.*

Northern India and the mountains of Assam.

This species was reduced by Baker to *D. triquetrum* DC., but its habit is entirely different, its leaves much smaller, and its pods glabrous, except for the ciliate margins. The two specimens cited above appear to be in all respects typical *D. pseudotriquetrum*, and I consider the form to be worthy of specific rank.

§ HETEROLOMA.

27. **Desmodium virgatum** Zoll. Nat. Geneesk. Arch. 3 (1846) 58; Prain in Journ. As. Soc. Beng. 66[2] (1897) 143, 399; Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) Bot. 103.

Desmodium gangeticum Naves in Blanco Fl. Filip. ed. 3, *pl. 377*, non DC.

Desmodium latifolium var. *virgatum* Miq. Fl. Ind. Bat. 1[1] (1855) 247.

LUZON, Province of Rizal, *Bur. Sci. 4 Foxworthy:* Province of Bataan, *For. Bur. 2231 Meyer:* without locality, *Marave 155, Vidal 248* (Herb. Kew), *Loher 2348, 2349* (Herb. Kew).

This species was reduced to *Desmodium latifolium* DC. by Miquel, as a variety, and later by Baker was merged in the species; it is, however, entirely worthy of specific rank.

Chittagong to Burma, Perak and Java.

28. **Desmodium gangeticum** (Linn.) DC. Prodr. 2 (1825) 327; Miq. Fl. Ind. Bat. 1[1] (1855) 247; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 168; F.-Vill. Nov. App. (1880) 62.

Hedysarum gangeticum Linn. Sp. Pl. (1753) 746.

Desmodium gangeticum var. *neaei* DC. Prodr. 2 (1825) 327.

Hippocrepis comosa Blanco Fl. Filip. (1837) 584, non Linn.

Desmodium diversifolium Blanco l. c. ed. 2 (1845) 408, ed. 3, 2: 384, non DC.

Meibomia gangetica O. Kuntze Rev. Gen. Pl. (1891) 196.

LUZON, Province of Cagayan, *For. Bur. 16767 Curran:* Province of Ilocos Norte, *Bur. Sci. 7641 Ramos:* Province of Benguet, *Williams 1406:* Province of Union, *Elmer 5671:* Province of Pangasinan, *Merrill 2872:* Province of Bulacan, *Yoder 46:* Manila, *McGregor 75, Baja 249:* Province of Cavite, *Bur. Sci. 1300 Mangubat:* Province of Rizal, *Bur. Sci. 6146 Robinson:* Province of Bataan, *Williams 52, Whitford 406, Elmer 6852, Merrill 3104:* Province of Tayabas, *Whitford 659, Gregory 119.* MINDORO, *Merrill 1269.* PALAWAN, *Merrill 849.* GUIMARAS, *For. Bur. 6479 Everett.* BOHOL, *Miss Adams.* BASILAN, *DeVore & Hoover 36.*

Native names: *Manquit* (Bataan); *payang-payàng* (Tayabas); *diquit-diquit* (Pangasinan); *pega-pega* (Basilan).

The variety *neaei* DC. Prodr. 2 (1825) 327, described from Philippine material, is not distinct from the species. The type has been kindly examined by Mr. C. DeCandolle at my request.

Widely distributed in the Philippines at low altitudes; tropical Africa and Asia to China, through Malaya to northern Australia and Polynesia; introduced in the West Indies.

29. **Desmodium lasiocarpum** (Beauv.) DC. Prodr. 2 (1825) 328.

Hedysarum lasiocarpum Beauv. Fl. Oware & Benin 1 (1804) 32, *t. 18;* Poir. in Lam. Encycl. Suppl. 5 (1817) 15.

Hedysarum latifolium Roxb. Hort. Beng. (1814) 57.

Desmodium latifolium DC. Prodr. 2 (1825) 328; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 168; F.-Vill. Nov. App. (1880) 62, excl. syn. Naves *pl. 372;* Vidal Rev. Pl. Vasc. Filip. (1886) 107.

Hippocrepis multisiliquosa Blanco Fl. Filip. (1837) 584.

Desmodium gangeticum Blanco l. c. ed. 2 (1845) 408, ed. 3, 2: 384, non DC.

Meibomia lasiocarpa O. Kuntze Rev. Gen. Pl. (1891) 196.

Luzon, Province of Benguet, *For. Bur. 15915 Bacani, Williams 1405:* Province of Rizal, *Bur. Sci. 1833 Ramos, For. Bur. 2008 Ahern's collector:* Province of Laguna, *Hallier s. n.* Mindanao, District of Zamboanga, *Merrill 5466.* Negros, *For. Bur. 13720 Curran.*

Tropical Africa and Asia to southern China and Formosa, through Malaya to New Guinea; introduced in the West Indies.

The specimens from Rizal Province sometimes have simple leaves, sometimes two leaflets, and sometimes three; the additional leaflets, when present, are very much smaller than the normal single one. The specimens are all manifestly referable to this species.

The Blancoan synonyms are referred here, and under *D. gangeticum*, above, after F.-Villar; the descriptions are too imperfect to be absolutely sure of the correctness of the identifications.

DOUBTFUL AND EXCLUDED SPECIES.

Desmodium pilosiusculum DC. Prodr. 2 (1825) 335.

The origin of the material on which this species was based is doubtful. DeCandolle says "in Philippicis ? (v. s. ex herb. Thibaud.)." Mr. C. DeCandolle has kindly supplied me with a photograph of the type; it is not matched by any recently collected Philippine material, nor among the extra-Philippine species represented in this Herbarium. Mr. C. DeCandolle suggests that the specimen may have come from America.

Desmodium kingianum Prain in Journ. As. Soc. Beng. 66[2] (1897) 398.

The type of this species was from Burma. Usteri[47] has reported it from Cebu and Panay, but I have seen no Philippine specimens that agree with Prain's description. The Philippine reference may have been based on erroneously identified material.

Desmodium reniforme DC.; F.-Vill. Nov. App. (1880) 62.

A species not definitely known from the Philippines. It is reported from India and Java.

Desmodium Desv. (1813) is antedated by *Meibomia* Adans. (1763), and *Pleurolobus* St. Hil. (1812), but is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

48. MONARTHROCARPUS gen. nov.

Calycis tubus brevis; lobi 2 superiores alte connati, 3 inferiores subcaudato-acuminati. Corolla ut in *Desmodio;* vexillum orbiculari-obovatum basi angustatum; alae oblongae, carinae adhaerentes. Stamen vexil-

[47] Beitr. Ken. Phil. Veg. (1905) 115.

lare a basi liberum, caetera connata. Ovarium stipitatum, 1-ovulatum. Legumen stipitatum, compressum, non articulatum, indehiscens, lanceolato-acinaciforme, acuminatum, reticulatum, monospermum. Semen estrophiolatum, anguste oblongum. Frutex parvus, suberectus. Folia 3- vel 1-foliolata, foliolis amplis, basi triplinerviis. Flores parvi, racemosi vel rarius paniculati.

Monarthrocarpus securiformis (Benth.) comb. nov.

Desmodium securiforme Benth. Pl. Jungh. (1852) 226; Miq. Fl. Ind. Bat. 1[1] (1855) 255; F.-Vill. Nov. App. (1880) 62; Vidal Phan. Cuming. Philip. (1885) 108, Rev. Pl. Vasc. Filip. (1886) 108.

An undershrub 20 to 60 cm high, erect or slightly scandent, the stem grayish or brownish, 3 to 4 mm in diameter, glabrous, smooth, simple, or very rarely with one or two branches, the younger parts densely puberulent. Leaves trifoliolate, the common petiole and rachis 5 to 10 cm long; stipules lanceolate, acuminate, 5 to 7 mm long, striate, puberulent; stipels acicular, puberulent, 3 to 5 mm long; leaflets subrhomboid, oblong-ovate to elliptic-ovate, chartaceous or submembranaceous, glabrous on the upper surface, the lower somewhat puberulent on the veins and reticulations, the apex rather strongly subcaudate acuminate, the base triangular-acute, the terminal leaflet equilateral 9 to 20 cm long, 5 to 7.5 cm wide, the lateral ones one-half to two-thirds as large, and somewhat inequilateral at the base, the rachis prolonged 1 to 3 cm beyond the insertion of the lateral leaflets; nerves prominent on the lower surface, a pair of opposite or alternate ones leaving the midrib at 5 to 10 mm above the base and extending to or above the middle of the leaflet, the lateral nerves above the subbasal pair 4 or 5 on each side of the midrib, curved-ascending, ultimately anastomosing, the reticulations distinct, rather lax; petiolules puberulent, 2 to 4 mm long. Inflorescence terminal, of simple racemes, or rarely forming a 2- or 3-branched panicle, 10 to 20 cm long, puberulent. Flowers white, about 7 mm long, in pairs, the bracteoles ovate-lanceolate, strongly acuminate, 1.5 mm long, the pedicels about 2 mm long. Calyx 3 mm long, puberulent, 2-cleft, the upper lobe with two minute teeth, the lower divided into three ovate-lanceolate, strongly caudate-acuminate, 1.5 mm long teeth. Standard orbicular-obovate, about 6 mm long, 5 mm wide, rounded, base narrowed to the short claw; wings about 2 mm wide, united to the keel. Vexillary filament free throughout. Ovary stipitate, lanceolate, narrowed at both ends, viscid-puberulent, with a single ovule. Pod not articulated, compressed, lanceolate-acinaciform, narrowed at both ends, stipitate, the apex prominently acuminate, somewhat falcate or nearly straight, the upper suture usually straight, the lower curved, scabrous-puberulent, indehiscent, strongly reticulate, the pericarp coriaceous, 2 to 3 cm long, 4 to 5 mm wide. Seed solitary, brown, glabrous, narrowly oblong,

blunt at both ends, straight or slightly curved, about 2 cm long, and 3 mm wide, often thicker in one half than in the other.

Luzon, Province of Laguna, *Cuming 576* (type in Herb. Kew.), *Elmer 8250, Alberto s. n.* Mindanao, Lake Lanao, Camp Keithley, *Mrs. Clemens 293, s. n.* Basilan, *For. Bur. 3456 Hutchinson.* Polillo, *Bur. Sci. 10761 McGregor.*

A sylvan species extending from slightly above sea level to an altitude of at least 800 m.

Var. **monophylla** var. nov.

Differt a typo foliis omnibus unifoliolatis.

Mindanao, District of Davao, Catalonan, *Copeland 937*, April, 1904, in forests, altitude 125 m.

This endemic species was originally described by Bentham as *Desmodium securiforme*, and placed by him in the section *Podocarpium*, stating that the articulations of the pods are usually solitary; a rather complete series of specimens shows that the pods are always reduced to a single joint, and that in a number of flowers examined, from different specimens, the ovaries never show traces of more than one joint, or more than one ovule. It has the general appearance of various species of *Desmodium* of the section *Podocarpium*, and has undoubtedly been derived from the section; it is, however, distinguishable from all species of *Desmodium* by its 1-seeded, nonarticulated pods, 1-ovuled ovaries, and narrowly oblong seeds, and I consider it to be generically distinct.

While *Monarthrocarpus* may not be distinguished from *Desmodium* by stronger characters than some of the sections of that genus, such as *Dendrolobium*, *Phyllodium*, etc., it has been considered expedient to propose for it generic rank, although logically, it should, perhaps be treated only as a section. As noted in the introduction to this paper, for purposes of comparison, genera have been retained as defined by Bentham and Hooker in their Genera Plantarum, or by Taubert in the Natürlichen Pflanzenfamilien, and hence I have not followed some recent botanists in raising various sections or subgenera of *Desmodium*, *Cassia*, etc., to generic rank, although in a number of cases I have no doubt but that some of the sections or subgenera are worthy of being so treated.

49. PSEUDARTHRIA W. & A.

1. **Pseudarthria viscida** (Linn.) W. & A. Prodr. (1834) 209; Wight Ic. *t. 286;* Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 154; Ceron Cat. Pl. Herb. (Manila) (1892) 62.

Hedysarum viscidum L. Sp. Pl. (1753) 747.

Desmodium viscidum DC. Prodr. 2 (1825) 336.

Desmodium timoriense DC. l. c. 327.

Panay, *Yoder 40, Copeland s. n.*

India and Ceylon to Timor; not reported from the Malay Peninsula.

Dr. H. Lecomte of the Museum of Natural History, Paris, has kindly compared material of *Yoder 40* with the type collection of *Desmodium timoriense* DC., and informs me that the Philippine material is the same as DeCandolle's species, which is here accordingly reduced.

50. PYCNOSPORA R. Br.

1. **Pycnospora nervosa** (Grah.) W. & A. Prodr. (1834) 197.

Crotalaria ? nervosa Grah. in Wall. Cat. (1832) no. 5428, nomen.

Pycnospora hedysaroides R. Br. ex W. & A. l. c.; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 153; F.-Vill. Nov. App. (1880) 60; Vid. Rev. Pl. Vasc. Filip. (1886) 108.

LUZON, Province of Benguet, *Williams 921, 1401.* SEMERARA, *Merrill 4145.* CULION, *Merrill 681.* MINDANAO, Lake Lanao, *Mrs. Clemens s. n.:* District of Davao, *Williams 2629, 2951.*

India and Ceylon to southern China and Formosa, and northern Australia, but not as yet reported from the Malay Peninsula or Archipelago.

The earliest specific name for this species is possibly supplied by *Flemingia polysperma* Moon Cat. (1824) 54, but the identity of Moon's species appears to be doubtful, as it is questionably referred here both by Wight & Arnott, and by Trimen. The original use of *Crotalaria ? nervosa* Grah. is a *nomen nudum*, and has no standing, but *Pycnospora nervosa* was published by Wight & Arnott, and it is considered that this name has precedence over the more commonly used *P. hedysaroides* R. Br., which was mentioned by Wight & Arnott only incidentally.

51. ALYSICARPUS Neck.

Calyx equaling several joints of the pod; pods glabrous, not at all rugose; leaves linear or lanceolate-linear; racemes slender, 8 to 15 cm long.
1. *A. bupleurifolius*

Calyx equaling the first or second joint of the pod only; pods glabrous or puberulent, distinctly rugose; leaves various, but never linear or linear-lanceolate; racemes less than 8 cm long.

Erect or suberect, often 1 m high, the branches sometimes hirsute with long, scattered, spreading hairs, never puberulent; leaves elliptic to elliptic-oblong, usually retuse at both ends; racemes lax, pods entirely glabrous.
2. *A. vaginalis*

Prostrate or spreading, rarely ascending, the branches usually less than 50 cm long; branchlets minutely puberulent; leaves exceedingly variable, acute, acuminate, or at least apiculate at the apex, never retuse; racemes dense; pods puberulent ..... 3. *A. nummularifolius*

1. **Alysicarpus bupleurifolius** (Linn.) DC. Prodr. 2 (1825) 352; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 158; Miq., Fl. Ind. Bat. 1[1] (1855) 232; F.-Vill. Nov. App. (1880) 61; Vidal Rev. Pl. Vasc. Filip. (1886) 108.

Hedysarum bupleurifolium Linn. Sp. Pl. (1753) 745.

Tetragonolobus simplicifolius Blanco Fl. Filip. ed. 2 (1845) 397, ed. 3, 2: 364 ?

Fabricia bupleurifolia O. Kuntze Rev. Gen. Pl. (1891) 181.

LUZON, Province of Pangasinan, *Bur. Sci. 4977 Ramos:* Province of Tarlac, *Merrill s. n.:* Province of Rizal, *Merrill:* Manila, *McGregor 62.* MINDANAO. District of Davao, *Copeland 363, Williams 2988.*

India and Ceylon, the Mascarene Islands, to southern China, Java, Timor, and Polynesia; not reported from the Malay Peninsula.

Tetragonolobus simplicifolius Blanco is referred here with doubt, as the short description does not apply in all respects; it is perhaps the same as *A. tetragonolobus* Edgw., where it was referred by F.-Villar, but I have seen no Philippine material at all approaching the latter species, which is definitely known only from India.

2. **Alysicarpus vaginalis** (Linn.) DC. Prodr. 2 (1825) 353; Miq. Fl. Ind. Bat. 1[1] (1855) 231; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 158; Trimen Fl. Ceyl. 2 (1894) 44; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 132.

Luzon, Province of Ilocos Norte, *Bur. Sci. 2302 Mearns:* Province of Bataan, *Williams 166:* Province of Pangasinan, *Bur. Sci. 4866 Ramos:* Province of Rizal, *Cuzner 11.*

India and Ceylon to the Malay Archipelago; other distribution doubtful on account of more or less confusion, by various authors, with the next.

3. **Alysicarpus nummularifolius** (Linn.) DC. Prodr. 2 (1825) 353.

Hedysarum nummularifolium Linn. Sp. Pl. (1753) 746, in part, excl. Fl. Zeyl, 288, which is *Indigofera echinata* Willd., fide Trimen.

Alyscicarpus vaginalis var. *nummularifolius* Miq. Fl. Ind. Bat. 1[1] (1855) 232; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 158; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 133.

Fabricia nummulariaefolia O. Kuntze Rev. Gen. Pl. (1891) 181.

Batanes Islands, Sabtan, *Bur. Sci. 3735 Fénix, Bur. Sci. 10133 McGregor.* Luzon, Province of Zambales, *Merrill 320, 320a:* Province of Pampanga, *Bolster 48:* Province of Bulacan, *Yoder 250:* Manila, *McGregor 71, Merrill 65, 3462, Santiago 50:* Province of Bataan, *Elmer 6778, Merrill 3091, Whitford 407, Williams 59:* Province of Rizal, *Cuzner 12.* Mindoro, *McGregor 321.* Palawan, *Bur. Sci. 893 Foxworthy.* Balabac, *Bur. Sci. 412 Mangubat.* Cebu, *Barrow 14.* Negros, *For. Bur. 13717 Curran.* Panay, *Copeland s. n., Yoder 10.* Bohol, *Bur. Sci. 1243 McGregor.* Mindanao, Lake Lanao, *Mrs. Clemens 8, s. n.:* District of Cotabato, *Copeland s. n.:* District of Zamboanga, *Williams 2101.* Basilan, *DeVore & Hoover 37.*

Native names: *Manimanihan, Manimani* (Manila); *banig-usa* (Bataan).

Widely distributed in the Philippines at low altitudes; India and Ceylon to southern China and Formosa, the Malay Peninsula and Archipelago to Polynesia; introduced in tropical America.

This was reduced by Miquel as a variety of *Alysicarpus vaginalis,* in which he has been followed by later authors. Prain states that the distinguishing characters are the spreading habit and condensed racemes of *nummularifolius,* and the ascending stems and lax racemes of *vaginalis,* and that the leaf characters depended upon by many botanists are not sufficiently constant; so far as our material goes, other apparently good characters are the much larger size, retuse leaves, and glabrous pods of *vaginalis,* and the smaller size, acute, acuminate or apiculate leaves, and puberulent pods of *nummularifolius.*

Specimens identified by Perkins [48] as *A. vaginalis* are rather *A. nummularifolius,* as well as those so determined by myself.[49] The leaves are exceedingly variable, elliptic, ovate, oblong, and even lanceolate ones being sometimes found on the same specimen; while on some plants, only elliptic, or ovate, or oblong leaves are found.

The original *Hedysarum nummularifolium* Linn. is a mixture, but I consider that it is typified by the reference to Petiver Gaz. 41, *t. 26, f. 4, "Onobrychis maderaspat. nummulariae folio, ..."* from which the specific name was taken. Mr. Oakes Ames has kindly supplied me with a tracing of this figure, and it unquestionably represents the species as here interpreted. Linnaeus' first reference is to "Fl. zeyl. 288," and the specimen in Hermann's Herbarium is *Indigofera echinata* Willd.[50]

[48] Frag. Fl. Philip. (1904) 19.
[49] *This Journal* 1 (1906) Suppl. 65; l. c. 3 (1908) Bot. 410.
[50] Trimen Fl. Ceyl. 2 (1894) 21.

52. URARIA Desv.

Stems erect, heads long-cylindric, 10 to 20 cm long; upper leaves 5–9-foliolate, the leaflets linear-lanceolate ..... 1. *U. picta*
Stems trailing, heads short, oblong, less than 8 cm long; leaves simple and trifoliolate, the leaflets oblong-rhomboid to elliptic ..... 2. *U. lagopodioides*

1. **Uraria picta** (Jacq.) Desv. Journ. Bot. 1 (1813) 123, *t. 5, fig. 19;* DC. Prodr. 2 (1825) 324; Miq. Fl. Ind. Bat. 1[1] (1855) 267; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 430; F.-Vill. Nov. App. (1880) 61; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 155; Vidal Rev. Pl. Vasc. Filip. (1886) 108.

Hedysarum pictum Jacq. Coll. 2 (1788) 262; Ic. 3 (1786–93) *t. 567.*

Luzon, Province of Cagayan, *Bur. Sci. 7924 Ramos:* Province of Isabela, *Bur. Sci. 8110 Ramos:* Province of Nueva Vizcaya, *Merrill 393:* Province of Benguet, *Williams 1416:* Province of Bataan, *Merrill 6247.* Mindoro, *Bur. Sci. 1521 Bermejos.* Mindanao, District of Davao, *Williams 2929.*

Tropical Africa and Asia to China and Formosa, Malaya to northern Australia; introduced in the West Indies.

2. **Uraria lagopodioides** (Linn.) Don Prodr. Fl. Nepal. (1825) 324; Desv. Mém. Soc. Linn. Paris 4 (1826) 309; Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 358.

Hedysarum lagopodioides Linn. Sp. Pl. (1753) 1198.

Hedysarum lagopoides Burm. f. Fl. Ind. (1768) 168, *t. 53, fig. 2.*

Uraria lagopoides DC. Prodr. 2 (1825) 324; Miq. Fl. Ind. Bat. 1[1] (1855) 268; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 430; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 156; Prain in Journ. As. Soc. Beng. 66[2] (1897) 131, 380.

Luzon, Province of Cagayan, *Bolster 160:* Province of Ilocos Norte, *For. Bur. 13949 Merritt & Darling:* Province of Benguet, *Williams 1404:* Province of Nueva Ecija, *Merrill 392:* Province of Rizal, *Cuzner 15, Guerrero 21:* Province of Laguna, *Hallier s. n.:* Manila, *McGregor 67.* Mindoro, *Merrill 888.* Negros, *For. Bur. 13716 Curran, For. Bur. 11227 Everett.* Panay, *Yoder 19.* Bohol, *Bur. Sci. 1242 McGregor.* Mindanao, Lake Lanao, *Mrs. Clemens 310, s. n.:* District of Davao, *Williams 2712, DeVore & Hoover 105, Copeland 369.*

Widely distributed in the Philippines in open grass lands, especially at low and medium altitudes; India and Ceylon to southern China, Formosa, Malaya to northern Australia.

The earliest specific name, *lagopodioides*, is here retained, especially as Prain states, l. c. 380, that there is now no longer any doubt as to the identity of *Hedysarum lagopodioides* Linn., with *Uraria lagopoides* (Burm.) DC. Curiously, Blanco seems to have overlooked this common species entirely.

53. LOUREA Neck.

Stems erect; leaflets 1, rarely 3, 4 to 6 times as broad as long.. 1. *L. vespertilionis*
Stems prostrate; leaflets 3, rarely 1, about as broad as long..... 2. *L. reniformis*

1. **Lourea vespertilionis** (Linn. f.) Desv. Journ. Bot. 1 (1813) 122, *t. 5, fig. 18;* DC. Prodr. 2 (1825) 323; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 154; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1887) 178; F.-Vill. Nov. App. (1880) 60.

Hedysarum vespertilionis Linn. f. Suppl. (1781) 331; Blanco Fl. Filip. (1837) 581, ed. 2 (1845) 407, ed. 3, 2: 382; Naves l. c. *pl. 201.*

It is doubtful if this species should be admitted as Philippine, as Blanco states that he saw only cultivated specimens, and F.-Villar makes the same statement. I have seen no Philippine material either wild or cultivated. The species is widely distributed in the tropics of the world.

2. **Lourea reniformis** (Lour.) DC. Prodr. 2 (1825) 324.

Hedysarum reniforme Lour. Fl. Cochinch. (1790) 447, excl. syn. fide DC.

Hedysarum obcordatum Poir. in Lam. Encycl. 6 (1804) 425.

Lourea obcordata DC. Prodr. 2 (1825) 324; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 154; F.-Vill. Nov. App. (1880) 60; Vidal Phan. Cuming. Philip. (1885) 108, Rev. Pl. Vasc. Filip. (1886) 108; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1887) 178; Perk. Frag. Fl. Philip. (1904) 20.

Luzon, Province of Benguet, *Loher 5119, For. Bur. 16227 Curran, Merritt, & Zschokke:* Province of Cagayan, *Bur. Sci. 7890 Ramos:* Province of Abra, *Bur. Sci. 7245 Ramos.*

Burma to southern China, Formosa, the Malay Archipelago to New Guinea and northern Australia; not reported from the Malay Peninsula.

54. PHYLACIUM Benn.

1. **Phylacium bracteosum** Benn. Pl. Jav. Rar. (1840) 159, *t. 33;* Benth. Pl. Jungh. (1852) 231; Miq. Fl. Ind. Bat. 1^1 (1855) 228; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 423; Vidal Rev. Pl. Vasc. Filip. (1886) 108; Prain ex King in Journ. As. Soc. Beng. 66^2 (1897) 129, 387; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 65.

Luzon, Province of Ilocos Sur, *For. Bur. 14047 Merritt & Darling:* Province of Benguet, *For. Bur. 16222 Curran, Merritt, & Zschokke, Bur. Sci. 3513 Mearns, Elmer 6051:* Province of Tarlac, *Merrill 3631:* Province of Bulacan, *Yoder 158:* Province of Rizal, *Merrill 1331:* Province of Bataan, *Merrill 1563, 3777, Bur. Sci. 1893 Foxworthy, For. Bur. 2734 Borden, Elmer 6701, Copeland 295:* Province of Tayabas, *For. Bur. 9655 Curran.* Mindoro, *For. Bur. 11373, 11422 Merritt, McGregor 136.* Negros, *For. Bur. 11225 Everett.* Mindanao, District of Davao, *Williams 2080, Copeland 644.*

Widely distributed in the Philippines, in the thickets at low and medium altitudes; Malay Peninsula, Sumatra, Java, Amboina, the Bismarck Archipelago and New Guinea.

Native names: *Malasincamas* (Bataan); *papuracna* (Rizal); *taquilis* (Negros).

55. LESPEDEZA Michx.

1. **Lespedeza juncea** Pers. var. **sericea** (Thunb.) Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1887) 181; Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) 104.

Hedysarum sericeum Thunb. Fl. Jap. (1784) 287.

Lespedeza sericea Miq. Ann. Mus. Ludg.-Bat. 3 (1867) 49.

Luzon, Province of *Benguet, Loher 2336, Williams 1420:* District of Bontoc, *Bur. Sci. 5991 Ramos.*

In the Philippines apparently confined to the high tableland of north central Luzon: northern India to China, Formosa, and Japan, also in Australia.

[*To be continued.*]

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AN ENUMERATION OF PHILIPPINE LEGUMINOSAE WITH KEYS TO THE GENERA AND SPECIES.

(Concluded.)

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(From the Botanical Section of the Biological Laboratory, Bureau of Science, Manila, P. I.)

56. DALBERGIA Linn. f.

Pod thin and flattened except opposite the seeds, straight or nearly so.

Thin parts of the pod distinctly reticulate, submembranaceous or slightly coriaceous; leaflets small, mostly less than 7 mm wide.

Leaflets distinctly oblique at the base, trapezoid-oblong, 5 to 7 mm wide. 1. *D. pinnata*

Leaflets equal or subequal at the base, linear-oblong, less than 4 mm wide. 2. *D. polyphylla*

Thin parts of the pod not or very obscurely reticulate, firmly coriaceous; leaflets medium, mostly 1 to 2 cm. wide.

Scandent; the portion of the pod opposite the seeds sharply defined, swollen; seeds orbicular ..... 3. *D. ferruginea*

An erect tree; the portion of the pod opposite the seeds usually not sharply defined, not or but slightly swollen; seeds oblong or ovate-oblong. 4. *D. minahassae*

Pod uniformly thickened throughout the valves, the upper suture curved or falcate, at least when young.

Scandent; pod flattened, the upper suture concave when ripe; leaflets obovate or obovate-oblong; flowers in short, congested panicles. 5. *D. candenatensis*

An erect tree; pod turgid, the upper suture straight or nearly so when ripe; leaflets elliptic to elliptic-ovate, narrowed towards the apex; inflorescence of rather lax, cymose panicles..... 6. *D. cumingii*

1. **Dalbergia pinnata** (Lour.) Prain in Ann. Bot. Gard. Calcutta **10**[1] (1904) 48.

Derris pinnata Lour. Fl. Cochinch. (1790) 432.

Dalbergia tamarindifolia Roxb. Hort. Beng. (1814) 53, nomen, Fl. Ind. **3** (1832) 233, pro parte; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 234; F.-Vill. Nov. App. (1880) 67; Vidal Rev. Pl. Vasc. Filip. (1886) 111; Perk. Frag. Fl. Philip. (1904) 82; Prain in Journ. As. Soc. Beng. **66**[2] (1897) 117, **70**[2] (1901) 49, Ann. Bot. Gard. Calcutta **10**[1] (1904) 69, *pl. 48*.

Endespermum scandens Blume Cat. Gew. Buitenzorg (1823) 92. Flora **8** (1825) 132, non *Dalbergia scandens* Roxb.

Luzon, Province of Zambales, *Bur. Sci. 2529 Foxworthy:* Province of Rizal, *Merrill 1772, For. Bur. 453, 1169 Ahern's collector, Bur. Sci. 1387 Ramos, Decades Philip. Forest Fl. no. 159 Ahern's collector.* Mindoro, *McGregor 244, For. Bur. 12004 Merritt.* Palawan, *Merrill 699.* Mindanao, Lake Lanao, *Mrs. Clemens 615.*

Widely distributed in the Philippines, extending from sea level to an altitude of at least 800 m; Himalayan region to Burma, southern China, Indo-China, the Malay Peninsula, Sumatra, Java, and Borneo.

Var. **badia** var. nov.

A typo differt foliolis in sicco brunneis, nitidis, supra glabris, coriaceis.

Luzon, Province of Tayabas, Pitogo, *For. Bur. 9649 Curran,* in thickets along the seashore.

At first sight this form appears to be quite distinct from the species, but the differences are apparently mainly in the color of the dried leaves, which are dark-brown, glabrous above, and strongly shining; the fruits are apparently identical with those of the typical form.

Derris pinnata Lour. has been reduced by various authors to *Dalbergia tamarindifolia* Roxb., but the reduction was not accepted by Dr. Prain in his monograph of the Asiatic species of *Dalbergia*, because Loureiro described the leaflets as glabrous. At my request Mr. E. G. Baker has kindly looked up Loureiro's type specimen, preserved in the herbarium of the British Museum, and has supplied me with sketches of the flower and a single leaflet. Mr. Baker writes as follows: "The leaflets *are not glabrous* as stated by Loureiro, but are strigose-pubescent beneath; the lobes of the calyx are short and might almost be described as subequal; the bracteoles are roundish and 2 mm long; the alæ are very similar to those figured by Colonel Prain, in his monograph, of *D. tamarindifolia* Roxb., and the keel is also subsimilar. It appears to me that without question it is very closely allied indeed, if not identical with *D. tamarindifolia* Roxb."

After studying the material available here, with reference to Loureiro's description and the data supplied by Mr. Baker, I am convinced that *Derris pinnata* Lour. is specifically identical with *Dalbergia tamarindifolia* Roxb., and the oldest specific name is hence adopted.

2. **Dalbergia polyphylla** Benth. Pl. Jungh. (1852) 256, pro parte, Journ. Linn. Soc. Bot. 4 (1860) Suppl. 44, pro parte; Miquel Fl. Ind. Bat. **1**[1] (1855) 132; F. Vill. Nov. App. (1880) 67; Vidal Rev. Pl. Vasc. Filip. (1886) 112; Prain in Journ. As. Soc. Beng. **70**[2] (1901) 48, Ann. Bot. Gard. Calcutta **10**[1] (1904) 70, *pl. 49*.

Luzon, Province of Ilocos Sur, *Cuming 1164* in Herb. Kew.: Province of Rizal, *For. Bur. 2962 Ahern's collector:* Province of Bataan, *Whitford s. n.*

Endemic.

3. **Dalbergia ferruginea** Roxb. Hort. Beng. (1814) 98, nomen, Fl. Ind. 3 (1832) 228; Benth. Pl. Jungh. (1852) 256; Miq. Fl. Ind. Bat. 1[1] (1855) 133; Prain in Journ. As. Soc. Beng. 70[2] (1901) 55, Ann. Bot. Gard. Calcutta 10[1] (1904) 101, *pl. 86;* Perk. Frag. Fl. Philip. (1904) 81; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 65.

Dalbergia luzonensis Vog. Nov. Act. Acad. Nat. Cur. 19 (1843) Suppl. 1:33; Miq. Fl. Ind. Bat. 1[1] (1855) 133.

Dalbergia limonensis Benth. Pl. Jungh. (1852) 256, sphalm.

Dalbergia stipulacea F.-Vill. Nov. App. (1880) 67; Vid. Sinopsis Atlas (1883) *t. 40, fig. C,* Rev. Pl. Vasc. Filip. (1886) 111, non Roxb.

Batanes Islands, Sabtan, *Bur. Sci. 10137 McGregor, Bur. Sci. 3739 Fénix.* Luzon, Province of Isabela, *Bur. Sci. 8038 Ramos:* Province of Zambales, *Hallier s. n.:* Province of Pampanga, *Merrill 1380:* Province of Bulacan, *For. Bur. 7202 Curran:* Province of Laguna, *Elmer, Alberto:* Province of Bataan, *Whitford 90, Leiberg 6028, Williams 480, Merrill 2493:* Province of Rizal, *Merrill 2694, 1693, Guerrero 25, For. Bur. 2887 Ahern's collector:* Province of Tayabas, *Merrill 2421, 2436, Bur. Sci. 2995 Mearns.* Mindoro, *Merrill 2205.* Mindanao, Province of Surigao, *Ahern 632:* District of Davao, *Williams 2855.*

Native names: *Culic manoc* (Pampanga); *guipus-guipus* (Surigao); *mala-malungoyon* (Bataan); *balibagan* (Panay), ex Vidal.

Widely distributed in the Philippines at low altitudes; Borneo to Buru, Celebes, New Guinea and the Caroline Islands.

4. **Dalbergia minahassae** Koord. Meded. s' Lands Plantent. 19 (1898) 430, 630; Prain in Ann. Bot. Gard. Calcutta 10[1] (1904) 91, *pl. 73.*

Luzon, Province of Bulacan, *For. Bur. 11189 Aguilar:* Province of Rizal, *For. Bur. 408 Ahern's collector, Bur. Sci. 959, 4633 Ramos:* Province of Bataan, *Bur. Sci. 1899 Foxworthy, For. Bur. 12951 Alvarez, For. Bur. 5773 Curran:* Province of Tayabas, *Whitford 985.* Mindoro, *For. Bur. 8822, 8846, 9746, 11445 Merritt.*

Native names: *Balabagan, balaugan* (Mindoro); *malacagios* (Rizal).

Celebes.

I am not at all sure that all the specimens cited above are really referable to this species, or whether two or three very closely allied forms are represented. Most of the specimens are described by the collectors as trees, but one or two are indicated as scandent. I consider this to be the most probable identification of *Amerimnon mimosella* Blanco, the type of which came from Tala, a locality near the boundary between the Provinces of Bulacan and Rizal.

5. **Dalbergia candenatensis** (Dennst.) Prain in Journ. As. Soc. Beng. 70[2] (1901) 49, Bengal Plants (1903) 411.

Cassia candenatensis Dennst. Schl. zum Hort. Malabar. (1818) 32.

Dalbergia monosperma Dalz. in Hook. Journ. Bot. and Kew Miscel. 2 (1850) 36; Benth. Pl. Jungh. (1852) 256; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 337; F.-Vill. Nov. App. (1880) 67; Vidal Rev. Pl. Vasc. Filip. (1886) 112; Perk. Frag. Fl. Philip. (1904) 82.

Dalbergia torta Grah. in Wall. Cat. (1832) no. 5873; Prain in Journ. As. Soc. Beng. 66[2] (1897) 120, Ann. Bot. Gard. Calcutta 10[2] (1904) 64, *pl. 42;* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 66.

Luzon, Province of Bataan, *Whitford s. n.:* Province of Tayabas, *Whitford 582.* Mindoro, *Merrill 1260.* Negros, *For. Bur. 7323 Everett.* Cebu, *Bur. Sci. 1716 McGregor.*

India to southern China, the Malay Peninsula and Archipelago to northern Australia, the Caroline Islands, and Polynesia.

6. **Dalbergia cumingiana** Benth. Pl. Jungh. (1852) 255; Miq. Fl. Ind. Bat. 1[1] (1855) 129; F.-Vill. Nov. App. (1880) 67; Vid. Phan. Cuming. Philip. (1885) 42, Rev. Pl. Vasc. Filip. (1886) 111; Prain in Journ. As. Soc. Beng. 70[1] (1901) 63, Ann. Bot. Gard. Calcutta 10[2] (1904) 34, *pl. 7;* Perk. Frag. Fl. Philip. (1904) 81.

Dalbergia cumingii Benth. in Journ. Linn. Soc. Bot. 4 (1860) Suppl. 32.

Luzon, Province of Cagayan, *Bur. Sci. 7790 Ramos, For. Bur. 18603 Klemme:* Province of Ilocos Norte, *Cuming 124½* (cotype): Province of Tayabas, *Whitford 701, Gregory 9½, For. Bur. 6687 Kobbe:* Province of Camarines, *For. Bur. 10771, 12254, 12255 Curran.* Negros, *For. Bur. 5617 Everett.* Leyte, *Elmer 7154.* Mindanao, Province of Surigao, *Long s. n.:* Lake Lanao, *Mrs. Clemens s. n.* A form from Balabac Island, *Bur. Sci. 406 Mangubat,* with lax panicles and more distinctly veined leaves may also be referable here.

Native names: *Carrilan* (Camarines); *tahid-labuyo* (Tayabas); *cannae* (Cagayan).

Endemic.

DOUBTFUL AND EXCLUDED SPECIES.

Dalbergia mimosella (Blanco) Prain in Ann. Bot. Gard. Calcutta 10[1] (1904) 42.

Amerimnon mimosella Blanco Fl. Filip. (1837) 563, ed. 2 (1845) 393, ed. 3, 2:357.

Dalbergia lanceolaria F.-Vill. Nov. App. (1880) 67, non Linn.

This species is known only from Blanco's imperfect description, and I have suggested above that it is the same as *Dalbergia minahassae* Koord., although Blanco's description is not entirely in accord with the characters of that species. The material on which it was based came from Tala, near the boundary between the Provinces of Rizal and Bulacan, Luzon, and according to Blanco is there known as *macapil.* Careful collecting in that locality, with especial reference to the native name, may serve to determine the identity of the species, but until such material is secured I do not think that the species should seriously be considered.

Dalbergia cassioides Wall.; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 457; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 82.

The Philippine record is based on a sterile specimen collected at Caldera, Mindanao, and is manifestly an erroneous identification. I have examined the specimen, which is preserved in the U. S. National Herbarium, and think it is probably a form of *D. ferruginea* Roxb. *D. cassioides* Wall. is a synonym of *D. stipulacea* Roxb., a species that is not known from the Philippines.

Dalbergia zollingeriana Miq. (=*D. parviflora* Roxb.); F.-Vill. Nov. App. (1880) 67. Not represented by any extant botanical material from the Philippines.

Dalbergia discolor Blume; F.-Vill. l. c. A species at present known only from Borneo and Celebes; not represented by any extant Philippine material.

Dalbergia spinosa Roxb.; F.-Vill. l. c. A species of India and Indo-China; not definitely known from the Philippines.

Dalbergia volubilis Llanos in Mem. Acad. Ciene. Madr. 3 (1858) 502; F. Vill. l. c. 67, non Roxb. Unidentifiable.

Dalbergia lanceolaria Llanos l. c.; F.-Vill. l. c., non Linn. Unidentifiable; probably a species of *Derris.*

According to strict rules of priority the name *Dalbergia* is untenable for this genus as several proposed ones are older. O. Kuntze has adopted the generic appellation *Amerimnon* P. Br. (1756), and transferred to it all the species of *Dalbergia* known to him. *Dalbergia* Linn. f. (1781) is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

57. PTEROCARPUS Linn.

Seed-bearing portion of the pod thickly beset with elongated slender spines.
1. *P. echinatus*

Pod without spines, glabrous or pubescent.
Pods usually less than 5 cm in diameter..... 2. *P. indicus*
Pods 6 to 8 cm in diameter..... 3. *P. blancoi*

1. **Pterocarpus echinatus** Pers. Syn. 2 (1807) 277; Prain Stray Leaves from Indian Forests 10, with Ind. Forest. 26 (1900); Merr. in Govt. Lab. Publ. (Philip.) 17 (1904) 20.

Echinodiscus echinatus Miq. Fl. Ind. Bat. 1[1] (1855) 137.

Pterocarpus crinaceus F.-Vill. Nov. App. (1880) 68; Vidal Sinopsis Atlas (1883) *t. 40, fig. B*, non Poir.

Pterocarpus vidalianus Rolfe in Journ. Linn. Soc. Bot. 21 (1884) 309; Vidal Rev. Pl. Vasc. Filip. (1886) 112; Perk. Frag. Fl. Philip. (1904) 20.

Pterocarpus klemmei Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 198.

LUZON, Province of Cagayan, *For. Bur. 4275, 5249, 7086 Klemme, For. Bur. 17127 Curran:* Province of Ilocos Norte, *For. Bur. 13859 Merritt & Darling:* Province of Ilocos Sur. *For. Bur. 5662 Klemme:* Province of Bulacan, *For. Bur. 7207 Curran:* Province of Laguna, *For. Bur. 8053 Curran & Merritt:* Province of Tayabas, *Merrill 1016, 2597, 2050, For. Bur. 10747 Curran, Hagger s. n.:* Province of Camarines, *For. Bur. 14334 Aguilar, For. Bur. 10633, 10729 Curran.* MINDORO, *For. Bur. 9895 Merritt.*

Celebes, Selayer.

In spite of the apparent difference between the fruits of this and the next species, the two are so closely allied that I have been unable to find any constant characters by which sterile or flowering specimens can be distinguished, and accordingly a number of flowering specimens which doubtless belong in part to the present species, are cited below, although probably they for the greater part belong to the next, which is the more common and widely distributed one in the Philippines. The specimens cited above are all with fruit.

Two specimens in the herbarium of the Bureau of Science show some steps of intergradation between *P. echinatus* and *P. indicus:* the first (*For. Bur. 10425 Curran*, Camarines Province, Luzon), presents the pods with numerous, very short spines, less than 1 mm long, on most of the pods, but with other pods with no traces of these short spines; the second (*For. Bur. 7050 Klemme*, Cagayan Province, Luzon) presents pods for most part entirely smooth, but 3 or 4 of the 15 on the specimen have each from two to five spines in all respects similar to those of *P. echinatus.*

Pterocarpus klemmei is here reduced to *P. echinatus*, as I am convinced that the type of the former is only a specimen of the latter species with very immature pods.

Flowering specimens, in part doubtless referable to the above species, but probably for the greater part belonging to the following one:

LUZON, Province of Cagayan, *For. Bur. 16956, 17190 Curran, For. Bur. 11289 Klemme, For. Bur. 18488, 18521 Alvarez:* Province of Tayabas, *For. Bur. 370 Bath, Merrill 2592, 1984, 2044, For. Bur. 6067 Kobbe, For. Bur. 6629 Reyes, For. Bur. 10293 Curran.* MINDORO, *Merrill 2231, Whitford 1473, For. Bur. 3675, 6729 Merritt.* PALAWAN, *For. Bur. 3840 Curran, For. Bur. 7441 Manalo.* BALABAC, *Bur. Sci. 391 Mangubat.* SAMAR, *For. Bur. 15063 Rosenbluth.* LEYTE, *For. Bur. 12632 Rosenbluth.* MINDANAO, Province of Surigao, *Bolster 234:* Lake Lanao, *Mrs. Clemens 288.*

In addition to the above material, there are about 40 additional sheets, consisting of leaf specimens only, in the herbarium of the Bureau, which are not cited here. This material comes from many different localities from northern Luzon to southern Mindanao, and is apparently all referable to either *P. echinatus* or to *P. indicus*.

2. **Pterocarpus indicus** Willd. Sp. Pl. 3 (1800) 904; Miq. Fl. Ind. Bat. 1[1] (1855) 135; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 238, in part; F.-Vill. Nov. App. (1880) 67; Vidal Sinopsis Atlas (1883) *t. 40, fig. A;* Prain in Journ. As. Soc. Beng. 66[2] (1897) 123, Stray Leaves from Indian Forests 7, with Ind. Forest. 26 (1900).

Pterocarpus pallidus Blanco Fl. Filip. (1837) 560, ed. 2 (1845) 391, ed. 3, 2:355; Naves l. c. *pl. 205.*

Babuyanes Islands, Camiguin, *Bur. Sci. 3976 Fénix:* Luzon, Province of Pangasinan, *For. Bur. 8315 Curran & Merritt:* Manila, *For. Bur. 19017 Curran* (cult.): Province of Camarines, *For. Bur. 10681 Curran:* Province of Sorsogon, *For. Bur. 10517 Curran.* Mindoro, *For. Bur. 9741, 4102, 8655, 5376 Merritt, Merrill 2580, Bur. Sci. 1543 Bermejos.* Masbate, *Merrill 2620, For. Bur. 1002 Clark, Whitford 1688.* Ticao, *For. Bur. 1019 Clark.* Leyte, *Elmer 7126.* Negros, *For. Bur. 12421 Danao.* Mindanao, District of Zamboanga, *For. Bur. 9346 Whitford & Hutchinson:* Province of Surigao, *Bolster 328:* Province of Misamis, *Alga 1.*

Tenasserim to southern China, the Malay Peninsula, Sumatra, Java, Celebes, New Guinea and the Caroline Islands.

As was the case with *Pterocarpus echinatus* Pers., only specimens with fruits have been here cited; most of the flowering specimens cited above probably belong with *P. indicus.*

This species and the above yield the valuable timber known in the Philippines as *narra,* which is very similar to the *padouk* of India. The most usual native names are *asana, naga,* and *narra,* and are applied indiscriminately to all three species here recognized; other native names are: *odias* (Pangasinan); *nala* (Abra); *taga* (Cagayan); *balauning* (Mindoro); *daitanag,* ex Blanco.

3. **Pterocarpus blancoi** Merr. in Govt. Lab. Publ. (Philip.) 6 (1904) 7.

Pterocarpus santalinus Blanco Fl. Filip. (1837) 561, ed. 2 (1845) 392, ed. 3, 2:356; F.-Vill. Nov. App. (1880) 67, non Linn.

Luzon, Province of Union, *Elmer 5690:* Province of Tarlac, *Merrill 2881:* Province of Nueva Ecija, *For. Bur. 11054 Saroca:* Province of Bulacan, *For. Bur. 7203 Currant:* Province of Rizal, *Merrill 2809, Bur. Sci. 987 Ramos, Decades Philip. For. Pl. no. 203 Ramos.*

The same native names are applied to this as to the preceding species; in Pampanga it is known as *apalit.*

Endemic; apparently closely allied to *P. papuanus* F. Muell. of New Guinea.

Pterocarpus blancoi is perhaps not specifically distinct from *P. indicus;* it is characterized by its much larger pods (6 to 8 cm in diameter), while *P. indicus,* at least the typical form, usually has pods 5 cm or less in diameter; some forms cited above under *P. indicus* have at least some pods 6 cm in diameter; as a rule the leaflets of *P. blancoi* are relatively narrower and more acuminate than are those of *P. indicus,* but these characters are not entirely constant.

EXCLUDED SPECIES.

Pterocarpus flavus Lour.: F.-Vill. Nov. App. (1880) 67.

Probably an erroneous identification, on the part of F.-Villar, for some form of *Pterocarpus indicus.* Loureiro's species is not a *Pterocarpus,* but is *Pongamia mitis* (L.) Merr. (*P. glabra* Vent.).

58. PONGAMIA Vent.

1. **Pongamia mitis** (Linn.) comb. nov.

Robinia mitis Linn. Sp. Pl. ed. 2 (1763) 1044.

Cytisus pinnatus Linn. l. c. ed. 1 (1753) 741, saltem pro parte (excl. Pluk. phyt. 104. f. 3).

Galedupa indica Lam. Encycl. 2 (1786) 594 (excl. syn. *Caju galedupa* Rumph.).

Dalbergia arborea Willd. Sp. Pl. (1800) 901.

Pongamia glabra Vent. Jard. Malm. 1 (1803) *t. 28*; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 240; Prain in Journ. As. Soc. Beng. 66 [2] (1897) 94, 456; F.-Vill. Nov. App. (1880) 68; Vidal Sinopsis Atlas (1883) *t. 41, fig. C*, Rev. Pl. Vasc. Filip. (1886) 113.

Galedupa maculata Blanco Fl. Filip. (1837) 559, ed. 2 (1845) 390, ed. 3 2: 353; Naves l. c. *pl. 417*.

Galedupa pinnata Taub. in Engl. & Prantl. Nat. Pflanzenfam. 3 [3] (1891) 344.

Luzon. Province of Cagayan, *For. Bur. 18454 Alvarez:* Province of Zambales, *Hallier s. n.:* Province of Bataan, *Merrill 1510, For. Bur. 5299 Curran:* Province of Tayabas, *For. Bur. 10199 Curran, Merrill 1001, 2586, Whitford 745, 916:* Province of Camarines, *For. Bur. 10768 Curran, Ahern 46, 206.* Polillo, *Bur. Sci. 9089 Robinson, Bur. Sci. 10762 McGregor.* Palawan, *Bur. Sci. 613 Foxworthy, For. Bur. 3773 Curran, Bur. Sci. 304 Bermejos.* Ticao, *For. Bur. 1038 Clark.* Panay, *Copeland s. n.* Negros, *For. Bur. 5614 Everett, For. Bur. 12418 Danao.* Cebu, *For. Bur. 6430 Espinosa.* Tinago, *Ahern 420.* Dinagat, *Ahern 496.* Mindanao, District of Zamboanga, *For. Bur. 12356 Hutchinson, For. Bur. 9200, 9151 Whitford & Hutchinson:* District of Davao, *DeVore & Hoover 236, Copeland 1327, Williams 2787:* Province of Surigao. *Bolster 398.* Basilan, *For. Bur. 3469 Hutchinson.*

There is some doubt as to the earliest specific name for this species. *Robinia mitis* Linn. (1763) was based in part on *Cytisus pinnatus* Linn., of the first edition of the "Species Plantarum," but in his consideration of *Robinia mitis*, Linnæus excluded the first reference, given in the first edition under *Cytisus pinnatus*, Pluk. phyt. 104. *f. 3.* I have been unable to check this reference to Plukenet, and consider it safer to adopt the second name proposed by Linnæus. B. Daydon Jackson, Esq., secretary of the Linnean Society, has kindly examined the specimen in the Linnean herbarium labeled by Linnæus *Robinia mitis*, and informs me that it an undoubted specimen of the plant usually named *Pongamia glabra*, consisting of a flowering branch in a young state, with a single detached pod.

The material cited above includes the typical form, with medium-sized leaflets and flowers, and also apparently the form described by Zollinger & Moritzi as *Pongamia grandifolia*, with larger leaflets and larger flowers. I find, as Prain has already noted, a great number of intergrading forms, and do not think that the latter can be distinguished by any constant character or set of characters. Among the numerous specimens cited above, *Ahern 420* is apparently typical *P. grandifolia* Zoll. & Mor.

Var. **xerocarpa** (Hassk.) comb. nov.

Pongamia xerocarpa Hassk. Retz. ed nov. 208.

Pongamia glabra var. *xerocarpa* Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 95.

Luzon, Province of Union, *Elmer 5695:* Province of Pangasinan, *Bur. Sci. 4966 Ramos:* Province of Pampanga, *Merrill 1368:* Province of Zambales, *Merrill 2921:* Province of Bataan, *Ahern 776. For. Bur. 2044 Borden, For. Bur. 1424 Ahern's collector:* Province of Tayabas, *Merrill 2036, For. Bur. 12803 Rosenbluth.* Mindoro, *For. Bur. 8645 Merritt.*

This variety differs from the typical form, as noted by Prain, in its more numerous (usually 7 to 9, rarely 5) leaflets, which are much smaller than in the type, mostly less than 3 cm wide.

The species extends along the seashores of the Mascarene Islands to India, southern China, Malaya, to northern Australia, and Polynesia; the var. *xerocarpa* extends from Ceylon to Sumatra, and the Malay Peninsula.

Native names: *Balic-balic* (Manila, Tayabas); *bayoc-bayoc* (Dinagat, Tinago); *baloc-baloc* (Tayabas, Negros, Palawan); *balot-balot* (Camarines); *maroc-baroc* (Camarines, Ticao); *balu-balu* (Basilan); *baoc-baoc* (Cebu); *bani* (Tayabas, Bataan, Pangasinan, Pampanga, Zambales); *baucy* (Cagayan).

The name *bani* seems to be more generally applied to the var. *xerocarpa*, which is apparently mostly found at a greater or less distance inland and away from the direct influence of salt water; the typical form is usually found close to the beach.

The generic name *Pongamia* Vent. (1803) is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress. The earliest name is *Pongam* Adans. (1763), which was altered to *Pungamia* by Lamarck (1797), and to *Pongamia* by Ventenant (1803). O. Kuntze has adopted the generic appellation *Cajum*, adapted from *Caju galedupa* of Rumphius (1741), while Lamarck (1786), proposed the generic name *Galedupa*, also from Rumphius, and which has been adopted by Taubert in the "Natürlichen Pflanzenfamilien." The case is fully discussed by Prain,[50] with especial reference to the objections to the use of the generic name *Galedupa*.

59. DERRIS Lour.

Standard not callose at the base.

Vexillary filament free throughout; flowers single, in ample thyrsoid panicles with nodes neither tumid nor produced into stalks (§ AGANOPE).

Pod winged only along the upper suture, and sinuate between the seeds; corolla nearly 1.5 cm long ..... 1. *D. diadelpha*

Pod winged down both sutures, not sinuate between the seeds; corolla 1 cm long or less ..... 2. *D. thyrsiflora*

Vexillary filament united with the others, at least in the middle of the tube; flowers fascicled on tumid nodes that are sometimes produced into stalks.

Pod winged along the upper suture.

Pod narrowly oblong to lanceolate, less than 1.5 cm wide, narrowed at both ends, many times longer than broad. (Unknown in *D. polyantha*). (§ BRACHYPTERUM).

Leaflets distinctly retuse at the rather blunt apex, scarcely acuminate, up to 13 cm long; racemes very densely flowered, the rachis densely pubescent ..... 3. *D. polyantha*

Leaflets acute or acuminate, or if retuse then less than 7 cm long and distinctly acuminate.

Pods densely ferruginous-pubescent; an erect tree or shrub. ..... 4. *D. cumingii*

Pods glabrous or nearly so; scandent shrubs.

Leaflets 3 to 7 cm long, the somewhat acuminate apex usually retuse. ..... 5. *D. scandens*

Leaflets 10 to 13 cm long, rather distinctly subcaudate-acuminate, the acumen blunt ..... 6. *D. philippinensis*

[50] Journ. As. Soc. Beng. 66[2] (1907) 96, 456.

Pod suborbicular or shortly and broadly oblong, 2.5 to 3 cm wide, never more than twice as long as wide, subtruncate at both ends (§ EUDERRIS).
Leaflets 10 to 18 cm long, stipellate; pod slightly pubescent. 7. *D. elegans*
Leaflets rarely exceeding 10 or 12 cm in length, usually shorter, exstipellate; pod glabrous. A littoral species ..... 8. *D. trifoliata*
Pod distinctly winged along both sutures. (Unknown in *D. mindorensis*); (§ DIPTERODERRIS).
Leaflets glabrous; pod broadly oblong, about 2 cm wide ..... 9. *D. micans*
Leaflets somewhat ferruginous-pubescent ..... 10. *D. mindorensis*
Standard with two auriculate callosities at the base of the limb (§ PARADERRIS).
All parts of the plant glabrous ..... 11. *D. lianoides*
Young branches, leaves, and inflorescence densely ferruginous-pubescent. 12. *D. elliptica*

1. **Derris diadelpha** (Blanco) comb. nov.

Pterocarpus diadelphus Blanco Fl. Filip. (1837) 563, ed. 2 (1845) 393, ed. 3, 2: 357.

Pongamia sinuata Wall. Cat. (1832) no. 5911, nomen.

Derris sinuata Thwaites Enum. Pl. Zeyl. (1859) 93; Benth. in Journ. Linn. Soc. Bot. 4 (1860) Suppl. 113; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 246; F.-Vill. Nov. App. (1880) 68; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 98; Perk. Frag. Fl. Philip. (1904) 84; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 66.

Derris floribunda Naves in Blanco Fl. Filip. ed. 3, *pl. 336*, non Benth.

Derris thyrsiflora F.-Vill. Nov. App. (1880) 68, non Benth.

LUZON, Province of Zambales, *Merrill 2189, Hallier s. n., For. Bur. 7014 Curran:* Province of Bataan, *Bur. Sci. 590 Mangubat, Merrill 2561, For. Bur. 12931 Alvarez, Whitford 1261:* Province of Rizal, *Bur. Sci. 6758 Robinson, For. Bur. 476 Ahern's collector, Guerrero 30, Merrill 1734, 2841, Decades Philip. Forest Fl. no. 213:* Manila, *Alberto s. n.* MINDORO, *Merrill 948, For. Bur. 12229 Rosenbluth.* NEGROS, *For. Bur. 5568 Ererett, Whitford 1638.* MINDANAO, Province of Surigao, *Ahern 359.*

Native names: *Balitos, baloc-baloc* (Negros); *tibalao, balanti, bagarilao, usinasinanan* (Rizal); *dugo-rogo, rugo-rugo* (Bataan); *balu-y-lamoc* (Zambales); *silasila*, ex Blanco.

Blanco's *Pterocarpus diadelphus* was referred by F.-Villar to *Derris thyrsiflora* Benth., a species that does not occur in the area from which Blanco secured his material. His description, although short, applies unmistakably to the species commonly known as *Derris sinuata* Thw., and *diadelphus*, being the earliest valid specific name is here adopted. The species is common in the region from which Blanco secured most of his material, and flowers from April to June.

Ceylon and India to the Malay Peninsula and Archipelago, and Indo-China.

2. **Derris thyrsiflora** Benth. in Journ. Linn. Soc. Bot. 4 (1860) Suppl. 249; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 100.

Millettia thyrsiflora Benth. Pl. Jungh. (1851) 249.

BASILAN, *Hallier s. n.*

The specimen is in fruit, and is probably referable here; flowering specimens may lead to a different disposition of it.

Nicobar Islands, the Malay Peninsula, Sumatra, and Java.

3. **Derris polyantha** Perk. Frag. Fl. Philip. (1904) 83.

LUZON, Province of Pampanga, *Merrill 1457:* Province of Rizal, *Merrill 1692, For. Bur. 430, 2653 Ahern's collector, Bur. Sci. 2188 Ramos, Decades Philip. Forest Fl. no. 180 Ahern's collector.*

Native names: *Tuglo* (Rizal); *malagogong-dapo* (Pampanga).

This is described as having the vexillary filament free, which would place the species in the § *Aganope*; I have examined a number of flowers from both specimens cited in the original description, and find the vexillary filament more or less united with the others. In Rizal Province the bark of this vine is used to stupefy fish.

Endemic.

4. **Derris cumingii** Benth. in Journ. Linn. Soc. Bot. 4 (1860) Suppl. 104; Vid. Phan. Cuming. Philip. (1885) 109; Perk. Frag. Fl. Philip. (1904) 82.

Derris cumingiana Vid. Rev. Pl. Vasc. Filip. (1886) 113.

Luzon, Province of Ilocos Norte, *Cuming 1208* (cotype): Province of Benguet, *For. Bur. 5133 Curran:* Province of Zambales, *Bur. Sci. 1922 Foxworthy:* Province of Rizal, *For. Bur. 7034, 7037 Curran, For. Bur. 1129, 1140, 2986 Ahern's collector, Merrill 1867, 2824.*

Native names: *Malacaguios, malacadios* (Bataan).

Endemic.

5. **Derris scandens** (Roxb.) Benth. in Journ. Linn. Soc. Bot. 4 (1860) Suppl. 103; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 240; F.-Vill. Nov. App. (1880) 68; Vid. Sinopsis Atlas (1883) *t. 41, fig. F;* Rev. Pl. Vasc. Filip. (1886) 112.

Dalbergia scandens Roxb. Pl. Coromandel 2 (1798) *t. 192.*

Dalbergia timoriensis DC. Prodr. 2 (1825) 417.

Galedupa frutescens Blanco Fl. Filip. (1837) 559, ed. 2 (1845) 391, ed. 3, 2:354; Naves l. c. ed. 3, *pl. 232.*

Deguelia timoriensis Taub. in Engl. & Prantl. Nat. Pflanzenfam. 3[3] (1891) 345.

Luzon, Province of Benguet, *Elmer 6463, Williams 1053, Bur. Sci. 3451 Mearns:* Province of Pangasinan, *Alberto 4:* Province of Zambales, *Bur. Sci. 4807 Ramos:* Province of Nueva Ecija, *Cuming 1420:* Province of Bulacan, *Bur. Sci. 6112 Robinson & Merritt:* Province of Rizal, *Bur. Sci. 3287 Ramos:* Province of Cavite, *Merrill 4185.* Mindoro, *Bur. Sci. 1535 Bermejos, For. Bur. 6183 Merritt.* Palawan, *Bur. Sci. 891 Foxworthy.* Burias, *For. Bur. 1723 Clark.* Tablas, *McGregor 339.* Samar, *Cuming 1699.* Negros, *For. Bur. 13588 Meyer & Foxworthy.* Mindanao, District of Davao, *Williams 2857.*

Native names: *Lapac* (Burias); *malasaga*, ex Blanco.

India to southern China through Malaya to northern Australia.

6. **Derris philippinensis** sp. nov.

Derris multiflora var.? *longifolia* Benth. in Journ. Linn. Soc. Bot. 4 (1860) Suppl. 108; Vid. Phan. Cuming. Philip. (1885) 109, non *D. longifolia* Benth.

Derris multiflora Vid. Rev. Pl. Vasc. Filip. (1886) 112; Perk. Frag. Fl. Philip. (1904) 83; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 66, non Benth.

Derris multiflora var.? *longifolia* Benth. was based on *Cuming 1162*, but Bentham states that the two specimens, *Junghuhn*, from Java, type of the species, and *Cuming 1162*, from the Philippines, type of the variety *longifolia*, were without fruit, and hence it was difficult to judge the affinities of the two specimens. Recently material has been collected in the Philippines, in fruit, that in all vegetative characters matches *Cuming 1162*, which shows that the var. *longifolia* belongs in the § *Brachypterum*, and must be closely allied to *Derris scandens;* as the pods of *D. multiflora* are described, from Junghuhn's notes, as "oblique rotundato," it is evident that the Javan and Philippine plants must be very different. Accordingly the Philippine form is here treated as a distinct species.

Scandent, glabrous except the inflorescence. Leaflets 5 to 7, narrowly ovate to oblong-lanceolate, 7 to 13 cm long, 2.5 to 4.5 cm wide, base rounded or acute, the apex strongly subcaudate-acuminate, the acumen blunt. Racemes shorter than or nearly equaling the leaves, axillary, rather slender, somewhat pubescent, many flowered. Flowers white, about 1 cm long. Pod thin, narrowly oblong to oblong-lanceolate, blunt, 4 to 8 cm long, 1 to 1.5 cm wide, very slightly falcate, the wing 1.5 to 2 mm wide.

LUZON, Province of Ilocos Norte, *Cuming 1162, Bur. Sci. 7635 Ramos:* Province of Benguet, *Elmer 6177:* Province of Rizal, *Merrill 5045:* Province of Bataan, *Topping 535, Williams 714:* Province of Tayabas, *Merrill 1969.*

Manifestly closely allied to *Derris scandens* (Roxb.) Benth., differing especially in its less numerous, much larger leaves, and its pods not distinctly narrowed at both ends as in that species.

7. **Derris elegans** (Grah.) Benth. Pl. Jungh. (1852) 252; Journ. Linn. Soc. Bot. 4 (1860) Suppl. 109; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 252; King ex Prain in Journ. As. Soc. Bot. 66 [2] (1897) 103.

Pongamia elegans Grah. in Wall. Cat. (1832) no. 7540.

CULION, *Merrill 666.* NEGROS, *For. Bur. 7249 Everett.* LEYTE, *Elmer 7162.* MINDANAO, District of Zamboanga, *Williams 2398:* Lake Lanao, *For. Bur. 3919 Hutchinson, Mrs. Clemens 434, 484,* and several sheets without number.

The material here referred to *Derris elegans* seems to differ from the typical form of that species, as described, in being nearly glabrous, and having longer racemes. One specimen cited above, *Merrill 666,* was referred by Doctor Perkins to *Derris uliginosa.* Although *D. elegans* is manifestly allied to that species, it is very different in its leaves and inflorescence, and, as noted by Prain, can always be distinguished by its stipellate leaves.

Tenasserim, the Andaman Islands, Malay Peninsula, and Sumatra.

8. **Derris trifoliata** Lour. Fl. Cochinch. (1790) 433.

Robinia uliginosa Roxb. ex Willd. Sp. Pl. 3 (1800) 1133.

Dalbergia heterophylla Willd. l. c. 901.

Galedupa uliginosa Roxb. Hort. Beng. (1814) 53, Fl. Ind. 3 (1832) 243.

Pongamia uliginosa DC. Prodr. 2 (1825) 416.

Pterocarpus frutescens Blanco Fl. Filip. (1837) 562, ed. 2 (1845) 392, ed. 3, 2: 356; Naves l. c. ed. 3, *pl. 159.*

Derris uliginosa Benth. Pl. Jungh. (1852) 252, Journ. Linn. Soc. Bot. 4 (1860) Suppl. 107; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 241; F.-Vill. Nov. App. (1880) 68; Vid. Rev. Pl. Vasc. Filip. (1886) 113.

BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4001 Fénix.* LUZON, Province of Zambales, *Hallier s. n.:* Manila, *Elmer 5503:* Province of Bataan, *For. Bur. 6356 Curran:* Province of Tayabas, *Whitford 581, 597, 759:* Province of Camarines, *For. Bur. 12278, 12288 Curran.* POLILLO, *Bur. Sci. 6988 Robinson.* MINDORO, *For Bur. 5516 Merritt, Bur. Sci. 921 Mangubat.* PALAWAN, *Bur. Sci. 831 Foxworthy.* CEBU, *Bur. Sci. 1715 McGregor.* MINDANAO, District of Zamboanga, *Hallier s. n.:* District of Cotabato, *Mrs. Clemens 810:* District of Davao, *Williams 2746, Copeland 352.* BASILAN, *For. Bur. 3973 Hutchinson.*

Native names: *Mangasin* (Tayabas); *tuba-tuba* (Basilan); *sila-sila,* ex Blanco: *hiñgasin, hiñgasinan* (Panay), ex F.-Villar.

A species confined to salt water or brackish swamps along the seashore

and tidal rivers; common throughout the littoral districts in the Philippines. Eastern Africa through India to Formosa, Malaya, and Polynesia.

Dr. A. B. Rendle informs me that the type of Loureiro's *Derris trifoliata* is not preserved in the British Museum; I consider the identity of this species and *Derris uliginosa* Roxb. to be unquestionable, and the earliest name is hence adopted. The next older name appears to be *Dalbergia heterophylla* Willd., and the type of this has been examined by Dr. H. Harms at my request, who reports that it is quite the same as *Derris uliginosa* Roxb.

The genus *Derris* was based by Loureiro on two species, *D. pinnata*, and *D. trifoliata*; the former is a *Dalbergia*, and is identical with *D. tamarindifolia* Roxb. (see p. 96). Under the circumstances it would be illogical to consider the first species described as the type of the genus, thus making *Dalbergia* and *Derris* synonymous, and hence the second species, *Derris trifoliata* Lour., must be adopted as the generic type.

9. **Derris micans** Perk. Frag. Fl. Philip. (1904) 82.

Luzon, Province of Rizal, *Merrill 2284, Bur. Sci. 4584 Ramos, For. Bur. 2892 Ahern's collector.*

Endemic.

10. **Derris mindorensis** Perk. l. c.

Mindoro, *Merrill 953.*

Endemic.

Whether or not *Derris micans* and *D. mindorensis* are distinct is doubtful. The type of the former is a fruiting specimen, nearly glabrous in all parts, and that of the latter is a flowering specimen, the under surface of the leaflets and the inflorescence somewhat pubescent. The vegetative characters are very similar in both, and flowering specimens from near the type locality of *D. micans* (*For. Bur. 2892 Ahern's collector*), have pubescent leaflets and panicles as in *D. mindorensis*. A larger series of specimens will be necessary to determine the exact relationships between the two forms. A cotype of *D. mindorensis* has been determined by Mr. Rolfe at Kew as *D. ferruginea* Benth., and it may be the same as the specimen collected by Vidal and so reported by Ceron.[51]

11. **Derris lianoides** Elmer Leafl. Philip. Bot. 1 (1907) 228.

Luzon, Province of Tayabas, *Elmer 7443. 9339. For. Bur. 10159 Curran:* Province of Rizal, *For. Bur. 2681 Ahern's collector.* Mindanao, Lake Lanao, *Mrs. Clemens 537* and several sheets without number: Province of Misamis, Mount Malindang, *For. Bur. 4775 Mearns & Hutchinson.*

This species belongs in the § *Paraderris*, and is apparently closely allied to *D. montana* Jungh., of Java, and to *D. malaccensis* Prain, of the Malay Peninsula. It differs from both in its smaller leaflets, and from the latter, at least, also in its narrower pods which are 5 to 8 cm long and 1.5 to 2 cm wide.

12. **Derris elliptica** (Roxb.) Benth. in Journ. Linn. Soc. Bot. 4 (1860) Suppl. 111; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 243; F.-Vill. Nov. App. (1880) 68; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 106; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 66.

Galedupa elliptica Roxb. Hort. Beng. (1814) 53, nomen, Fl. Ind. 3 (1832) 242.

Cylista piscatoria Blanco Fl. Filip. (1837) 589.

Galactia ? terminaliflora Blanco l. c. ed. 2 (1845) 411, ed. 3, 2: 390.

Millettia splendens F. Vill. Nov. App. (1880) 59.

[51] Cat. Pl. Herb. (Manila) (1892) 66.

Millettia piscatoria Merr. in Govt. Lab. Publ. (Philip.) **27** (1905) 411, l. c. **29** (1905) 18.

Luzon, Province of Rizal, *Decades Philip. Forest Fl. no. 176,* as *Millettia, For. Bur. 473, 1164 Ahern's collector, Bur. Sci. 4570 Ramos:* Province of Bataan, *Whitford 60:* Province of Laguna, *Elmer:* Province of Tayabas, *For. Bur. 11108 Curran.* Mindoro, *McGregor 154, Merrill 4043.* Mindanao, Lake Lanao, *Mrs. Clemens 410:* District of Davao, *Williams 2788, 2909.*

Native names: *Tibauglan* (Rizal); *tubli,* ex Blanco.

Chittagong and Tenasserim through the Malay Peninsula to Sumatra, Java, New Guinea and the Bismarck Archipelago.

There are apparently several other species of the genus represented in the materials before me, but most of the forms not classified are represented by flowering specimens only. As it is practically impossible in many cases definitely to determine, in the absence of fruit, whether the plant being dealt with is a *Derris* or a *Millettia,* I have refrained from describing any of these forms, with the hope that eventually additional material will be secured that will enable us satisfactorily to place the forms now represented only by flowering specimens.

The generic name *Derris* Lour. (1790) is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress. O. Kuntze has referred all the species to *Pterocarpus,* and Taubert has adopted the genus *Deguelia* Aubl. (1775). Two other earlier names are *Salkan* Adans., and *Solori* Adans. (1763), the latter two being synonyms of *Derris,* as shown by Prain, and not referable to *Dalbergia,* where they have been placed by most authors.

DOUBTFUL AND EXCLUDED SPECIES.

Derris discolor Benth.; Ceron Cat. Pl. Herb. (Manila) (1892) 67. A species of doubtful status from Sikkim and Silhet. The Philippine record is probably due to an erroneously identified plant; it was based on a specimen from Balabac Island, *Vidal 2665.*

Derris ferruginea Benth.; Ceron l. c. 66. The Philippine record is based on *Vidal 2576* from the Province of Isabela, Luzon, a specimen of which is in the Kew Herbarium; this specimen is very similar to *D. mindorensis* Perk., but is slightly more pubescent. Material collected in Mindanao, *Bolster 356, 406,* insufficient for accurate identification, may be the same as Vidal's specimen. Whether or not the Philippine material is referable to *D. ferruginea* Benth., I am unable to determine at present. That species is supposed to extend from the eastern Himalayan region to Burma. See *D. mindorensis* Perk., above.

60. **EUCHRESTA** Benn.

1. **Euchresta horsfieldii** (Lesch.) Benn. Pl. Jav. Rar. (1840) 148, *t. 21;* Benth. in Journ. Linn. Soc. Bot. 4 (1860) Suppl. 118; Miq. Fl. Ind. Bat. 1[1] (1855) 125; Baker in Hook. f. Fl. Brit. Ind. 2 (1878) 248; F.-Vill. Nov. App. (1880) 68; Ceron Cat. Pl. Herb. (Manila) (1892) 67.

Andira horsfieldii Lesch. in Ann. Mus. Paris **16** (1810) 481, *t. 12;* DC. Prodr. 2 (1825) 476.

Luzon, Province of Rizal, Mount Cayatang, *Bur. Sci. 2159 Ramos:* Province of Tayabas, Mount Banajao, *Bur. Sci. 2470 Foxworthy:* Province of Albay, Mount Mayon, *Bur. Sci. 6484 Robinson:* without definite locality, *Vidal 2622, Loher 2336* (in Herb. Kew.). Negros, Mount Canlaon, *For. Bur. 13674 Curran.*

Khasia Mountains and eastern India, Formosa, Luchu Archipelago, and Java.

61. INOCARPUS Forst.

1. **Inocarpus edulis** Forst. Char. Gen. (1776) 66, *t. 33:* F.-Vill. Nov. App. (1880) 362; Oliver in Hook. Ic. IV 9 (1889) *pl. 1837;* Perk. Frag. Fl. Philip. (1904) 21.

Bocoa edulis Baill. Adansonia 9 (1868–1870) 237.

Gajanus edulis O. Ktze. Rev. Gen. Pl. (1891) 189.

JOLO, *Warburg 14677*, in herb. Berol. PALMAS, *Merrill 5336.*

Malay Archipelago to Polynesia, frequently only cultivated, and only so found in the Philippines. Palmas Island, mentioned above, is really not a part of the Philippine group politically, although formerly so considered; it is a small island to the south-east of Mindanao, and belongs to the Dutch, being ruled as a dependency of Celebes.

Inocarpus edulis has been referred to *Bocoa*, the latter being the older generic name; De Dalla Torre & Harms, however, retain *Inocarpus* Forst., and *Bocoa* Aubl., as distinct genera.

62. PISUM Linn.

1. **Pisum sativum** Linn. Sp. Pl. (1753) 727; F.-Vill. Nov. App. (1880) 62.

LUZON. Manila, *Nieva 312.*

The common pea, introduced from Europe and cultivated only, properly having no place in the Philippine flora; locally known by one of its Spanish names, *chicharo.*

63. ABRUS Linn.

Pod oblong, turgid, 2.5 to 5 cm long, 3- to 6-seeded; seeds red and black.
1. *A. precatorius*

Pod narrowly-oblong, thin, not turgid, 6 to 8 cm long, somewhat curved, 6- to 12-seeded; seeds black ..... 2. *A. laevigatus*

1. **Abrus precatorius** Linn. Syst. Nat. ed. 12 (1767) 472; Blanco Fl. Filip. (1837) 565, ed. 2 (1845) 394, ed. 3, 2: 361; Naves l. c. ed. 3, *pl. 156;* Miq. Fl. Ind. Bat. 1[1] (1855) 159; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 175; F.-Vill. Nov. App. (1880) 62.

Glycine abrus Linn. Sp. Pl. (1753) 753.

Abrus abrus W. F. Wight in Contr. U. S. Nat. Herb. 9 (1905) 172.

BATANES ISLANDS, Sabtan, *Bur. Sci. 3729 Fénix.* BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4028 Fénix.* LUZON, Province of Cagayan, *For. Bur. 14824 Darling, For. Bur. 16510 Bacani, For. Bur. 16749 Curran:* Province of Isabela, *Bur. Sci. 8111 Ramos:* Province of Ilocos Norte, *For. Bur. 14673 Darling, Bur. Sci. 2299 Mearns:* Province of Ilocos Sur, *Bur. Sci. 10079, 10093 McGregor:* Province of Union, *Elmer 5672:* Province of Pampanga, *Bolster 3, Merrill 1434:* Province of Rizal, *Bur. Sci. 1043 Ramos:* Province of Bataan, *For. Bur. 5981 Curran, Merrill 1588, Whitford s. n.:* Province of Cavite, *Baja 285:* Province of Tayabas, *Gregory 33, Merrill 1960.* POLILLO, *Bur. Sci. 6967 Robinson.* MINDORO, *Merrill 902.* TICAO, *For. Bur. 1059 Clark.* PANAY, *Copeland s. n.* MINDANAO, District of Davao, *Copeland 308:* Lake Lanao, *Mrs. Clemens s. n.* BASILAN, *Halliar s. n.*

Native names: *Saga, saga-saga* (Tayabas); *saga-baguin* (Polillo); *cansasaga* (Pampanga), *casasaga* (Bataan); *bugayong* (Ilocos, Union); *lasa* (Sabtan); other names, ex Blanco, *sagamamin, bangati, gicos-gicos, agaiyangyiang, mangadolong, caloo, matangpune, aroyangyang.*

Widely distributed in the Philippines at low and medium altitudes; cosmopolitan in the Tropics.

2. **Abrus laevigatus** E. Mey. Comm. 1 (1835–37) 126; Harv. Fl. Cap. 2: 263.

Abrus pulchellus Wall. Cat. (1832) no. 5819, nomen; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 175; F.-Vill. Nov. App. (1880) 62; Perk. Frag. Fl. Philip. (1904) 84; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 35.

Luzon, Province of Abra, *Bur. Sci. 7281 Ramos:* Province of Benguet, *Williams 1415:* Province of Zambales, *Hallier s. n.:* Province of Bulacan, *Yoder 48:* Province of Bataan, *Copeland 293, For. Bur. 2068 Borden, Whitford 1034, Williams 76.*

India and Ceylon to the Malay Peninsula and Archipelago; also in tropical and southern Africa.

EXCLUDED SPECIES.

Abrus fruticulosus Wall.; F.-Vill. Nov. App. (1880) 62. A species of British India, probably credited to the Philippines by F.-Villar on erroneously identified material.

64. CLITORIA Linn.

1. **Clitoria ternatea** Linn. Sp. Pl. (1753) 753; DC. Prodr. 2 (1825) 233; Blanco Fl. Filip. (1837) 590, ed. 2 (1845) 412, ed. 3, 2: 391; Naves l. c. ed. 3, *pl. 301;* Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 208.

Clitoria philippensis Perr. Mém. Linn. Soc. Paris 2 (1824) 111; C. B. Rob. in Philip. Journ. Sci. 3 (1908) Bot. 305.

Luzon, Province of Cagayan, *For. Bur. 16743 Curran:* Province of Abra, *Bur. Sci. 7297 Ramos:* Province of Ilocos Norte. *For. Bur. 19045 Darling, Bur. Sci. 2223 Mearns:* Province of Ilocos Sur, *For. Bur. 14075 Merritt & Darling:* Province of Union, *Elmer 5576:* Province of Pangasinan, *Bur. Sci. 4848, 4886, 4951 Ramos, Merrill 2875:* Province of Pampanga, *Merrill 1430:* Province of Laguna, *Williams 2057, 3071:* Manila, *Merrill 3439, McGregor 46, Favila 51, Cuzner 14:* Province of Bataan, *Merrill 1580.* Lubang, *Merrill 969.* Palawan, *Bur. Sci. 199, 200 Bermejos, For. Bur. 4163, 4192 Curran.* Cebu, *Brown 5.* Mindanao, District of Davao, *Copeland 449.*

Widely distributed and abundant in the Philippines at low altitudes in thickets, etc.; commonly cultivated. Both the blue and white-flowered forms represented in the material cited above; throughout the Tropics in gardens and as an escape.

65. CENTROSEMA Benth.

1. **Centrosema plumieri** (Turp.) Benth. in Ann. Wien. Mus. 2 (1838) 118; F.-Vill. Nov. App. (1880) 65; Usteri Beitr. Ken. Philip. Veg. (1905) 115.

Clitoria plumieri Turp. in Pers. Syn. 2 (1807) 303; DC. Prodr. 2 (1825) 234; Naves in Blanco Fl. Filip. ed. 3, *pl. 455.*

Bradburya plumieri O. Kuntze Rev. Gen. Pl. (1891) 164.

Cebu, *Bur. Sci. 1735 McGregor, Hallier s. n.*

A native of tropical America, introduced in the Philippines; it is not known whether the species is spontaneous or only cultivated in the Archipelago.

Bradburya Raf. (1817), and *Vexillaria* Hoffmg. (1824), are both older than *Centrosema*, the latter name being first used by DeCandolle, in 1825, as a section of *Clitoria*. *Centrosema* is, however, here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

66. DUMASIA DC.

1. **Dumasia villosa** DC. Mém. Leg. (1825) 257, *t.* ½. Prodr. 2 (1825) 241; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 183.

Rhynchosia ? henryi Hemsl. in Journ. Linn. Soc. Bot. 23 (1887) 196.

Luzon, Province of Benguet, Bugias, *Merrill 4671;* Mount Santo Tomas (Tonglon), *Williams 1412.*

Himalayan region to southern China, Java, Madagascar, and Natal.

The Philippine specimens differ from Asiatic material in our herbarium (*Henry 9238*, Yunnan, China, and *Meebold 5343*, Manipur, India) in some slight characters, being less villous, and with smaller leaflets. I can, however, detect no specific differentiating characters in the material before me.

67. SHUTERIA W. & A.

1. **Shuteria vestita** (Grah.) W. & A. Prodr. (1834) 207; Benth. Pl. Jungh. (1852) 232; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 181; Rolfe in Journ. Bot. 23 (1885) 212; Vidal Rev. Pl. Vasc. Filip. (1886) 109.

Glycine vestita Grah. in Wall. Cat. (1832) no. 5512.

Luzon, District of Bontoc, *For. Bur. 18388 Alvarez:* Province of Benguet, *Elmer 6075, Topping 98, Bur. Sci. 2793 Mearns, Williams 1538, Merrill 4797; For. Bur. 15939 Bacani, Bur. Sci. 5521 Ramos, For. Bur. 16221 Curran, Merritt, & Zschokke.*

India and Ceylon to southern China.

The Philippine material matches Chinese specimens, so named, closely, but is apparently somewhat different from Indian material. A critical examination of the Philippine and Chinese plants and comparison of the same with a large series of Indian specimens will be necessary to determine whether or not more than one species is represented.

68. GLYCINE Linn.

1. **Glycine tomentosa** Benth. Fl. Austral. 2 (1864) 245; Rolfe in Journ. Bot. 23 (1885) 212; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1887) 189; Vidal Phan. Cuming. Philip. (1885) 108, Rev. Pl. Vasc. Filip. (1886) 109.

Luzon, Province of Ilocos Norte, *Cuming 1238.*

Southern China and Australia.

Glycine hispida (Moench.) Maxim. is represented among our Philippine material by a single specimen from plants cultivated for experimental purposes in Manila, *Cuzner 49.* This Asiatic species properly has no place in the Philippine flora, and is apparently not cultivated by the natives. The beans are imported from Amoy in considerable quantities by the Chinese in Manila.

EXCLUDED SPECIES.

Glycine javanica Linn.; F.-Vill. Nov. App. (1880) 62.

I have seen no Philippine material representing this species; it extends from tropical Africa to India and Ceylon, and is also found in Java.

69. TERAMNUS Sw.

1. **Teramnus labialis** (Linn. f.) Spreng. Syst. 3 (1826) 235; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 184; F.-Vill. Nov. App. (1880) 63; Vid. Rev. Pl. Vasc. Filip. (1886) 109; Perk. Frag. Fl. Philip. (1904) 84.

Glycine labialis Linn. f. Suppl. (1774) 325.

Luzon, Province of Cagayan, *For. Bur. 16655 Bacani:* Province of Ilocos Norte, *For. Bur. 14677 Darling, Bur. Sci. 2277 Mearns:* Province of Union, *Elmer 5586:*

Province of Pangasinan, *Bur. Sci. 4927 Ramos:* Province of Bulacan, *Yoder 44:* Province of Batangas, *Marave 165:* Province of Laguna, *Bur. Sci. 6026 Robinson:* Province of Bataan, *Merrill 1592, Williams 268:* Province of Rizal, *Bur. Sci. 6521 Robinson, Merrill 5071, Bur. Sci. 2050 Ramos:* Manila, *Santiago 59.* CEBU, *Barrow 15.* BASILAN, *DeVore & Hoover 45.*

Widely distributed in the Philippines at low altitudes; throughout the Tropics.

The Philippine specimens appear to be nearer to the variety *mollis* (Benth.) Baker, than to the typical form; all the specimens cited above, that are in fruit, have the pods appressed-strigose, while in the typical form they are described as glabrous.

70. ERYTHRINA Linn.

Pods turgid and seed bearing throughout their length, the basal portion not flattened.

Calyx spathaceous, oblique, not at all 2-lipped, splitting to the base down the back § STENOTROPIS ..... 1. *E. indica*

Calyx campanulate, subequally 2-lipped, not splitting to the base § MICROPTERYX.

Leaflets ovate or rhomboid-ovate, acuminate, submembranaceous, pubescent beneath; pods slender, about 8 mm wide, with a long, very slender stipe, the valves very thinly coriaceous ..... 2. *E. stipitata*

Leaflets oblong to oblong-ovate, obtuse or acute, sometimes slightly acuminate, coriaceous or subcoriaceous; pods stout, about 1.5 cm wide, the stipe stout, the valves very thickly coriaceous ..... 3. *E. fusca*

Pods flat, seedless and indehiscent in their lower half § HYPAPHORUS. 4. *E. subumbrans*

1. **Erythrina indica** Lam. Encycl. 2 (1785) 391; DC. Prodr. 2 (1825) 412; Miq. Fl. Ind. Bat. 1[1] (1855) 207; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 188; F.-Vill. Nov. App. (1880) 63; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 66.

Erythrina corallodendrum orientalis Linn. Sp. Pl. (1753) 706.

Erythrina picta Linn. Sp. Pl. ed. 2 (1763) 993 p. p., quoad syn. *Gelala alba* Rumph.

Erythrina orientalis Murr. in Comm. Gotting. 8 (1787) 35, *pl. 1.*

Erythrina lithosperma Blume Cat. Gew. Buitenz. (1823) 92; Hassk. Pl. Jav. Rar. (1848) 381, non Miq. Fl. Ind. Bat. 1[1] (1855) 209.

Erythrina carnea Blanco Fl. Filip. (1837) 564, ed. 2 (1845) 393, ed. 3. 2: 359; Naves l. c. ed. 3, *pl. 217,* non Dryand.

LUZON, Province of Cagayan, *For. Bur. 17131 Curran:* Province of Abra, *For. Bur. 14539 Darling:* Province of Union, *Elmer 5588:* Manila, *Decades Philip. Forest Fl. No. 277 Merrill:* Province of Bataan, *For. Bur. 1266, 1274 Borden, For. Bur. 2235 Meyer, For. Bur. 5935 Curran:* Province of Tayabas, *Whitford 684, Merrill 1904, 2039:* Province of Camarines, *Ahern 30.* MINDORO, *For Bur. 8770, 9695 Merritt.* PALAWAN, *For. Bur. 3557 Curran.* PANAY, *For. Bur. 115 Gammill, Copeland s. n.* MINDANAO, District of Davao, *Ahern 675;* Lake Lanao, *Mrs. Clemens 205.*

Quite universally known in the Philippines as *dap-dap;* in Abra as *dab-dub;* in Cagayan as *voc-voc* and *bag-bac.*

Common throughout the Philippines, especially along the seashore; frequently planted inland. India to southern China, Malaya, and Polynesia.

Erythrina indica Lam., includes, in part, *E. picta* Linn., the latter being much the earlier name. *Erythrina picta* Linn. was based in part on botanical material in Linnæus' hands, and in part on *Gelala alba* Rumph. Herb. Amboin. 2: 234,

t. 77, but the description does not apply to the plant figured and described by Rumphius. It seems reasonable to consider that the specimen in the Linnean Herbarium represents the type of the species, and that he erred in referring to it Rumphius's *Gelala alba;* what the specimen in the Linnean Herbarium really represents can only be determined by an examination of the material. Specimens closely matching Rumphius' figure of *Gelala alba* are represented by *For. Bur. 3557 Curran* from Palawan, but in all respects other than the mottled leaves this specimen is typical *Erythrina indica* Lam. Baker[52] states "*E. picta* Linn. (Rumph. Amboin. *t.* 77) appears to be a mere form of this [*E. indica* Lam.], with variegated leaves."

2. **Erythrina stipitata** sp. nov. § Micropteryx.

Arbor circiter 10 m alta; ramulis vix aculeatis; foliis trifoliolatis, foliolis junioribus ovatis vel rhomboideis, acuminatis, submembranaceis, subtus pallidis, puberulis; racemis simplicibus, circiter 15 cm longis; floribus 3 cm longis; leguminibus 5 ad 9 cm longis, circiter 8 mm latis, subcylindraceis, vix torulosis, longissime tenuiter stipitatis, valvis tenue coriaceis, reticulatis.

A tree about 10 m high. Trunk with rather thin, yellowish bark, and with very large, scattered, subpyramidal spines which are from 1 to 1.5 cm high, and nearly as thick at the base, minutely apiculate. Branches glabrous, unarmed, the ultimate branchlets stout, often slightly puberulent. Leaves trifoliolate, all parts, when very young, densely puberulent; leaflets pale beneath, pubescent, the terminal one rhomboid-ovate, acuminate, the lateral ones ovate, up to 5 cm long (probably considerably larger when mature). Flowers crimson, about 3 cm long, in many flowered racemes about 15 cm long, their pedicels about 5 mm long, solitary or two at a node. Calyx broadly campanulate, distinctly 2-lobed, about 6 mm long. Vexillum 3 cm long, 1.3 cm wide, about equally narrowed at both ends, scarcely clawed. Pod subcylindric, long-apiculate, 5 to 9 cm long, about 8 mm wide, glabrous or nearly so, dehiscent along the ventral suture, the pedicels slightly elongated, the calyx persistent; stipe very slender, 1.5 to 2 cm long, about 1 mm thick; valves very thinly coriaceous, obscurely reticulate; seeds few, three or four, brown when nearly mature, about 7 mm long, and half as thick.

Lubang Island, near the town of Lubang, in open lands at sea level, with flowers and nearly mature fruits April 7, 1903, *Merrill 958.* Deciduous, with only immature leaves at this date.

This species is allied to *Erythrina subcrosa* Roxb. of British India, but apparently most closely related to *E. microcarpa* Koord. & Val. of Java; from the latter it differs especially in its unarmed branches and branchlets, differently shaped seeds, and in its differently disposed flowers which in *E. microcarpa* are in racemosely disposed cymules, and in *E. stipitata* are in simple racemes.

[52] Hook. f. Fl. Brit. Ind. 2 (1876) 189.

3. **Erythrina fusca** Lour. Fl. Cochinch. (1790) 427; Miq. Fl. Ind. Bat. 1[1] (1855) 208.

Erythrina ovalifolia Roxb. Hort. Beng. (1814) 53, Fl. Ind. 3 (1832) 254; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 189; F.-Vill. Nov. App. (1880) 63; Perk. Frag. Fl. Philip. (1904) 85; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 72.

Erythrina picta Blanco Fl. Filip. (1837) 565, non Linn.

Erythrina caffra Blanco l. c. ed. 2 (1845) 394, ed. 3, 2:360; Naves l. c. *pl. 326*, non Thunb.

Luzon, Province of Ilocos Norte, *Bur. Sci. 2311 Mearns:* Province of Pangasinan, *For. Bur. 3655 Saroca:* Manila, *Marave 153, Merrill Decades Philip. Forest. Fl. No. 278:* Province of Bataan, *Williams 357, For. Bur. 6529 Curran.* Mindanao, Lake Lanao, *Mrs. Clemens 204.*

Native names: *Dapdap* (Bataan); *telbang* (Pangasinan); *anii* (Ilocos Norte).

Along streams in open lands at low altitudes; Assam and Bengal to Indo-China, the Malay Peninsula and Archipelago.

The reduction of *Erythrina ovalifolia* Roxb. to *E. fusca* Lour., the latter much the earlier, has not previously been suggested by any author known to me; I fail to find any constant characters for distinguishing the two.

4. **Erythrina subumbrans** (Hassk.) comb. nov.

Hypaphorus subumbrans Hassk. Retzia ed. nov. 198, fide Koord. & Val., Hort. Bogor. Descr. (1858) 197.

Erythrina secundiflora Hassk. Pl. Jav. Rar. (1848) 378, non Brotero.

Erythrina lithosperma Miq. Fl. Ind. Bat. 1[1] (1855) 209; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 190; F.-Vill. Nov. App. (1880) 63; Naves in Blanco Fl. Filip. ed. 3, *pl. 345;* Vidal Sinopsis Atlas (1883) *t. 41, fig. A*, Phan. Cuming. Philip. (1885) 108, Rev. Pl. Vasc. Filip. (1886) 109; Perk. Frag. Fl. Philip. (1904) 85; Prain in Journ. As. Soc. Beng. 66[2] (1897) 73; Koord & Valet. Meded. 's Lands Plantent. 14 (1895) 64, non Blume.

Erythrina sumatrana Miq. Fl. Ind. Bat. Suppl. (1860–61) 304.

Erythrina hypaphorus Boerl. in Teysmannia 5: 20, fide Koord. & Valeton.

Luzon, Province of Abra, *For. Bur. 14570 Darling:* Province of Benguet, *Elmer 8666:* Manila, *For. Bur. 12470 Curran:* Province of Cavite, *For. Bur. 7693 Curran:* Province of Rizal, *For. Bur. 10014 Curran:* Province of Tayabas, *Merrill 1950.* Mindoro, *Whitford 1386.* Leyte, *Elmer 7132.* Mindanao, District of Cotabato, *Mrs. Clemens s. n.*

Native names: *Dapdap* (Manila, Cavite, Tayabas, Mindoro); *sablang* (Abra).

Indo-China to the Malay Peninsula and Archipelago.

What I consider to be the oldest valid name is here adopted for this species. It is the species usually known as *Erythrina lithosperma* Blume, but the original *E. lithosperma* Blume Cat. (1823) 92, *nomen nudum*, and later very fully described by Hasskarl[53] is *Erythrina indica* Lam., as noted by Koorders & Valeton,[54] while the *Erythrina lithosperma* Miq. Fl. Ind. Bat. 1[1] (1855) 209, is not at all Blume's species but is the form here considered as *E. subumbrans*. Prain[55] proposes to retain the species under the name of *E. lithosperma*, but with Miquel as its author instead of Blume, but to avoid confusion I consider it advisable to abandon the name altogether. Both the spiny form (var. *armata* Miq., and the spineless one (var. *inermis* Miq.) are represented in the material cited above.

[53] Pl. Jav. Rar. (1848) 381.

[54] Meded. 's Lands Plantent. 14 (1895) 58, 64.

[55] Journ. As. Soc. Beng. 66[2] (1897) 73.

71. STRONGYLODON Vog.

Racemes very long, pendent, exceeding 1 m in length ..... 1. *S. macrobotrys*
Racemes less than 40 cm in length, scarcely pendulous.
Ovary densely pubescent.
Flowers 3 cm long or somewhat less ..... 2. *S. elmeri*
Flowers 4 to 5 cm long ..... 3. *S. zschokkei*
Ovary glabrous.
Flowers red ..... 4. *S. lucidus*
Flowers green (color unknown in *S. crassifolius*).
Nodes of the inflorescence produced into 1 to 2 cm long branchlets. 5. *S. caeruleus*
Nodes of the inflorescence only very slightly produced.
Ovules 1 or 2 ..... 6. *S. crassifolius.*
Ovules 5 ..... 7. *S. pulcher*

1. **Strongylodon macrobotrys** A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 448, *t. 49;* Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 66. 3 (1908) Bot. 81.

Strongylodon warburgii Perk. Frag. Fl. Philip. (1904) 85?

Luzon, Province of Laguna, Los Baños, *Wilkes Expedition* (type in U. S. National Herbarium), *Merrill 5114,* March, 1906; Pacte-Piapi, *For. Bur. 9565 Curran,* March, 1908: Province of Bataan, *For. Bur. 6235, 6524 Curran, Williams 633, Whitford 67, 160, For. Bur. 2808 Meyer, Copeland s. n.:* Province of Tayabas, *Merrill 4070, Elmer 9336.* Mindoro, *McGregor 190, For. Bur. 12015 Merritt.*

Native names: *Tayabac, bayo-u* (Bataan); *buracan* (Mindoro).

Known only from Luzon and Mindoro, and a most striking species, growing usually in humid forests, ravines, etc., extending from slightly above sea level (Laguna, Mindoro), to an altitude of 1,000 m (Mount Mariveles, Bataan). The long, pendent, many-flowered racemes exceed 1 m in length, and the flowers are variously described as greenish-blue, nile-green, green, and verdigris; they are a very peculiar pallid greenish or bluish-green shade difficult to describe. Dried flowers appear as though they were tinged with purple, although in reality there is no trace of purple in the fresh flowers. The original description calls for reddish or purplish flowers, but as indicated by Gray, there were no notes with the specimen, and the color was probably estimated from the dried specimens. Fully grown flowers vary from 4 to 5 or 6 cm in length, or, if the keel be straightened out, sometimes 7 cm long. Doctor Perkins has described the flowers of *S. warburgii* as 8.5 cm long, but I have seen none as large as this, and the measurement may be due to a typographical error. I can not otherwise distinguish the latter species from *S. macrobotrys.* I have examined the type of *S. macrobotrys,* but not that of *S. warburgii.*

2. **Strongylodon elmeri** Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 20.

Luzon, Province of Benguet, *Elmer 6260, 8984:* Province of Cagayan, *For. Bur. 16676 Bacani.*

Endemic.

3. **Strongylodon zschokkei** Elmer Leafl. Philip. Bot. 1 (1907) 297.

Luzon, Province of Benguet, *Elmer 8540* (cotype).

Apparently very closely allied to the preceding, and perhaps not specifically distinct; my material of *S. zschokkei* is so poor that it is difficult to determine the exact differences between it an *S. elmeri.* The flowers are described as having

a banner 4 cm long, and the style 5 cm long, but none of the flowers on the specimen before me, which are apparently immature, exceed 3 cm in length.

Endemic.

4. **Strongylodon lucidus** (Forst.) Seem. Fl. Vit. (1865–68) 61; Merr. in Philip. Journ. Sci. 2 (1907) Bot. 424.

Glycine lucida Forst. Prodr. (1786) 51.

Rhynchosia lucida DC. Prodr. 2 (1825) 387.

Strongylodon ruber Vog. in Linnaea 10 (1836) 585; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 446, *t. 48;* Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 191; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 69.

Balut Island, *Merrill 5411.*

Ceylon, Andaman Islands, New Guinea to the Fiji Islands and Hawaii.

5. **S. caeruleus** Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 20.

Luzon, Province of Benguet, *Elmer 6097, 8908;* possibly also represented by *Topping 58,* and *Elmer 6438* from the same Province, and by *Bur. Sci. 3304 Ramos,* from Rizal Province, Luzon.

Endemic.

6. **Strongylodon crassifolius** Perk. Frag. Fl. Philip. (1904) 85.

Luzon, Province of Bataan, Mariveles, (*Warburg 12899*).

A species known to me only by description. The types of this, and of *S. warburgii,* are in the Berlin Herbarium, but at the time of my visit there in January, 1908, neither had been distributed into the herbarium, and were hence unavailable for study. Described as having long, circinnate tendrils, a character otherwise unknown in the genus.

Endemic.

7. **Strongylodon pulcher** C. B. Robinson in Philip. Journ. Sci. 3 (1908) Bot. 184.

Mindanao, District of Zamboanga, *Williams 2362:* Lake Lanao, *Mrs. Clemens 415, s. n.*

Endemic.

72. MUCUNA Adans.

Perennials; pods flat or cylindric, winged on both sides, the seeds large, flattened or globose, with a hilum extending round the greater part of their periphery (Subgen. Zoopthalmum).

Pods with plaits across their faces (§ Citta).

Pod 5 to 7 cm wide, with numerous, very irritating, brown hairs; flowers dark-purple ..... 1. *M. nigricans*

Pod 3 cm wide, with few and scarcely stinging hairs; flowers nearly white. 2. *M. curranii*

Pods without plaits across their faces (§ Carpopogon).

Pods flat, broad, glabrous, or with long stinging hairs.

Pods about 20 cm long, less than 1 cm thick, glabrous, distinctly reticulate, terminated by a slender 1 to 2 cm long acumen..... 3. *M. mindorensis*

Pods less than 15 cm long, rusty-hispid with stinging hairs, 1 to 1.5 cm thick, not reticulate, the tip rounded or obtuse, sometimes with a very short apiculus..... 4. *M. gigantea*

Pods cylindric, densely pubescent with very short, gray, nonirritating hairs. 5. *M. longipeduculata*

Annuals or perennials, with turgid, somewhat hooked pods, not winged; seeds small, oval, with a small lateral hilum (Subgen. Stizolobium).

Pods densely covered with brown, stiff, very irritating hairs.

Leaves densely gray-tomentose beneath, the leaflets mostly broader than long, the terminal one usually retuse, chartaceous ..... 6. *M. sericophylla*

Leaves slightly pubescent beneath, the leaflets longer than broad, acute or acuminate, membranaceous ..... 7. *M. pruriens*

Pods finely and softly gray-pubescent, the hairs not at all irritating, longitudinally ridged in the median portion..... 8. *M. nivea*

Pods densely and softly purplish-velvety, not or very obscurely longitudinally ridged ..... 9. *M. deeringiana*

Pods unknown; racemes about 13 cm long, and with the calyx yellow-tomentose with short hairs, and with interspersed longer ones; young shoots, petioles, and under surface of the leaflets ferruginous-tomentose; flowers 5.5 to 6.5 cm. long ..... 10. *M. aurea*

1. Mucuna nigricans (Lour.) Steud. Nom. ed. 2, 2 (1841) 163.

Citta nigricans Lour. Fl. Cochinch. (1790) 456.

Carpopogon imbricatum Roxb. Hort. Beng. (1814) 54, nomen.

Mucuna imbricata DC. Prodr. 2 (1825) 406; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 185; Prain in Journ. As. Soc. Beng. 66[2] (1897) 65; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 67.

Negretia urens Blanco Fl. Filip. (1837) 586, ed. 2 (1845) 409, ed. 3, 2: 387.

Mucuna monosperma F.-Vill. Nov. App. (1880) 63, non DC.

Stizolobium imbricatum O. Ktze. Rev. Gen. Pl. (1891) 208.

Zoopthalmum nigricans Prain l. c. as syn.

Luzon, Province of Cagayan, *Bolster 126:* Province of Zambales, *Hallier s. n.:* Province of Pampanga, *Merrill 3914:* Province of Bataan, *Bur. Sci. 1885 Foxworthy, Whitford 1028, Merrill 3783, Williams 231:* Province of Tayabas, *Cuming 688.* Polillo, *Bur. Sci. 6969 Robinson.* Mindoro, *For. Bur. 11455 Merritt.* Leyte, *Elmer 7138.* Mindanao, Province of Surigao, *Bolster 314:* District of Zamboanga, *For. Bur. 9093 Whitford:* District of Davao, *Copeland 944.*

Native names: *Duglo* (Bataan); *baluctot* (Polillo); *alilipai* (Zamboanga); *buquitquit, lipai,* ex Blanco.

Himalayan region to Indo-China and the Andaman Islands; probably also in the Malay Archipelago. Closely allied species are *M. junghuhniana* (O. Kuntze) Prain, of Java, and *M. cyanosperma* K. Sch. from the Moluccas.

2. Mucuna curranii Elmer Leafl. Philip. Bot. 1 (1907) 230.

Luzon, Province of Benguet, *Elmer 8442, Williams 1424, Merrill 4818, For. Bur. 5111 Curran,* locally known to the Igorots as *dungan.*

Endemic.

3. Mucuna mindorensis Merr. in Philip. Journ. Sci. 3 (1908) Bot. 231.

Mucuna acuminata Merr. l. c. 1 (1906) Suppl. 196, non Grah.

Mindoro, *McGregor 322, 220, For. Bur. 6861 Merritt, Merrill 4069.* It is probably also represented by *For. Bur. 10289 Curran,* from Tayabas Province, Luzon, and *For. Bur. 2955 Ahern's collector,* from Rizal Province, Luzon, both without fruits.

Endemic.

4. Mucuna gigantea (Willd.) DC. Prodr. 2 (1825) 405; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 186; F.-Vill. Nov. App. (1880) 63; Vid. Rev. Pl. Vasc. Filip. (1886) 109; Perk. Frag. Fl. Philip. (1904) 86.

Dolichos giganteus Willd. Sp. Pl. 3 (1800) 1041.

Carpopogon giganteum Roxb. Hort. Beng. (1814) 54.

Stizolobium giganteum Spreng. Syst. 4 (1827) Cur. Post. 281.

Zoopthalmum giganteum Prain in Journ. As. Soc. Beng. 66[2] (1897) 68, as syn.

LUZON, Province of Cagayan, *For. Bur. 16704 Bacani:* Province of Ilocos Norte, *Cuming 1087:* Province of Bataan, *For. Bur. 5976, 6381 Curran.* POLILLO, *Bur. Sci. 6868, 9260 Robinson.* MINDANAO, District of Davao, *Williams 2698, Copeland 622:* Province of Surigao, *Merrill 5438.*

Always found near the seashore; India, Indo-China, the Malay Peninsula and Archipelago, to Polynesia.

5. **Mucuna longipedunculata** Merr. in Govt. Lab. Publ. (Philip.) 29 (1905) 18.

LUZON, Province of Benguet, *Elmer 8949a, 6233.* MINDANAO, Province of Surigao, *Bolster 394.*

The last specimen cited has mature pods which are cylindric, 16 cm long and 3.5 cm in diameter.

Endemic.

6. **Mucuna sericophylla** Perk. Frag. Fl. Philip. (1904) 86.

Mucuna luzoniensis Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 196.

LUZON, Province of Cagayan, *Warburg 12438* (type, in herb. Berol.): District of Lepanto, *Bur. Sci. 7046 Ramos:* Province of Union, *Elmer 5599* (type of *M. luzoniensis*): Province of Benguet, *Williams 1423, Elmer 8910:* Province of Pangasinan, *Cuming 954* (in herb. Kew.): Province of Zambales, *For. Bur. 5870 Curran.* MINDORO, *For. Bur. 6194, 6195 Merritt.* LEYTE, *Elmer 7247.* MINDANAO, Lake Lanao, *Mrs. Clemens 355, 882.*

The types of *Mucuna sericophylla* and *M. luzoniensis* are not identical, but additional material shows a number of intergrades, and I am now of the opinion that the species can not be distinguished from one another. The species shows some variation, but in all essential characters appears to be constant; the leaflets are not all emarginate, but frequently are blunt or acute, or even shortly apiculate-acuminate. It is manifestly allied to *M. pruriens.*

Endemic.

7. **Mucuna pruriens** (Linn.) DC. Prodr. 2 (1825) 405; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 187; Prain in Journ. As. Soc. Beng. 66[2] (1897) 68; F.-Vill. Nov. App. (1880) 63: Perk. Frag. Fl. Philip. (1904) 86.

Dolichos pruriens Linn. Syst. Nat. ed. 10 (1859) 1162.

Stizolobium pruriens Pers. Syn. 2 (1807) 299.

Carpopogon pruriens Roxb. Hort. Beng. (1814) 54.

Negretia pruriens Blanco Fl. Filip. ed. 2 (1845) 411, ed. 3, 2: 389: Naves l. c. ed. 3, *pl. 331.*

Mucuna atropurpurea F.-Vill. Nov. App. (1880) 63, non DC.

LUZON, Province of Laguna, *Bur. Sci. 6020 Robinson:* Province of Rizal, *Merrill s. n.:* Manila, from cultivated plants, seeds from Rizal Province, *Merrill 6348, s. n., Shaw 219.*

Native names: *Nipai, lipai* (Bataan, Laguna).

In various forms throughout the Tropics; the above form India to Malaya.

8. **Mucuna nivea** (Roxb.) W. & A. Prodr. (1834) 255; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 188; F.-Vill. Nov. App. (1880) 63; Piper & Tracy in U. S. Dept. Agr. Bureau Plant Industry Bull. 179 (1910) 15, *pl. 4, fig. A.*

Carpopogon niveum Roxb. Hort. Beng. (1814) 54, *nomen nudum,* Fl. Ind. 3 (1832) 285.

Negretia mitis Blanco Fl. Filip. (1837) 588, ed. 2 (1845) 410, ed. 3, 2:388; Naves l. c. ed. 3, *pl. 405,* non Ruiz & Pav.

Mucuna lyonii Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 197.

Luzon, Province of Cagayan, *For. Bur. 18596 Alvarez:* Manila, from cultivated plants, seeds from Pampanga Province, *Lyon s. n.*

Native name: *Sabual* (Pampanga).

Messrs. Piper and Tracy have recently studied the various cultivated forms of *Mucuna*, under the title "The Florida Velvet Bean and Related Plants" l. c., and have come to the conclusion that the Philippine *Mucuna lyonii* Merr., is identical with the Indian *M. nivcum* W. & A., or as they prefer to call it, *Stizolobium niveum* (Roxb.) O. Ktze. They are undoubtedly correct in the above conclusion, but I can not concur with them in the opinion that "*Mucuna nivea* DC." which is a *nomen nudum*, based on *Carpopogon niveum* Roxb. Hort. Beng. (1814) 54, *nomen nudum*, is a species distinct from *Mucuna nivea* W. & A. Under present rules DeCandolle's name, not being properly "published" has no standing. The chief character by which Messrs. Piper & Tracy attempt to separate "*Mucuna nivea* DC.," from *M. nivea* W. & A., is that the legumes, when ripe, are entirely free from pubescence, a character expressly stated by Roxburgh in the original description of his *Carpopogon niveum*, Fl. Ind. 3 (1832) 285, on which *Mucuna nivea* W. & A. was based.

India; cultivated in other warm countries.

9. **Mucuna deeringiana** (Bort) comb. nov.

Stizolobium deeringianum Bort U. S. Dept. Agr. Bureau Plant Ind. Bull. 141 (1909) 31, *pl. 2, 3.*

Luzon, Province of Pampanga, *Merrill s. n.:* Province of Bataan, Lamao, *For. Bur. 1817 Borden.*

The origin of the above species is unknown, and its status is not definitely known. The two Philippine specimens were undoubtedly raised from American seeds, the first from seeds distributed by the Philippine Bureau of Agriculture, while the second appeared in nursery beds at Lamao. For a history of the form see Bort, Katherine Stephens, "The Florida Velvet Bean and its History."[56] It is possible that the species is only a cultural form of *Mucuna nivea*, *M. velutina*, or some other species.

10. **Mucuna aurea** C. B. Rob. in Philip. Journ. Sci. 3 (1908) Bot. 183.

Luzon, Province of Benguet, *Williams 1292.*

Endemic.

This last species can not be placed in its proper section until fruits are secured; it is well characterized among the Philippine species by its ferruginous-tomentose indumentum.

The generic name *Mucuna* Adans. (1763) has been retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress. Older names are *Stizolobium* and *Zoopthalmum*, both of P. Browne (1756), and both of these have been taken up by various later authors. The whole subject has been well discussed by Prain,[57] who treats both P. Browne's names as subgenera of *Mucuna*, but expresses the opinion that both *Zoopthalmum* and *Stizolobium* will probably at an early date be again considered generically distinct.

EXCLUDED SPECIES.

Mucuna capitata W. & A.; F.-Vill. Nov. App. (1880) 63.

I have seen no Philippine material that I consider referable to this species; probably credited to the Philippines on an erroneous identification.

[56] U. S. Dept. Agr. Bureau of Plant Industry, Bull. 141[3] (1909) 25–32.

[57] Journ. As. Soc. Beng. 66[2] (1897) 401–107.

73. SPATHOLOBUS Hassk.

1. **Spatholobus gyrocarpus** (Wall.) Benth. Pl. Jungh. (1852) 238; Miq. Fl. Ind. Bat. 1[1] (1855) 204; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 204; F.-Vill. Nov. App. (1880) 63; Vid. Phan. Cuming. Philip. (1885) 109, Rev. Pl. Vasc. Filip. (1886) 110; Perk. Frag. Fl. Philip. (1904) 87; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 76.

Butea gyrocarpa Wall. Cat. (1832) no. 5442.

LUZON, Province of Rizal, *Merrill 2685, Bur. Sci. 3268 Ramos, For. Bur. 464, 1149, 2957 Ahern's collector:* Province of Albay, *Cuming 945.*

Native name: *Ipal, ipales* (Rizal).

Penang and Perak.

A possible second species of the genus is represented by *Merrill 4002* from Atimonan, Tayabas Province, Luzon, but the fruits are dehiscent throughout their length, and contain four seeds; they are very similar to those of *Erythrina subumbrans.* As there is some chance that this number represents a mixture of material, the pods having been picked up from the ground, I do not consider it advisable to describe it at the present time.

74. GALACTIA P. Br.

1. **Galactia tenuiflora** (Klein) W. & A. Prodr. (1834) 206; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 192.

Glycine tenuiflora Klein ex Willd. Sp. Pl. 3 (1800) 1059; DC. Prodr. 2 (1825) 241.

LUZON, Province of Benguet, Kias, *Elmer 6613* (det. Prain): Province of Rizal, San Pedro Macati, *Shaw 388.*

India to Ceylon, Siam, tropical Africa, Malaya, and Australia; not previously reported from the Philippines.

75. DIOCLEA H. B. K.

Pods very densely and softly villous with long, spreading, persistent, ferruginous hairs ..... 1. *D. umbrina*

Pods slightly pubescent with short, appressed hairs, ultimately subglabrescent. ..... 2. *D. reflexa*

1. **Dioclea umbrina** Elmer Leafl. Philip. Bot. 1 (1907) 224.

LUZON, Province of Benguet, *Elmer 8922:* Province of Rizal, *Merrill 1621.* LEYTE, *Elmer 8922.*

A species well characterized by its very densely ferruginous-villous pods. The flowers are as yet unknown, and it is possible that the species does not belong to the genus.

Endemic.

2. **Dioclea reflexa** Hook. f. Niger Flora (1849) 306; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 196; Rolfe in Journ. Bot. 23 (1885) 212; Vidal Phan. Cuming. Philip. (1885) 109, Rev. Pl. Vasc. Filip. (1886) 110; Prain in Journ. As. Soc. Beng. 66[2] (1897) 59, Ann. Bot. Gard. Calcutta 9[1] (1901) 30, *pl. 40;* Perk. Frag. Fl. Philip. (1904) 87.

LUZON, Province of Laguna, *Cuming 521:* Province of Rizal, *For. Bur. 3333 Ahern's collector.* MINDORO, *Merrill 4033, McGregor 227, For. Bur. 6876 Merritt.*

Widely distributed in the Tropics of the world.

76. LUZONIA Elmer.

1. **Luzonia purpurea** Elmer Leafl. Philip. Bot. 1 (1907) 220.

Dioclea sp.? Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 67.

Luzon, Province of Tayabas, Lucban, *Elmer 9913*, May, 1907: Province of Bataan, Lamao River, *For. Bur. 3059 Borden*, May, 1905.

This endemic, monotypic genus is undoubtedly closely allied to *Canavalia*, and even more closely to *Dioclea*, to the latter genus especially by its staminal characters, the fertile anthers being reduced to six. It seems, however, to be distinguished from *Dioclea*, as well as from *Canavalia*, by its calyx characters. The probability of the plant representing a new genus was suggested to me by Doctor Prain in January, 1906, to whom a duplicate of Borden's specimen had been sent for identification. Regarding this specimen, Doctor Prain wrote as follows: "I do not agree with you in thinking that it is a *Dioclea*. The leaf is wonderfully suggestive of *Canavalia*, but I should not be surprised, when fruit is found, that you have near a new genus. It should be in the neighborhood of *Dioclea* and *Canavalia*." The fruit is as yet unknown.

77. MACROPSYCHANTHUS Harms.

Leaves nearly glabrous; pod rather flat, about 18 cm long..... 1. *M. mindanaensis*
Leaves rather strongly ferruginous-pubescent; pod turgid, mostly 10 to 15 cm long ..... 2. *M. ferrugineus*

1. **Macropsychanthus mindanaensis** sp. nov.

Frutex scandens, glabra vel subglabra; foliis trifoliolatis, foliolis ovato-ellipticis, subglabris, valde acuminatis; stipulis basi productis; racemis elongatis, multifloris; floribus albido-purpureis, circiter 3 cm longis, vexillis basi auriculatis; staminibus omnibus fertilibus; leguminibus 18 cm longis, 5 cm latis, pubescentibus.

A woody vine reaching a height of 10 m, nearly glabrous. Stems grayish, glabrous, terete, lenticellate, the shoots also glabrous. Petioles 12 to 15 cm long, slightly hairy or ultimately glabrous, each subtended by a pair of pubescent stipules which are attached by their central part, the lower part produced at nearly right angles from the upper, both free parts less than 5 mm long. Leaflets ovate-elliptic, chartaceous, somewhat shining when dry, of the same color on both surfaces, glabrous, or the lower surface with a few scattered hairs especially on the midrib and nerves, 10 to 15 cm long, 6 to 10 cm wide, base rounded or acute, the apex abruptly and rather slenderly acuminate; nerves 8 to 10 on each side of the midrib, prominent; petiolules pubescent, 5 to 8 mm long; stipels acicular, pubescent, nearly as long as the petiolules. Racemes up to 10 cm in length, glabrous below, above, at least when young, ferruginous-pubescent, flower-bearing in the upper half, the nodes produced as club-shaped branchlets which become stout and woody in fruit and nearly 1 cm long, each bearing several flowers, and each subtended by a linear-lanceolate, deciduous, acuminate, 5 mm long, pubescent bract. Flowers about 3 cm long, pale-purple. Calyx 1.5 cm long, pubescent externally, villous within, the lower three teeth oblong-ovate, 8 mm long, 4 mm wide, blunt, the upper two connate into a 5 mm long and 7 mm wide lobe

which is retuse at the apex. Petals all clawed, and about equal in length; standard with a 7 mm long claw, the lamina orbicular, retuse, 2.5 cm wide, with two auricular callosities at the base. Stamens all fertile, the vexillary filament free at the base, united above with the others. Ovary densely villous. Pods (immature) about 18 cm long, 5 cm wide, rather flat, not much thickened on the dorsal suture, ferruginous-pubescent, the apex acuminate. Seeds 3 to 5.

MINDANAO, Province of Surigao, *Bolster 330*, with flowers and immature fruits, April, May, 1906, in forests along streams at an altitude of about 60 m.

Of the two species here described, the above approaches closest to the type of the genus, *Macropsychanthus lauterbachii* Harms, of New Guinea. It is, however, quite distinct from that species.

2. **Macropsychanthus ferrugineus** sp. nov.

Frutex scandens, ramulis foliis inflorescentiisque ferrugineo-pubescentibus; foliolis ovatis vel elliptico-ovatis, acuminatis, stipitellatis; stipulis basi productis; floribus 2.5 cm longis; staminibus omnibus fertilibus; leguminibus usque ad 18 cm longis, 7 cm latis; seminibus 2.5 cm diametro, hilo lineari semicinctis.

A scandent woody vine reaching a height of at least 10 m, the stems grayish-brown, terete, lenticellate, glabrous, the younger parts rather strongly ferruginous-villous as are the petioles and leaflets. Leaves very similar to those of Philippine *Dioclea reflexa;* petiole about 15 cm long, subtended by a pair of 1 to 1.5 cm long stipules attached by their median portions, and about equally long above and below the point of attachment; leaflets ovate to elliptic-ovate, subcoriaceous, 10 to 20 cm long, 5 to 13 cm wide, ferruginous-villous on both surfaces; nerves 11 to 13 on each side of the midrib; petiolules about 5 mm long; stipels acicular, villous, about as long as the petiolules. Racemes 30 to 40 cm long, ferruginous-pubescent, flower-bearing in the upper half, the nodes produced as short, club-shaped branchlets, each bearing several flowers, each node subtended by a lanceolate, deciduous, ferruginous bract about 7 mm long. Flowers 2.5 cm long, pink. Calyx 1.5 cm long, ferruginous-pubescent outside, somewhat villous within, the lower three teeth oblong-ovate, about 7 mm long, 5 mm wide, the upper two connate into a 6 mm long and wide lobe, cleft about one-third its length into divergent teeth. Petals all clawed; standard 2.5 cm long, the claw stout, about 7 mm. long, the lamina orbicular, 2 cm wide, retuse, not auricled at the base but with a thickened swelling; wings equalling the standard, about 8 mm wide, decurrent-acuminate at the base; keel as long as the other petals, incurved, hooded, 1 cm wide (not spread), decurrent-acuminate at the base. Staminal-tube curved, the filaments all antheriferous, the vexillary one free at the base, somewhat united with the others above. Ovary villous. Pod almost woody, turgid, 11 to 18 cm long, 6 to 7 cm wide, at first ferruginous-pubescent, when very old glabrous or nearly so, nearly 1 cm thick on the dorsal suture, at least 2 cm thick in the middle. Seeds

two or three, nearly circular in outline, 2.5 cm in diameter, 2 cm thick, smooth, shining, brown, mottled with darker color, the hilum linear, extending more than one-half around the seed.

MINDANAO, Lake Lanao, Camp Keithley, *Mrs. Clemens 419*, and three sheets without number.

This species in superficial characters is very similar to *Dioclea reflexa* Hook. f., and was at first considered by me to belong in that genus, as an intermediate between the sections *Pachylobium* and *Eudioclea*, having 10 fertile stamens and a linear hilum; it seems, however, to be referable to the above genus, in spite of its similarity to *Dioclea reflexa*. The flowers of both the above species are only about one-half as large as those of *M. lauterbachii* Harms, but structurally they appear to be about the same. If the two species here described are correctly treated generically, then *Macropsychanthus* must be very closely allied to *Dioclea*.

This previously monotypic genus was based on *Macropsychanthus lauterbachii* Harms in Schumann & Lauterbach Fl. Deutsch. Schutzgeb. Südsee (1901) 366, *pl. 10*, and the presence of additional representatives in the Philippines is a case of interest from the point of geographical distribution.

78. PUERARIA DC.

Branches 4-angled ..... 1. *P. tetragona*
Branches terete.
Flowers in simple racemes, medium sized; leaflets stipellate.
Stipules not produced below their point of attachment; leaflets mostly medium-sized or small, rounded, acute, or apiculate-acuminate; pods slightly hairy, subglabrescent, less than 5 mm wide..... 2. *P. phascoloides*
Stipules peltate, much produced below their point of attachment; leaflets ample, acuminate, rarely lobed; pods densely hirsute, about 8 mm wide. 3. *P. thunbergiana*
Flowers small, in dense, spike-like racemes which are paniculately arranged; leaflets not stipellate, strongly acuminate..... 4. *P. warburgii*

1. Pueraria tetragona sp. nov.

Scandens, plus minus hirsuta, ramis quadrangulatis; foliolis ovatis vel oblongo-ovatis, integris, submembranaceis, acuminatis, lateralibus plus minus obliquis; stipulis lanceolatis, deciduis, basi non productis; racemis axillaribus, solitariis, quam petioli brevioribus; floribus albis, circiter 7 mm longis; leguminibus lineari-oblongis, leviter hirsutis, 5 mm latis.

A scandent annual, the stems distinctly 4-angled, hirsute, especially on the angles, with reflexed, brownish hairs. Leaves alternate, trifoliolate, the petiole slightly hirsute, 5 to 8 cm long, produced 1 to 2 cm above the insertion of the lateral leaflets; leaflets submembranaceous, green and somewhat shining when dry, both surfaces with very few, scattered hairs, entire, base rounded or subacute, apex sharply acuminate, the lateral ones somewhat inequilateral, 7 to 12 cm long, 3 to 6.5 cm wide, with a pair of subbasal nerves, and three of four nerves on each side of the midrib above the basal pair; petiolules 2 to 3 mm long, hirsute, the stipels acicular, about 1 mm long; stipules lanceolate, acuminate, less than 5 mm long. Racemes axillary, solitary, 2 to 3 cm long, the

rachis, bracts, bracteoles, and calyces hirsute with elongated, scattered, usually appressed hairs. Flowers white, about 7 mm long, usually in pairs from a swollen node, each node subtended by two or three narrowly lanceolate, acuminate, hirsute, 2 to 3 mm long bracts; pedicels 2 to 3 mm long, with a pair of bracteoles, similar to the bracts, near the apex. Calyx 5 mm long, the lower three teeth lanceolate, acuminate, 3 mm long, subequal, the upper two connate for one-half their length into a deeply cleft lobe as long as the lower teeth. Standard 6 mm long, obovate-orbicular, rounded, clawed, not auricled or callose; wings equalling the standard, adherent to the keel and geniculate, with an oblong, 8 mm long, obtuse auricle at the geniculation; keel as long as the other petals, very similar in size and shape to the wings, auricled. Stamens all fertile, the vexillary one united with the rest. Ovary linear-lanceolate, sessile, slightly hirsute; style glabrous, slightly curved. Pods flat, 4 to 5 cm long, about 5 mm wide, hirsute with scattered hairs, acuminate, slightly constricted between the seeds, each containing from 6 to 8, compressed, brown seeds about 2.5 mm long.

PALAWAN, near Puerto Princesa, *Bur. Sci. 295 Bermejos*, January, 1906. A species readily recognizable by its 4-angled stems.

2. **Pueraria phaseoloides** (Roxb.) Benth. in Journ. Linn. Soc. Bot. 9 (1865) 125; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 199; F.-Vill. Nov. App. (1880) 64; Perk. Frag. Fl. Philip. (1904) 87; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 67.

Dolichos phascoloides Roxb. Fl. Ind. 3 (1832) 316.

Pachyrhizus teres Blanco Fl. Filip. (1837) 580.

Pachyrhizus montanus Blanco l. c. ed. 2 (1845) 406, ed 3, 2:381.

Dioscorea bolojonica Blanco l. c. ed. 1 (1837) 800, ed. 2 (1845) 551. ed. 3, 3:208.

LUZON, Province of Benguet, *For. Bur. 15704 Merritt & Darling:* Province of Tarlac, *Merrill 3620:* Province of Bulacan, *Yoder 42:* Province of Bataan, *Merrill 1547, 3778, For. Bur. 2340 Borden, Elmer 6719.* MINDANAO, Lake Lanao, *Mrs. Clemens 640.*

India to southern China, the Malay Peninsula and Archipelago.

3. **Pueraria thunbergiana** (S. & Z.) Benth. in Journ. Linn. Soc. Bot. 9 (1865) 122; Forbes & Hemsl. l. c. 23 (1887) 191; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 410.

Dolichos hirsutus Thunb. in Trans. Linn. Soc. 2 (1794) 237, non *Pueraria hirsuta* Kurz (1873).

Pachyrhizus thunbergianus S. & Z. Fl. Jap. Fam. Nat. 2 (1846) 113.

Neustanthus chinensis Benth. Fl. Hongk. (1861) 86.

BATANES ISLANDS, Batan, *Bur. Sci. 3833 Fénix.* BABUYANES ISLANDS, Camiguin, *Bur. Sci. 4116 Fénix.* LUZON, Province of Benguet, *Elmer 6600:* Province of Tayabas, *Bur. Sci. 6803 Robinson:* BANTON, *McGregor 347.* NEGROS, *For. Bur. 13712, 17339 Curran.*

India to Korea and Japan, south to Formosa; possibly also in the Buru Archipelago.

The specimen from Buru Island mentioned by Forbes & Hemsley may be referable to *P. textilis* Laut. & K. Sch., rather than to *P. thunbergiana*. The former is described as having sessile flowers, but in all the material of *P. thunbergiana*

I have examined the flowers are pedicelled. Prain[58] asserts that with the abundant material now available for study it is imposible to distinguish *Pueraria thompsoni* Benth. from *P. thunbergiana* Benth., even as a variety.

4. **Pueraria warburgii** Perk. Frag. Fl. Philip. (1904) 87.

Glycine warburgii Merr. in Philip. Journ. Sci. 3 (1908) Bot. 231.

Luzon, Province of Albay, *For. Bur. 12392 Curran.* Mindanao, District of Davao, Baganga, *Merrill 5430;* Santa Cruz, *Williams 2953;* Taumo, *Warburg 14664* (type in herb. Berol.!); *DeVore & Hoover 368.*

This species was previously transferred by me to *Glycine,* but I am now of the opinion that it belongs properly in the genus *Pueraria;* in young specimens the swollen nodes of the inflorescence are not very evident, but are distinct in more mature material. The same species, or a closely allied one, is also found in Celebes; see Perkins l. c.

79. CANAVALIA DC. (*Canavali* Adans.).

Pod turgid, often nearly flat along the dorsal suture, 10 cm long or less, about 4.5 cm wide; leaflets acuminate ..... 1. *C. turgida*

Pod usually flat, if turgid then usually less than 3 cm wide, or if 4.5 cm wide, then exceeding 20 cm in length.

Leaflets broad and rounded at the apex, or even retuse; a littoral species. 2. *C. lineata*

Leaflets acuminate; inland species, wild and cultivated.

Pod less than 20 cm in length and 3 cm in width ..... 3. *C. ensiformis*

Pod 25 to 30 cm long, 4 to 5 cm wide ..... 4. *C. gladiata*

1. **Canavalia turgida** Grah. in Wall. Cat. (1832) no. 5534; Miq. Fl. Ind. Bat. 1[1] (1855) 215; Prain in Journ. As. Soc. Beng. 66[2] (1897) 417; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 81, 410.

Canavalia ensiformis var. *turgida* Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 196; F.-Vill. Nov. App. (1880) 64.

Canavalia virosa Naves in Blanco Fl. Filip. ed. 3, *pl. 319,* non W. & A.

Canavalia obtusifolia Prain in Journ. As. Soc. Beng. 66[2] (1897) 63; Perk. Frag. Fl. Philip. (1904) 88; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 67, non DC.

Batanes Islands, Batan, *Bur. Sci. 3189 Mearns:* Babuyanes Islands, Camiguin, *Bur. Sci. 4071 Fénix.* Luzon, Province of Cagayan, *Bur. Sci. 7423 Ramos:* Province of Zambales, *Hallier s. n.:* Province of Pampanga, *Merrill 1424:* Province of Bataan, *For. Bur. 5931 Curran, Williams 317, Merrill 3172:* Province of Tayabas, *Whitford 707, Gregory 88.* Polillo, *Bur. Sci. 9238 Robinson.* Mindoro, *Merrill 1292.* Palawan, *Merrill 700, Bur. Sci. 337 Bermejos.* Balabac, *Bur. Sci. 494 Mangubat.* Ticao, *For. Bur. 1051 Clark.* Negros, *For. Bur. 5618 Everett.* Panay, *Copeland 109.* Mindanao, Lake Lanao, *Mrs. Clemens s. n.*

Native names: *Daluyduy* (Masbate); *danglin* (Mindoro).

Widely distributed in the Philippines, usually in thickets near the seashore, but scarcely growing on the beach; also on the borders of Lake Lanao, Mindanao (altitude about 800 m). Near the coast from India to southern China and Formosa through Malaya.

The synonymy of this species has been discussed by Prain,[59] who considers it under the name of *Canavalia turgida* Grah., but states that it is the plant to which the name *Canavalia obtusifolia* properly belongs. In this last conclusion I do not concur, for *Dolichos obtusifolius* Lam. was based primarily on the

[58] Journ. As. Soc. Beng. 66[2] (1897) 419.

[59] L. c. 118.

references to Tournefort, Plumier, and Plukenet, and the description is manifestly not applicable to *Canavalia turgida* Grah., for the leaflets are described as very obtuse or almost round, and the pod as 6 to 8 inches long and 1½ inches wide; moreover Lamarck in adding the reference to Rheede, which is *Canavalia turgida* Grah., states "*forté Katu-tjandi* Rheed. Mal. 8. p. 83. t. 43." *Canavalia obtusifolia* DC. was based on *Dolichos obtusifolius* Lam., but DeCandolle reversed the order of citing synonyms, giving Rheede precedence; the name is, however, from Lamarck, and I consider *Canavalia obtusifolia* DC. to be typified by *Dolichos obtusifolius* Lam., not by *Katu-tjandi* Rheede. As to the specific name of the plant, *turgida* is probably the earliest valid one, although this point is not certain. In this connection Prain states: "It [*Canavalia turgida* Grah.] is, moreover, *Dolichos rotundifolius* Vahl, of which indeed DeCandolle had seen a specimen, thus confirming the conclusion that Roxburgh had already formed. This, from his drawing, is without any possibility of doubt Roxburgh's *Dolichos rotundifolius*." I have not seen the original description of *Dolichos rotundifolius* Vahl, but that given by Willdenow[60] does not seem to me to apply to *Canavalia turgida* Grah., as the leaflets are described as "ovali-subrotundis," and the pods as "Legumina tripollicaria unguem lata." in which characters Vahl's species appears to me to concur with *Canavalia lineata* (Thunb.) DC., rather than with *C. turgida* Grah.

2. **Canavalia lineata** (Thunb.) DC. Prodr. 2 (1825) 404; Prain in Journ. As. Soc. Beng. 66[2] (1897) 63; Merr. in Philip. Journ. Sci. 3 (1908) Bot. 410.

Dolichos lineatus Thunb. Fl. Jap. (1784) 280.

Canavalia obtusifolia DC. Prodr. 2 (1825) 404; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 196; F.-Vill. Nov. App. (1880) 64.

Dolichos obtusifolius Lam. Encycl. 2 (1786) 295.

Dolichos acinaciformis Blanco Fl. Filip. (1837) 578 (?), non Jacq.

Canavalia ensiformis Blanco l. c. ed. 2 (1845) 404, ed. 3, 2:377 (?), non DC.

Batanes Islands, Batan, *Bur. Sci. 3680 Fénix.* Luzon, Province of Cagayan, *For. Bur. 16612 Curran:* Province of Union, *Elmer 5650:* Province of Zambales, *Merrill 342:* Province of Bataan, *Elmer 7033, Williams 319:* Manila, *McGregor 58, Torralba 207, Merrill 3423:* Province of Tayabas, *For. Bur. 9583 Curran, Whitford 840.* Mindanao, District of Davao, *Copeland 562:* Province of Surigao, *Allen 169, Long s. n.:* District of Zamboanga, *Hallier s. n.*

Along the seashore, usually growing in pure sand of the beach; coasts of India to Japan, through Malaya to Australia; also in tropical America, if the synonyms of DeCandolle and Lamarck are properly placed.

This species in floral characters is practically identical with *Canavalia turgida* Grah., but its pods are quite different, and it can always be distinguished by its rounded leaflets.

3. **Canavalia ensiformis** (Linn.) DC. Prodr. 2 (1825) 404; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 195; F.-Vill. Nov. App. (1880) 64; Perk. Frag. Fl. Philip. (1904) 88; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 67.

Dolichos ensiformis Linn. Sp. Pl. (1753) 725.

Luzon, Province of Cagayan, *Bolster 188:* District of Bontoc, *For. Bur. 16553 Curran & Merritt:* Province of Benguet, *For. Bur. 15883 Bacani:* Province of Union, *Fénix 12:* Province of Zambales, *Bur. Sci. 5119 Ramos:* Province of Pampanga, *Bur. Sci. 1943 Foxworthy:* Province of Pampanga, *Merrill s. n.:* Province of Bataan, *Elmer 6870, Merrill 1485, 1602, 3811, For. Bur. 79 Barnes, For. Bur. 2197 Meyer, Williams 532:* Province of Rizal, *Bur. Sci. 11 Foxworthy:* Manila, *Merrill 4094, Lyon s. n.* Lubang, *Merrill 963.*

[60] Sp. Pl. 3 (1800) 1040.

Widely distributed in the Philippines, some forms probably cultivated, but most of the specimens cited above from wild plants; Tropics of the world. Exceedingly variable.

4. **Canavalia gladiata** (Jacq.) DC. Prodr. 2 (1825) 404; Blanco Fl. Filip. ed. 2 (1845) 403, ed. 3, 2:376; Naves l. c. ed. 3, *pl. 449.*

Dolichos gladiatus Jacq. Coll. 2 (1788) 276.

Dolichos ensiformis Blanco Fl. Filip. (1837) 577.

LUZON, Manila. *Merrill 3425, Bur. Sci. 5167 Ramos.* MINDANAO, Lake Lanao, *Mrs. Clemens 589, s. n.*

All the specimens cited above are from cultivated plants, and this form is unknown in the wild state in the Philippines. It is characterized by its very large pods, which are from 25 to 30 cm long, and about 5 cm wide.

I am not at all sure that the specimens above cited represent true *Canavalia gladiata* (Jacq.) DC., as I have not seen the original description of the species; it is reduced by most authors to *Canavalia lineata* (Linn.) DC.

Tropics of the world; certainly not a native of the Philippines.

80. CAJANUS DC.

1. **Cajanus indicus** Spreng. Syst. 3 (1826) 248; Miq. Fl. Ind. Bat. 1[1] (1855) 174; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 217; F.-Vill. Nov. App. (1880) 66; Vid. Phan. Cuming. Philip. (1885) 109; Perk. Frag. Fl. Philip. (1904) 88; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 47.

Cytisus cajan Linn. Sp. Pl. (1753) 739; Blanco Fl. Filip. (1837) 597.

Cytisus pseudo-cajan Jacq. Hort. Vindob. 2 (1772) 54, *t. 119.*

Cajan inodorum Medic. in Vorles. Churpf. Phys. Ges. 2 (1787) 363.

Cajanus bicolor DC. Cat. Hort. Monsp. (1813) 85, Prodr. 2 (1825) 406; Blanco Fl. Filip. ed. 2 (1845) 416, ed. 3, 2:396; Naves l. c. ed. 3, *pl. 167.*

Cajanus flavus DC. l. cc.

Cajan cajan Millsp. Field. Columb. Mus. Bot. 2 (1900) 53.

LUZON, Province of Cagayan, *For. Bur. 18604 Klemme, Merrill 191:* Province of Ilocos Norte, *Bur. Sci. 2293 Mearns:* Province of Benguet, *Bur. Sci. 5828 Ramos:* Province of Batangas, *Marave 167:* Province of Bataan, *For. Bur. 2337 Borden, For. Bur. 2266 Meyer:* Province of Rizal, *Bur. Sci. 2170 Ramos:* Manila, *Ocampo 268:* MINDORO, *For. Bur. 9872 Merritt, Bur. Sci. 6688 Robinson.* BUSUANGA, *For. Bur. 3535 Curran.* CULION, *Merrill 452.* BALABAC, *Bur. Sci. 385 Mangubat.* MASBATE, *Merrill 3055.* NEGROS, *Muñoz s. n.* MINDANAO, Lake Lanao, *Mrs. Clemens 207, 245:* District of Davao, *DeVore & Hoover 119.* BASILAN, *Hallier s. n.*

Native names: *Caguios* (Rizal, Batangas, Manila); *callos* (Balabac); *cadios* (Mindoro); *gablos* (Bataan); *cardis* (Ilocos, Cagayan); *tabios* (Masbate, Negros); *caldis* (Benguet).

Widely distributed in the Philippines and frequently cultivated; probably a native of the Old World, but now distributed throughout the Tropics of the world.

The most generally used specific name is here retained for this well-known species, although it is by no means the oldest. Following the Vienna rules, strictly, a new combination is necessary, whichever generic name is used. The oldest generic name is *Cajan* Adans. (1763), which was corrected by DeCandolle (1813) to *Cajanus*, and the case is not covered by the list of *nomina conservanda* of the Vienna Botanical Congress, although following strict priority, *Cajan* would be the correct generic name; both specific names proposed by DeCandolle are older than the one proposed by Sprengel, under which the species is generally

known. However, neither has been taken up, as there are still older ones available. According to the Vienna rules, duplicate binomials are inadmissible, and hence, if *Cajan* be accepted as the generic name, *Cajan cajan* (L.) Millsp. is inadmissible and a new combination would be necessary; the oldest specific name in this case would be from *Cytisus pseudo-cajan* Jacq. (1772). If, however, *Cajanus* be retained as the generic name, the oldest specific name would of necessity have to be taken from *Cytisus cajan* Linn., as the combination of the specific name *cajan* under the genus *Cajanus* hardly constitutes a duplicate binomial. Under present rules *Cajan cajan* is inadmissible, but *Cajanus cajan* is entirely proper and admissible (!), a very good illustration of inconsistency.

81. DUNBARIA W. & A.

Leaflets only slightly pubescent beneath, pale, but scarcely whitish.
1. *D. cumingiana*

Leaflets densely white-tomentose beneath..... 2. *D. merrillii*

1. **Dunbaria cumingiana** Benth. Pl. Jungh. (1852) 242; Miq. Fl. Ind. Bat. 1[1] (1855) 177; F.-Vill. Nov. App. (1880) 66; Vid. Phan. Cuming. Philip. (1885) 109, Rev. Pl. Vasc. Filip. (1886) 110.

LUZON, Province of Benguet, *Bur. Sci. 5760 Ramos;* Province of Tayabas, *Cuming 819* (type in Herb. Kew.), *Elmer 7799, Bur. Sci. 6046 Robinson;* Province of Rizal, *Merrill 5074.*

Endemic.

2. **Dunbaria merrillii** Elmer Leafl. Philip. Bot. 1 (1907) 225 (as *Dumbaria*).

LUZON, Province of Benguet, *Elmer 8502* (type number); Province of Pangasinan, *Alberto 4;* Province of Cagayan, *Bur. Sci. 7411, 7872 Ramos.*

A species very closely allied to, and perhaps not specifically distinct from the preceding, distinguished, so far as I can determine from the material at hand, only by its more dense and whitish pubescence.

Endemic.

82. CANTHAROSPERMUM W. & A.

Petals marcescent; leaflets 4 to 7 cm long; pods 5 to 7 cm in length.. 1. *C. volubile*

Petals deciduous; leaflets 1.5 to 3 cm long; pods less than 3 cm long.
2. *C. scarabaeoides*

1. **Cantharospermum volubile** (Blanco) comb. nov.

Cytisus volubilis Blanco Fl. Filip. (1837) 599.

Cajanus volubilis Blanco l. c. ed. 2 (1845) 417, ed. 3, 2:398.

Dunbaria horsfieldii Miq. Fl. Ind. Bat. 1[1] (1855) 179.

Atylosia mollis F.-Vill. Nov. App. (1880) 66; Vid. Sinopsis Atlas (1883) *t. 41, fig. E*, Phan. Cuming. Philip. (1885) 109, Rev. Pl. Vasc. Filip. (1886) 110; Perk. Frag. Fl. Philip. (1904) 88, non Benth.

Atylosia crassa Prain in Journ. As. Soc. Beng. 66[2] (1897) 45.

LUZON, Province of Union, *Elmer 5612;* District of Lepanto, *Bur. Sci. 7025 Ramos;* Province of Rizal, *For. Bur. 2157 Ahern's collector.* URIAN (Sulu Archipelago), *Merrill 5399.*

India, Indo-China, the Andaman Islands, and the Malay Archipelago.

In regard to the specific name for this species, *volubile*, being by far the oldest is here adopted. Blanco's description of *Cytisus volubilis*, although short, applies unmistakably to the material cited above. Prain[61] has called attention to the fact that *Atylosia mollis* Benth. is a mixture of two different species, and the name, derived from *Collaca mollis* Grah., is applicable only to a Himalayan plant.

[61] Journ. As. Soc. Beng. 66[2] (1897) 46.

He adopts the name *Atylosia crassa*, based on the *nomen nudum*, *Dolichos crassus* Grah., for the Indo-Malayan form referred by most authors to *Atylosia mollis* Benth.

2. **Cantharospermum scarabaeoides** (Linn.) Baill. in Bull. Soc. Linn. Paris 1 (1883) 384 (*scarabacoideum*).

Dolichos scarabacoides Linn. Sp. Pl. (1753) 726.

Rhynchosia scarabacoides DC. Prodr. 2 (1825) 387.

Atylosia scarabacoides Benth. Pl. Jungh. (1852) 245; Miq. Fl. Ind. Bat. 1[1] (1855) 173; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 215; F.-Vill. Nov. App. (1880) 66; Vid. Phan. Cuming. Philip. (1885) 109; Perk. Frag. Fl. Philip. (1904) 88.

Luzon, Province of Cagayan, *For. Bur. 18613 Klemme:* District of Abra, *Bur. Sci. 7118 Ramos:* Province of Benguet, *Williams 1418:* Province of Union, *Elmer 5703:* Province of Pampanga, *Merrill 1431:* Province of Bulacan, *Yoder 140:* Province of Rizal, *Cuzner 28.* Mindoro, *Bur. Sci. 6659 Robinson.* Masbate, *Merrill 3397.* Mindanao, Lake Lanao, *Mrs. Clemens 774:* District of Davao, *DeVore & Hoover 104.*

Widely distributed in the Philippines at low altitudes in open grass-lands; India, Indo-China, southern China, Malaya, Mariannes and Mascarene Islands.

The generic name *Cantharospermum* W. & A. has only page preference over *Atylosia* W. & A., and the latter is by far the more commonly used one. The fact that *Atylosia* was not included in the list of *nomina conservanda* of the Vienna Botanical Congress is an excellent illustration of the inconsistency of that list.

83. RHYNCHOSIA Lour.

1. **Rhynchosia calosperma** Warb. in Engl. Bot. Jahrb. 12 (1891) 314; Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 370; Perk. Frag. Fl. Philip. (1904) 88.

Luzon, Province of Pampanga, *Merrill 1443*, locally known as *balabalatungan*.

New Guinea, the Bismarck Archipelago, and the Key Islands.

I have followed Perkins in this identification; the type of the species has not been seen by me.

DOUBTFUL AND EXCLUDED SPECIES.

Rhynchosia fridericiana (Weinm.) DC. Prodr. 2 (1825) 387; F.-Vill. Nov. App. (1880) 67.

Glycine fridericiana Weinm. in Flora 4 (1821) 29.

This species was described from specimens cultivated in Russia from seeds said to have been received from the Philippines, and I have been unable to determine its status from the short description available here. M. C. DeCandolle informs me that there is no specimen in the DeCandolle Herbarium, and Dr. A. Fischer von Waldheim, Director of the Botanical Garden at St. Petersburg, informs me that it is unrepresented in the Herbarium of that Institution.

Rhynchosia viscosa DC.; F.-Vill. Nov. App. (1880) 66.

Rhynchosia densiflora DC.; F.-Vill. l. c. 67.

Rhynchosia minima DC.; F.-Vill. l. c. 66.

The above three species were credited to the Philippines by F.-Villar, but no Philippine material has been seen by me, and accordingly they are not admitted here.

The oldest name for the genus is *Dolicholus* Medic. (1787), but *Rhynchosia* Lour. (1790) is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

84. ERIOSEMA DC.

1. **Eriosema chinense** Vog. in Nov. Act. Acad. Nat. Cur. 19 (1843) Suppl. 1: 31; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 219; F.-Vill. Nov. App. (1880) 66; Vid. Rev. Pl. Vasc. Filip. (1886) 111.

Crotalaria tuberosa Ham. in Don Prodr. (1825) 241, non *Eriosema tuberosum* A. Rich. (1847).

LUZON, Province of Cagayan, *Bur. Sci. 7891 Ramos:* Province of Isabela, *Bur. Sci. 7982 Ramos:* District of Lepanto, *Merrill 4463:* Province of Benguet, *Bur. Sci. 5327 Ramos, For. Bur. 5109, 5131 Curran, Bur. Sci. 2474, 2736, 2769 Mearns. Elmer 6371:* Province of Nueva Vizcaya, *Merrill 402.* SEMERARA, *Merrill 4135.*

India to southern China, the Malay Peninsula and Archipelago, to northern Australia.

85. FLEMINGIA Roxb.

Leaves 1-foliolate; flowers in small cymules enclosed by large, folded, persistent bracts, and arranged in racemes longer than the leaves..... 1. *F. strobilifera*

Leaves 3-foliolate; flowers racemose or paniculate, the bracts small, deciduous.

Flowers arranged in lax, spreading, racemose panicles..... 2. *F. lineata*

Flowers in very dense, congested, spike-like racemes, or panicled racemes.

Leaflets oblong, scarcely narrowed at the apex, rounded, or apiculate; plant decumbent or prostrate ..... 3. *F. philippinensis*

Leaflets gradually narrowed to the acuminate or acute apex; plants erect or suberect.

Leaves slightly pubescent beneath..... 4. *F. macrophylla*

Leaves rather densely and softly villous beneath..... 5. *F. cumingiana*

1. **Flemingia strobilifera** (Linn.) R. Br. in Ait. Hort. Kew. ed. 2, 4 (1812) 350; DC. Prodr. 2 (1825) 351; Miq. Fl. Ind. Bat. 1[1] (1855) 161; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 227; F.-Vill. Nov. App. (1880) 67; Vid. Sinopsis Atlas (1883) *t. 40, fig. E,* Rev. Pl. Vasc. Filip. (1886) 111.

Hedysarum strobiliferum Linn. Sp. Pl. (1753) 764.

LUZON, Province of Ilocos Norte, *Bur. Sci. 2273 Mearns:* Province of Union, *Elmer 5557:* Province of Pangasinan, *For. Bur. 3652 Saroca:* Province of Pampanga, *Merrill 1435, Feliciano 290:* Province of Rizal, *Merrill 1335:* Manila, *Abella 104:* Province of Bataan, *Whitford 47, Merrill 1589:* Province of Tayabas, *Merrill 1896.* PANAY, *Copeland s. n.* CULION, *Merrill 439.* BALABAC, *Bur. Sci. 501 Mangubat.* MINDANAO, District of Zamboanga, *For. Bur. 9254 Whitford & Hutchinson.* BASILAN, *DeVore & Hoover 23.*

Native names: *Copa-copa* (Pangasinan); *paking, pakayam* (Pampanga); *payang-payang* (Rizal); *paraparanahan, panapanalahan* (Bataan, Tayabas); *pirangan* (Balabac); *caliacai* (Zamboanga, Basilan).

India to southern China, the Malay Peninsula and Archipelago; introduced in Mauritius and the West Indies.

2. **Flemingia lineata** (Linn.) Roxb. Hort. Beng. (1814) 56, Fl. Ind. 3 (1832) 341; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 228; F.-Vill. Nov. App. (1880) 67; Usteri Beitr. Ken. Philip. Veg. (1905) 116.

Hedysarum lineatum Linn. Syst. ed. 10 (1759) 1170.

Flemingia blancoana Llanos Frag. (1851) 81; Blanco Fl. Filip. ed. 3, 4[1]:62.

LUZON, Province of Bulacan, *Mrs. Templeton.*

India and Ceylon through Malaya to northern Australia; not reported from the Malay Peninsula.

3. **Flemingia philippinensis** Merr. & Rolfe in Philip. Journ. Sci. 3 (1908) Bot. 103.

Luzon, District of Bontoc, *For. Bur. 16541 Curran:* District of Lepanto, *Merrill 4460.*

Endemic.

4. **Fleminga macrophylla** (Willd.) O. Kuntze ex Prain in Journ. As. Soc. Beng. 66[2] (1897) 440, in nota.

Crotalaria macrophylla Willd. Sp. Pl. 3 (1800) 982.

Flemingia congesta Roxb. ex Ait. Hort. Kew. ed. 2, 4 (1812) 349; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 228, pro parte; F.-Vill. Nov. App. (1880) 67; Vid. Rev. Pl. Vasc. Filip. (1886) 111.

Rhynchosia sericea Vid. Sinopsis Atlas (1883) *t. 40, f. D.!;* F.-Vill. Nov. App. (1880) 67, prob., non Span.

Moghania macrophylla O. Kuntze Rev. Gen. Pl. (1891) 199.

Luzon, Province of Benguet, *Elmer 6241, For. Bur. 16224 Curran, Merritt, & Zschokke:* Province of Laguna, *For. Bur. 8867 Curran:* Province of Pampanga, *Merrill 1454:* Province of Rizal, *Merrill 1342:* Province of Bataan, *Whitford 76.* Cuyo, *Merrill 687.* Mindanao, Lake Lanao, *Mrs. Clemens 825.*

India to southern China and Malaya.

Flemingia congesta Roxb., as interpreted by Baker in Hooker's "Flora of British India," has been separated by Prain[62] into no less than six species, and two others, considered by Baker as synonyms of *F. wallichii* W. & A., are regarded by Prain as distinct, and are placed by him with the segregates from *F. congesta*. Incidentally Doctor Prain credits O. Kuntze with the new combination *Flemingia macrophylla*, but Kuntze originally made the transfer to *Moghania*, not to *Flemingia*. At my request Dr. H. Harms has compared the Philippine material with Willdenow's type, and writes as follows: "I have compared the specimen in Willdenow's Herbarium, no. 13260, named *Crotalaria macrophylla* Willd., with some Philippine specimens (i.e., Cuming's) of *Flemingia congesta* Roxb., and I think that they are identical; indeed I do not see any differences between the specimens, so that Willdenow's name must be admitted as the oldest for the species, according to Doctor Kuntze's statements. * * * The Philippine specimens agree better with Willdenow's type than do several of the Indian specimens, in our herbarium, referred to *F. congesta* Roxb."

5. **Flemingia cumingiana** Benth. Pl. Jungh. (1852) 245; Miq. Fl. Ind. Bat. 1[2] (1855) 67; F.-Vill. Nov. App. (1880) 67.

Philippines, without locality, *Cuming s. n.* in Herb. Kew. (type).

The type impresses me as being a rather densely pubescent form of the preceding species, and *F. cumingiana* may ultimately prove not to be separable from that. I am disposed to refer to *F. cumingiana* the following specimens, although some of them have considerably larger leaflets than has the type of the species: Luzon, Province of Abra, *Bur. Sci. 7130 Ramos:* Province of Bulacan, *Yoder 152:* Province of Bataan, *Merrill 1601.*

Endemic.

Flemingia involucrata Benth. is recorded from the Philippines by F.-Villar. Nov. App. 67; it extends from India to Java, but I have seen no Philippine specimens.

Flemingia Roxb. is here retained as the name for this genus, although O. Kuntze has adopted the generic name *Moghania* St. Hil. (1813), in which he has been followed by Taubert in Engler & Prantl's "Natürlichen Pflanzenfamilien." Kuntze asserts that *Flemingia* was not published until 1819, (1814, *nomen*

[62] Journ. As. Soc. Beng. 66[2] (1897) 439.

nudum), but "Index Kewensis" gives the place of publication as volume four of the second edition of Aiton's "Hortus Kewensis," the date of which is given by Pritzel as 1812; this proves to be a valid publication and, if the dates are correct, then *Flemingia* has priority over *Moghania*. The case is not covered by the list of *nomina conservanda* of the Vienna Botanical Congress, although DeDalla Torre & Harms in their "Genera Siphonogamarum" accept *Flemingia* Roxb. in preference to *Moghania* St. Hil., giving the date of publication of the former as 1812.

86. PHASEOLUS Linn.

Stipules small, basifixed.

Scandent; pods glabrous.

Flowers less than 8 mm long; petals puberulent externally, greenish-yellow; pods broad, flattened, 1.5 to 2 cm wide ..... 1. *P. lunatus*

Flowers about 2.5 cm long; petals glabrous, pink to purple; pods less than 1 cm wide, subtorulose between the seeds ..... 2. *P. adenanthus*

Erect; pods appressed-pubescent, about 4 mm wide; flowers dark-purple. 3. *P. semierectus*

Stipules produced below the point of insertion; petals yellow, glabrous.

Leaflets linear-lanceolate to lanceolate, mostly less than 1 cm in width; pods glabrous or somewhat strigose ..... 4. *P. minimus*

Leaflets ovate, oblong-ovate or orbicular-ovate exceeding 2 or 3 cm. in width.

Pods glabrous; leaflets usually repand or slightly lobed ..... 5. *P. calcaratus*

Pods pubescent.

Erect or scandent; leaflets pubescent or glabrous, not lobed, acute, obtuse, or slightly acuminate, cultivated ..... 6. *P. radiatus*

Scandent; fulvous-pubescent; leaflets rather strongly acuminate, lobed or repand ..... 7. *P. sublobatus*

1. **Phaseolus lunatus** Linn. Sp. Pl. (1753) 724; Blanco Fl. Filip. (1837) 573, ed. 2 (1845) 400, ed. 3, **2**: 370; Naves l. c. ed. 3, *pl. 352*; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 200.

Phaseolus inamoenus Blanco Fl. Filip. (1837) 271, ed. 2 (1845) 399 (err. typ. *inamatus*), ed. 3, **2**: 368, non (?) Linn.

Phaseolus vexillatus Blanco l. c. ed. 1, 574, non Linn.

Phaseolus vulgaris Blanco l. c. ed. 2 (1845) 401, ed. 3, **2**: 371, non Linn.

Phaseolus ilocanus Blanco l. c. ed. 1, (1837) 572.

Phaseolus tunkinensis Blanco l. c. ed. 2 (1845) 399, ed. 3, **2**:369; Naves l. c. ed. 3, *pl. 369*, non (?) Lour.

LUZON. Province of Cagayan, *For. Bur. 16768 Curran*: Province of Ilocos Norte, *Bur. Sci. 7645 Ramos, Bur. Sci. 2279 Mearns*: Province of Abra, *For. Bur. 14651 Darling*: Province of Benguet, *For. Bur. 16220, 16223 Curran, Merritt, & Zschokke*: Province of Union, *For. Bur. 15710 Merritt & Darling*: Province of Nueva Ecija, *For. Bur. 8500 Curran*: Province of Pampanga, *Parker 39, Merrill s. n.*: Province of Batangas, *Cuzner 37*, Province of Rizal, *Bur. Sci. 2171 Ramos*: Province of Laguna, *Elmer, Hallier s. n.* PALAWAN, *Bur. Sci. 279 Bermejos*. MINDANAO, District of Davao, *DeVore & Hoover 235*.

Widely known in the Philippines as *patani*, other names given by Blanco being *buttingi* and *biringi* (Batangas), and the Spanish names *zabache* and *frijoles de Abra*.

A native of tropical America, now widely distributed in the Philippines, chiefly in cultivation; Tropics of the world.

I have followed F.-Villar in the reductions of the several species recognized by Blanco, as they all seem to be cultivated forms of this variable species.

F.-Villar refers Blanco's species to three varieties of *P. lunatus* Linn., var. *inaemoenus* (L.) F.-Vill., var. *tunkinensis* (Lour.) F.-Vill., and var. *xuaresii* (Zucc.) F.-Vill.

2. **Phaseolus adenanthus** G. W. F. Mey. Prim. Fl. Esseq. (1818) 239; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 200; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 49; Perk. Frag. Fl. Philip. (1904) 89.

Phaseolus rostratus Wall. Pl. As. Rar. 1 (1830) 50, *t. 63;* Usteri Beitr. Ken. Philip. Veg. (1905) 116.

Luzon, Province of Cagayan, *For. Bur. 16582 Curran:* Province of Ilocos Norte, *Bur. Sci. 2211, 2230, 2276, 2278 Mearns:* Province of Pangasinan, *Bur. Sci. 4950 Ramos, For. Bur. 8406 Curran & Merritt:* Province of Rizal, *Bur. Sci. 6527 Robinson:* Province of Laguna, *For. Bur. 8870 Curran:* Manila, *Carlos 136, Merrill 632, 3420, 3492, 4095, 4096, Hallier s. n., Zamora 60.* Mindanao, District of Zamboanga, *Williams 2437.*

Native name: *Patanit-baquit* (Ilocos).

Cosmopolitan in the Tropics.

3. **Phaseolus semierectus** Linn. Mant. (1771) 100; Baker in Hook. f. Fl. Brit. Ind. 2 (1870) 201; Miq. Fl. Ind. Bat. 1[1] (1855) 201; Perk. Frag. Fl. Philip. (1904) 89.

Luzon, Manila, *Merrill 30, Elmer 5536, McGregor 53, Cuzner 59, Airan 137.*

Abundant about Manila, and thoroughly naturalized, apparently of comparatively recent introduction, as it is not described by Blanco, nor listed by F.-Villar, as is also the case with the preceding species. A native of tropical America, now widely distributed in the Tropics of the world.

4. **Phaseolus minimus** Roxb. Fl. Ind. 3 (1832) 290; Benth. Fl. Hongk. (1861) 88; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1887) 193.

Luzon, Province of Cagayan, *For. Bur. 16475 Bacani:* Province of Isabela, *Bur. Sci. 7987 Ramos:* Province of Benguet, *Williams 1408.* Mindanao. District of Davao, *Copeland 544, DeVore & Hoover 167.*

A species well characterized by its narrow, elongated leaflets; previously known only from southern China.

5. **Phaseolus calcaratus** Roxb. Hort. Beng. (1814) 54. Fl. Ind. 3 (1832) 289; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 203; Prain ex King in Journ. As. Soc. Beng. 66[2] (1897) 49; F.-Vill. Nov. App. (1880) 65.

Vigna lutcola Merr. in Philip. Journ. Sci. 3 (1908) Bot. 411, non Benth.

Babuyanes Islands, Camiguin, *Bur. Sci. 4064 Fénix.* Luzon, Province of Cagayan, *For. Bur. 16778 Curran:* District of Bontoc, *For. Bur. 16550 Curran & Merritt:* Province of Benguet, *Williams 1287:* Province of Pangasinan, *Bur. Sci. 4875 Ramos:* Province of Pampanga, *Bolster 16, 59:* Province of Laguna, *Williams 2049, Elmer:* Province of Rizal, *For. Bur. 2167 Ahern's collector:* Province of Tayabas, *Bur. Sci. 9338 Robinson, Whitford 860.* Ticao, *For. Bur. 1048 Clark.* Palawan, *Merrill 808.* Polillo, *Bur. Sci. 10764 McGregor.*

India to Malaya.

I am not at all sure that all the specimens cited above really represent *Phaseolus calcaratus* Roxb., but the description applies rather closely. Some of the specimens have been identified and distributed as *P. mungo* Linn., and others as *Vigna lutcola* Baker. A good series of Indo-Malayan specimens is needed for purposes of comparison. The oldest valid specific name may prove to be *Phaseolus pubescens* Blume.

6. **Phaseolus radiatus** Linn. Sp. Pl. (1753) 725.

Phaseolus mungo Blanco Fl. Filip. (1837) 573, ed. 2 (1845) 400, ed. 3, 2: 370; F.-Vill. Nov. App. (1880) 65; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 203 (in part), non Linn.

Luzon, Province of Batangas, *For. Bur. 7782 Curran & Merritt:* Province of Rizal, *Bur. Sci. 2169 Ramos.*

Native names: *Mungos* (widely used), *balatong*, ex Blanco.

The form here referred to *Phaseolus radiatus* Linn. is only cultivated in the Philippines, and is quite universally known as *mungos*. This erect form is the one described by Linnæus as *Phaseolus radiatus*, and is frequently identified as *Phaseolus mungo* Linn. I have seen no Philippine material that I consider referable to the true *Phaseolus mungo* Linn.

India to China and Malaya; widely cultivated and variable.

7. **Phaseolus sublobatus** Roxb. Hort. Beng. (1814) 54, Fl. Ind. 3 (1832) 288. *Phaseolus trinervius* Heyne in Wall. Cat. (1832) no. 5603; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 203: F.-Vill. Nov. App. (1880) 65.

Mindanao, Lake Lanao, *Mrs. Clemens 630.*

India to Malaya.

DOUBTFUL AND EXCLUDED SPECIES.

Phaseolus vulgaris Linn.; F.-Vill. Nov. App. (1880) 64. A number of forms of this are cultivated by Chinese gardeners for the Manila market, probably entirely grown from imported seeds.

Phaseolus ricciardianus Ten.; Usteri Beitr. Ken. Philip. Veg. (1905) 116, reported from Negros by Usteri, but I have seen no Philippine material.

A full series of the various cultivated species of this genus, and comparison of the same with extra-Philippine material is essential to a clear exposition of them.

87. VIGNA Savi.

Keel not prolonged into a beak; flowers yellow or yellowish.

Pods very long, up to 60 cm in length, many-seeded; cultivated.... 1. *V. sinensis*

Pods short, few-seeded, less than 7 cm in length.

Whole plant glabrous ..... 2. *V. lutea*

Young stems and pods pubescent, other parts of the plant often so. 3. *V. luteola*

Keel prolonged into a beak; pods densely pilose; flowers purplish.... 4. *V. pilosa*

1. **Vigna sinensis** (Linn.) Endl. ex Hassk. Pl. Jav. Rar. (1848) 386; Walp. Ann. 4:562; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 23 (1887) 193.

Dolichos sinensis Linn. Cent. Pl. (1756) 28, Amoen. Acad. 4 (1759) 132.

Dolichos catiang Linn. Mant. (1771) 269.

Vigna catjang Walp. in Linnaea 13 (1839) 533; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 205; F.-Vill. Nov. App. (1880) 65; Naves in Blanco Fl. Filip. ed. 3, *pl. 285.*

Dolichos sesquipedalis Blanco Fl. Filip. (1837) 575, ed. 2 (1845) 401, ed. 3, 2:375; Naves l. c. ed. 3, *pl. 286*, non Linn.

Phaseolus caracalla Blanco l. cc.; F.-Vill. Nov. App. (1880) 65, (?) non Linn.

Luzon, Manila, *Merrill 4104:* Province of Pampanga, *Merrill s. n.*

Quite universally known in the Philippines as *sitao; quibal*, ex Blanco. Cultivated only; cultivated in most tropical and subtropical countries.

2. **Vigna lutea** (Sw.) A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 452; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 205; Perk. Frag. Fl. Philip. (1904) 89; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 67.

Dolichos luteus Sw. Prodr. Veg. Ind. Occ. (1788) 105; DC. Prodr. 2 (1825) 398.

Vigna retusa Walp. Repert. 1 (1842) 778; Prain ex King in Journ. As. Soc. Beng. 66 [2] (1897) 51.

Luzon, Province of Bataan, *For. Bur. 2295 Meyer, Williams 316:* Province of Tayabas, *For. Bur. 9582 Curran, Whitford 687, Gregory 85.* Polillo, *Bur. Sci. 9284 Robinson.* Mindoro, *Merrill 1263, 3334.* Palawan, *Bur. Sci. 336 Bermejos.* Balabac, *Bur. Sci. 476 Mangubat.* Mindanao, District of Cotabato, *Mrs. Clemens 814:* District of Zamboanga, *Hallier s. n.:* District of Davao, *Copeland 561.*

A species characteristic of sandy seashores, widely distributed in the Philippines; Tropics of the world.

O. Kuntze[63] reduces *Vigna luteola* Benth. and *V. lutea* A. Gray (*Dolichos luteus* Sw.) to *Vigna repens* (Linn.) O. Kuntze (*Dolichos repens* Linn.). Whether or not the reductions are correct I am unable to determine, but the specific name *repens* is invalidated in *Vigna* by *V. repens* Baker (1876).

3. **Vigna luteola** (Jacq.) Benth. in Thw. Enum. (1859) 90, and in Mart. Fl. Bras. 15 (1859–62) 194, *t. 50, fig. 2;* Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 205; Perk. Frag. Fl. Philip. (1904) 89.

Dolichos luteolus Jacq. Hort. Vind. 1 (1770) 39, *t. 90.*

Mindanao, Lake Lanao, *Mrs. Clemens 209:* District of Cotabato, *For. Bur. 3951 Hutchinson.*

Tropics of the world; Baker, certainly by error, describes the pods as one-half inch wide.

4. **Vigna pilosa** (Roxb.) Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 207; Perk. Frag. Fl. Philip. (1904) 89; Usteri Beitr. Ken. Philip. Veg. (1905) 116; Merr. in Govt. Lab. Publ. (Philip.) 35 (1906) 22.

Dolichos pilosus Roxb. Hort. Beng. (1814) 55. Fl. Ind. 2 (1832) 312; DC. Prodr. 2 (1825) 397.

Luzon, Province of Rizal, *Merrill 3674:* Manila, *Hallier s. n.:* Province of Zambales, *Hallier s. n.*

India and Formosa.

DOUBTFUL AND EXCLUDED SPECIES.

Vigna repens (Grah.) Baker; F.-Vill. Nov. App. (1880) 65. A species definitely known only from Burma, to which F.-Villar reduced *Dolichos repens* Blanco (non Linn.). I am unable to determine Blanco's species with satisfaction at the present time, although F.-Villar may have been correct in the reduction.

Vigna vexillata Rich.; Perk. Frag. Fl. Philip. (1904) 89. Credited to Mindanao on material collected by Warburg; I have seen no Philippine specimens that I consider referable to the species, and was unable to find Warburg's specimen in the Berlin herbarium.

88. DOLICHOS Linn.

Style flattened, bearded along the inner edge; inflorescence of axillary, elongated, narrow, racemose panicles; flowers various, purplish, pink, white, or slightly yellowish; pods flattened, about 2 cm wide ..... 1. *D. lablab*

Style filiform, not bearded on the inner edge, but usually so at the apex; flowers few, in short axillary racemes; pods less than 1 cm wide.

Glabrous or only slightly pubescent; leaflets lobed or repand; flowers pink. 2. *D. falcatus*

Softly pilose with long, spreading, white hairs; leaflets entire; flowers yellow. 3. *D. uniflorus*

1. **Dolichos lablab** Linn. Sp. Pl. (1753) 725; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 209; F.-Vill. Nov. App. (1880) 65; Perk. Frag. Fl. Philip. (1904) 90.

Lablab vulgaris Savi Diss. (1821) 19; DC. Prodr. 2 (1825) 401.

[63] Rev. Gen. Pl. (1891) 212.

Glycine lucida Blanco Fl. Filip. (1837) 578, non Forst.

Lablab cultratus DC. Prodr. 2 (1825) 402; Blanco Fl. Filip. ed. 2 (1845) 405, ed. 3, 2: 379; Naves l. c. ed. 3, *pl. 292.*

LUZON, Province of Cagayan, *For. Bur. 16763 Curran:* Province of Ilocos Norte, *Bur. Sci. 2206 Mearns:* Province of Union, *Elmer 5569, 5590, 5730:* District of Bontoc, *Bur. Sci. 7009 Ramos:* Province of Benguet, *Merrill 4314, For. Bur. 15740 Curran & Merritt:* Province of Batangas, *Cuzner 42:* Province of Laguna, *Hallier s. n.:* Manila, *Merrill 3448, 4089.* CULION, *Merrill 522.* BASILAN, *DeVore & Hoover 32.*

Widely distributed in the Philippines, cultivated and spontaneous; Tropics of the Old World.

Native names: *Batao* (widely used); *parda* (Ilocos); *sibachi* (Batangas); *baglao* (Basilan); *bulai*, ex Blanco.

Both the typical form, and the var. *lignosa* (Linn.) Prain, are represented in the material cited above, the former having seeds with their long axes parallel with the pod, and the later having seeds with their long axes across the pod.

The genus *Lablab* Adans. was based on the above species, and has been retained by some authors, including Pilger in Engl. & Prantl. Nat. Pflanzenfam. Nachtr. 3 (1908) 174, as worthy of generic rank.

2. **Dolichos falcatus** Klein in Willd. Sp. Pl. 3 (1800) 1047; DC. Prodr. 2 (1825) 398; A. Gray Bot. Wilkes U. S. Explor. Exped. (1854) 453; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 211; F.-Vill. Nov. App. (1880) 66.

Dolichos trilobus Blanco Fl. Filip. ed. 2 (1845) 403, ed. 3, 2: 375, non Linn.

LUZON, Province of Ilocos Norte, *For. Bur. 14678 Darling, Bur. Sci. 7678 Ramos:* Province of Batangas, *Cuzner 24:* Province of Laguna, *Bur. Sci. 6027 Robinson, Hallier s. n.:* Province of Rizal, *Baja 246.* CEBU, *Brown 6.* NEGROS, *For. Bur. 13714 Curran.*

Native names: *Paiap-gobat* (Laguna); *gocot-maya* (Cebu).

India and Ceylon, not reported from southern China or Malaya.

Dolichos trilobus Blanco was reduced by F.-Villar to *Phaseolus calcaratus* Roxb.; it is, however, unquestionably referable to *Dolichos falcatus* Klein.

3. **Dolichos uniflorus** Lam. Encycl. 2 (1786) 299; DC. Prodr. 2 (1825) 398; Trimen Fl. Ceyl. 2 (1894) 76.

LUZON, Province of Rizal, *Cuzner 29.*

India and Ceylon (var. *glaber* Trimen); other range uncertain on account of confusion with *Dolichos biflorus* Linn., to which Lamarck's species has been reduced by Baker, the range of the latter being given as "everywhere in the Tropics of the Old World." Not previously reported from the Philippines.

89. PACHYRRHIZUS Rich.

1. **Pachyrrhizus erosus** (Linn.) Urb. Symb. Antill. 4 (1905) 311.

Dolichos erosus Linn. Sp. Pl. (1753) 726.

Dolichos bulbosus Linn. l. c. ed. 2 (1763) 1021.

Pachyrrhizus angulatus Rich. ex DC. Prodr. 2 (1825) 402; Blanco Fl. Filip. ed. 2 (1845) 405, ed. 3, 2:380; Miq. Fl. Ind. Bat. 1[1] (1855) 191; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 207; F.-Vill. Nov. App. (1880) 65; Vid. Rev. Pl. Vasc. Filip. (1886) 110; Naves in Blanco Fl. Filip. ed. 3, *pl. 249;* Oliver in Hook. Ic. Pl. III 9 (1889) *pl. 1842*

Pachyrrhizus jicamas Blanco Fl. Filip. (1837) 579.

Pachyrrhizus bulbosus Kurz in Journ. As. Soc. Beng. 45[2] (1876) 246; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 67.

Cacara erosa O. Kuntze Rev. Gen. Pl. (1891) 165.

LUZON, Province of Bataan. *For. Bur. 1955 Borden, Merrill 3098, For. Bur. 54 Barnes, Bur. Sci. 1611 Foxworthy:* Province of Rizal, *For. Bur. 3324 Ahern's collector:* Manila, *McGregor 65.* PANAY, *Yoder 31.*

Almost universally known in the Philippines as *sincamas*, ex Blanco also *hicamas*.

A species now widely distributed in the Tropics of the world, probably of American origin; thoroughly naturalized in the Philippines and very abundant.

The oldest generic name is *Cacara* (Rumph.) Thou. (1805), but *Pachyrrhizus* Rich. (1825) is here retained in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

90. PSOPHOCARPUS Neck.

1. **Psophocarpus tetragonolobus** (Linn.) DC. Prodr. 2 (1825) 403; Miq. Fl. Ind. Bat. 1[1] (1855) 181; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 211; F.-Vill. Nov. App. (1880) 66; Perk. Frag. Fl. Philip. (1904) 90.

Dolichos tetragonolobus Linn. Sp. Pl. ed. 2 (1763) 1020; Blanco Fl. Filip. (1837) 576, ed. 2 (1845) 402, ed. 3, 2:374; Naves l. c. ed. 3, *pl. 293.*

Botor tetragonoloba O. Kuntze Rev. Gen. Pl. (1891) 162.

LUZON, Province of Cagayan, *Bolster 183, For. Bur. 16605, 16759 Curran:* Province of Pangasinan, *Bur. Sci. 4860, 4864 Ramos:* Province of Bataan, *Merrill 3313:* Manila, *Merrill 646, McGregor 47, 50.* MASBATE, *Merrill 3401.* PALAWAN, *For. Bur. 3614 Curran.* NEGROS, *For. Bur. 13659 Curran.*

Native names: *Cigarrillos* (widely used); *scgadella* (Negros); *amelc* (Cagayan); *calamismis, pal-lam,* ex Blanco.

Widely distributed in the Philippines, cultivated and naturalized; probably introduced. India to Malaya, etc., frequently cultivated.

PSOPHOCARPUS PALUSTRIS Desv. has been reported from the Philippines by F.-Villar (Nov. App. 66), but I have seen no specimens.

The generic name *Psophocarpus* Neck. (1790), is retained instead of *Botor* Adans. (1763), in accordance with the list of *nomina conservanda* of the Vienna Botanical Congress.

EXCLUDED GENERA.

In the "Novissima Appendix" to the third edition of Blanco's "Flora de Filipinas," F.-Villar enumerates the following six species, representing six different genera. I have seen no Philippine representatives of any of these genera, and they are accordingly here excluded.

ACROCARPUS FRAXINIFOLIUS Wight; F.-Vill. Nov. App. (1880) 74. Known from India and Sumatra.

CICER ARIETINUM L.; F.-Vill. Nov. App. (1880) 62. Said by F.-Villar to be cultivated in Luzon and Panay. If the species occurs in the Philippines at all, then it will be only as an introduced plant.

DIALIUM LAURINUM Baker; F.-Vill. Nov. App. (1882) 351. A species of the Malay Peninsula.

MECOPUS NIDULANS Benn.; F.-Vill. Nov. App. (1880) 61. Burma to Malaya.

NEPTUNIA OLERACEA Lour.; F.-Vill. Nov. App. (1880) 73. Cosmopolitan in the Tropics. The specimen cited, *Cuming 2352*, was from Malacca, not from the Philippines.

PAROCHETUS COMMUNIS Ham.: F.-Vill. Nov. App. (1880) 58. India to southern China and Java.