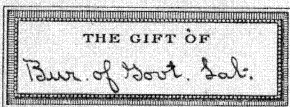
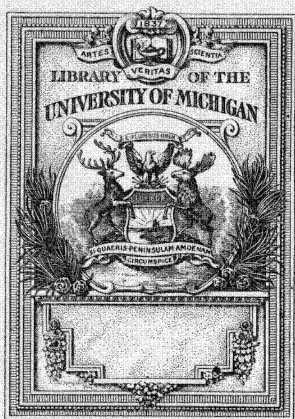
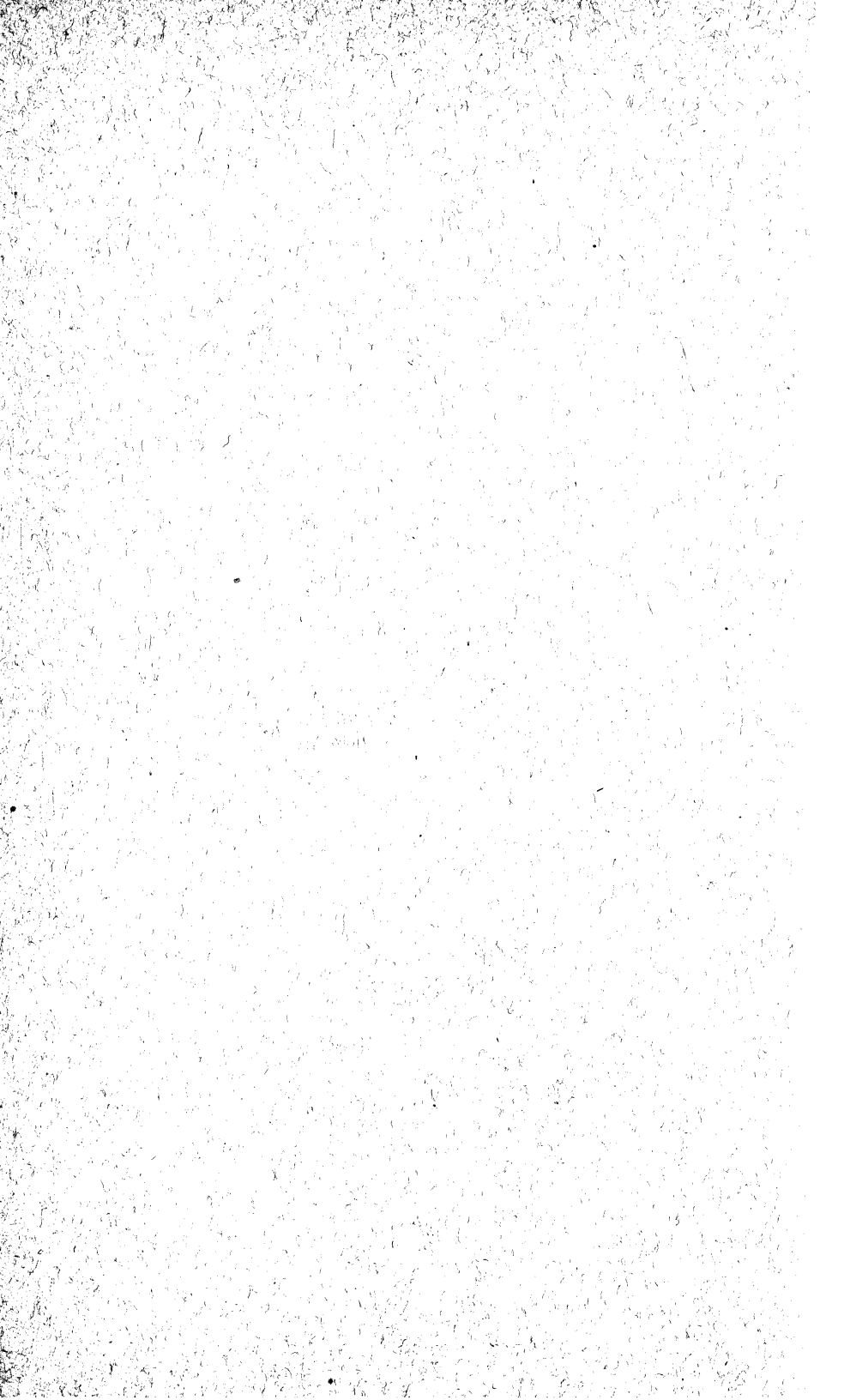


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No. 29.—SEPTEMBER, 1905

DEPARTMENT OF THE INTERIOR
BUREAU OF GOVERNMENT LABORATORIES

I. NEW OR NOTEWORTHY PHILIPPINE
PLANTS, III

II. THE SOURCE OF MANILA ELEMI

BY

ELMER D. MERRILL, BOTANIST

MANILA
BUREAU OF PUBLIC PRINTING
1905

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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. Pinta (Paño Blanco). By Paul G. Woolley, M. D. *Chemical Laboratory*: IV. Notes on Analysis of the

(Continued on third page of cover.)

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1905



LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF GOVERNMENT LABORATORIES,
OFFICE OF THE SUPERINTENDENT OF LABORATORIES,
Manila, P. I., December 1, 1904.

SIR: I have the honor to transmit herewith and recommend for publication two articles: (1) New or Noteworthy Philippine Plants, III; (2) The Source of Manila Elemi; by Elmer D. Merrill, Botanist.

Very respectfully, RICHARD P. STRONG,
Director Biological Laboratory,
Acting Superintendent Government Laboratories.

HON. DEAN C. WORCESTER,
Secretary of the Interior, Manila, P. I.

I. NEW OR NOTEWORTHY PHILIPPINE PLANTS, III.

By ELMER D. MERRILL, *Botanist*.

Two previous articles have been published under this title, Bureau of Government Laboratories publications 6 and 17, the third and present paper having been prepared as material and data became available. In order to facilitate reference to the preceding papers, a full index to all species considered in the three publications has been included in the present one.

PANDANACEÆ.

Sararanga philippinensis, sp. nov.

An erect tree 6 to 8 m. high, branched at the top, the inflorescence a long compound panicle 100 to 120 cm. long. Leaves about 2 m. long, 7 cm. wide, the margins stoutly antrorsely toothed throughout, the midrib beneath antrorsely toothed, above glabrous. Axis and branches of the inflorescence densely grayish stellate pubescent throughout. Flowers unknown. Fruit yellowish, glabrous, 6 to 8 mm. wide, 5 mm. long, subreniform, sulcate between the pyrenes when dry, subtended by a discoid entire or slightly lobed calyx-like bract, sessile, the stigmas small, about 16, arranged in two parallel rows along the median portion of the fruit. Pyrenes 3 mm. long, 2 mm. wide, thin, broadly ovate, both ends rounded, about 16 in each fruit, arranged in two parallel rows.

Type specimen No. 749. (H. N. Whitford.) Tinuan River, Province of Tayabas (Infanta), Luzon, September 4, 1904. Growing in forests along the seashore at 3 to 5 m. above the sea.

This genus was based on a single species from New Guinea, and the discovery of a second species in the Philippines is of special interest.

Pandanus pallidus, sp. nov. § *Sussea*.

A small shrub 2 m. high or less, with elongated leaves, which are gradually narrowed upward to the long, slender, acute, scarcely acuminate apex, the fruits globose, 4 to 5 cm. in diameter, dull white when mature, 5 to 7 crowded in a dense, erect raceme about 24 cm. long. Trunk erect,

5 cm. in diameter, the bark smooth, dull gray, somewhat scaly, the branches 3 to 5, terminating the trunk, ascending. Leaves 1 to 1.2 m. long, 3 to 4 cm. wide below, gradually narrowed upwards to the apex, the margins antrorsely toothed throughout, the midrib on the upper surface glabrous, beneath with scattered antrorse teeth or in part glabrous, the lateral nerves on the upper surface sparingly antrorsely toothed in the upper part of the leaf, beneath glabrous. Raceme 25 cm. long or less, erect, the heads crowded, short pedunculate, each subtended by a broad bract, the lower bracts acuminate, exceeding the raceme, the upper ones much shorter, triangular acute, the margins and midrib finely serrate toothed. Drupes closely packed, about 75 in each fruit, obovate, irregularly 5 to 6 angled, 1.5 cm. long, 0.8 to 1.2 mm. thick above, tapering from near the apex to the cuneate base, the apex abruptly rounded or convexly subpyramidal, striate, the stigmas plane, 2 mm. in diameter, the loculi 2 to 4 in each drupe.

Type specimen No. 5840 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, March, 1904. Growing in open grass lands along streams in the pine region, not common. Staminate flowers were observed by the collector in July, but could not be preserved.

***Pandanus caudatus* sp. nov. § *Keura*.**

A tree 7 to 8 m. high, with solitary, pendant, subglobose or ellipsoid fruits about 17 cm. long, the leaves tapering above to the slender caudate-acuminate apex. Trunk 25 cm. in diameter, with yellowish bark, beset with small scattered conical spines, the aerial roots wide spreading, 2 to 3 m. long, the few short branches crowded at the apex of the trunk. Leaves 1.2 to 1.8 m. long, about 5 cm. wide, the margins antrorsely toothed throughout, the midrib above glabrous, beneath finely antrorsely toothed, the two lateral nerves antrorsely toothed on the upper surface for the upper third of the leaf, the caudate apex antrorsely toothed, about 6 cm. long. Fruit yellowish red, fragrant, about 17 cm. long, nearly as thick, with 60 or 70 or more drupes, the peduncle about 30 cm. long. Drupes about 6 cm. long, 2.5 to 3 cm. thick, irregularly 4 to 6 angled, obovate, tapering below to the nearly cuneate base, scarcely or slightly narrowed at the apex which is truncate, flattened, the apex about 1.5 cm. wide, and 3 cm. long, sulcate, the sulci between the loculi about 5 mm. deep; loculi irregularly disposed, 10 to 12 in each drupe, their apices irregular convexly conical; stigmas 1 to 2 mm. in diameter, more or less oblique.

Type specimen No. 6143 (A. D. E. Elmer), Sablan, Province of Benguet, Luzon, April, 1904. Not common, in thickets along streams.

***Pandanus simplex* sp. nov. § *Brayantia*.**

An erect, unbranched tree about 6 m. high, the leaves about 3 m. long and 11 cm. wide, the fruit solitary, cylindrical or subglobose, about 9 cm. in diameter. Margins of the leaves toothed, the teeth below, stout and distant 2 to 3 cm., above small and close, the midrib beneath with scattered teeth, above glabrous. Peduncle stout, triangular, 3 to 3.5 cm. thick. Drupes 1-celled, 3 cm. long, about 1 cm. thick, many, obovoid, the basal portion 2 cm. long, compressed, angular, narrowed below, the apical portion angular, subpyramidal, the tip smooth and rounded, scarcely truncate. Stigma plain, sessile, sublateral, about 2 mm. in diameter.

Type specimen No. 782 (Whitford), Tinuan River, Province of Tayabas (Infanta), Luzon, September 6, 1904. Growing on hilltops at an elevation of about 150 m. Locally known as *Calaquinay*. Perhaps most closely related to *Pandanus conoideus* Lam., from the Moluccas.

GRAMINEÆ.

Agrostis elmeri sp. nov.

A weak, erect, tufted, glabrous, perennial grass about 40 cm. high, with linear, flat leaves, more or less contracted panicles about 20 cm. long, subequal empty glumes and awnless flowering glumes, the palea equaling the glume in length. Culms slender, the nodes glabrous. Sheaths about equaling the internodes, glabrous. Ligule 3 to 4 mm. long, minutely scabrid, entire, obtuse, or slightly lacerate in older specimens. Leaves about 10 cm. long, 3 mm. wide, the cauline ones similar in shape and size to the radical. Panicles greenish, the rachis glabrous, the branches minutely scabrous; branches ascending, subverticillate, 5 to 7 cm. long, the pedicels scabrous, 3 mm. long, filiform, thickened at the base of the spikelet. Empty glumes subequal, lanceolate, acute or slightly acuminate, 2 mm. long, 0.8 mm. wide (when spread), the keel scabrous, the margins minutely so. Flowering glume 1.6 mm. long, acute, awnless, glabrous. Palea equaling the flowering glume. Anthers 0.5 mm. long.

Type specimen No. 6558 (A. D. E. Elmer), Mount Santo Tomas, Province of Benguet, Luzon, July 1, 1904. This species grows on the open, grassy slopes of the mountain, at an altitude of 2,000 m. and above, forming tufts, the weak stems often more or less reclining. *Agrostis elmeri* is according to Hackel, to whom specimens were sent, very closely related to *Agrostis perennans* Tuck., a species of the northeastern United States. No species of the genus has previously been reported from the Philippines.

Dinochloa diffusa (Blanco) Merrill, Govt. Lab. Publ. 27:93. 1905. (*Bambusa diffusa* Blanco, Fl. Filip. ed. 1, 289; ed. 2, 187; ed. 3, 1:334. *Dinochloa dielisiana* Pilger in Perkins Frag. Fl. Philip. 149: 1904; at least in part, Nos. 1408 and 2550 Merrill.)

This species was reduced by Fernandez-Villar¹ to *Schizostachyum acutiflorum* Munro, which is apparently an error. The species here considered to represent Blanco's *Bambusa diffusa* is very abundant throughout the region from which Blanco received his material, and as it apparently produces flowers at least once a year it is very doubtful whether Blanco overlooked it. On account of its diffuse and often somewhat spiny branches it is much used by the natives for making rough brush fences about their clearings as noted by Blanco. It is represented by the following specimens, all from the Island of Luzon: Province of Bataan, Lamao River, Mount Mariveles: No. 2550 (Merrill), June, 1903; No. 3297 (Merrill), October, 1903; No. 519 (Whitford), July, 1904; No. 1261 (Forestry Bureau), collected by Borden, July, 1904. Province of Zambales, No. 388 (Forestry Bureau), collected by Maule, March, 1904. Province of Pampanga, Arayat,

¹ Nov. App., 324.

No. 1408 (Merrill), March, 1903. Province of Benguet, Mount Santo Tomas, No. 6566 (Elmer), July, 1904.

***Coelachne hackeli* sp. nov.**

A low, spreading grass, rooting in the mud and forming dense mats in shallow water, the flowering branches 3 to 5 cm. high, with much reduced few flowered spike-like inflorescence 1 to 1.5 cm. long, scarcely exerted from the upper sheaths, the empty glumes slightly ciliate at the apex, the flowering glumes pubescent, at least in the lower third. Stems prostrate, rooting at the nodes, the nodes bearded. Sheaths about 1 cm. long, glabrous, those on the flowering branches overlapping; ligule obsolete; leaf blades 1 to 1.5 cm. long, 2 mm. wide or less, acuminate, slightly scabrous above. Panicles slightly purplish, the few branches erect, appressed, 2 to 4 mm. long, each with 2 to 4 spikelets. Spikelets 2-flowered, 2.5 mm. long; empty glumes ovate, obtuse or subtruncate, slightly ciliate at the apex, one somewhat larger than the other, 1 to 1.2 mm. long. Flowering glumes 2 mm. long, 1.2 mm. wide, acute, sparingly pubescent on the back, at least in the lower third. Palea about equaling the glume, glabrous. Seed 1 mm. long. Upper spikelet sterile.

Type specimen No. 5752 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, March, 1904. Forming dense floating mats on stagnant or slowly running water.

Specimens of this plant were forwarded to Dr. E. Hackel, of Graz, Austria, who pronounced it to be an undescribed species of *Coelachne*, most closely related to *Coelachne pulchella* R. Br., var. *simpliuscula* (Munro) Hook. f., and kindly supplied the author with specimens of the latter variety. As Dr. Hackel points out, the species here proposed differs from the above variety in its larger spikelets, ciliated tips of the empty glumes, and pubescent flowering glumes. Two species of this genus, *Coelachne pulchella* R. Br., and *C. brachiata* Munro, are credited to the Philippines by F.-Villar,¹ but the record in the case of both species needs verification.

MORACEÆ.

***Ficus propinqua* sp. nov. § *Eusyce*.**

A scandent species, the stem 2.5 cm. in diameter or less, with ovate-oblong, cordate, acuminate leaves, villous beneath, and axillary glabrous receptacles. Stems dark brown, the branchlets reddish-brown, densely villous with yellowish-brown hairs. Leaves 9 to 12 cm. long, 3.5 to 6 cm. wide, coriaceous, glabrous and shining above, beneath the midribs and nerves densely fulvous-villous, the reticulations with few scattered similar hairs, the margins recurved, the base broad, 5-nerved; lateral nerves about 6 pairs, very prominent beneath, apex narrowed gradually to the slender, short acumen; petioles densely fulvous-villous, 1.5 cm. long; stipules thin, brown, subpersistent, ovate-lanceolate, acuminate, 2.5 cm. long, 1 cm. wide, glabrous, except the slightly villous midrib above. Receptacles shortly peduncled, 1 to 3, in the axils of the leaves, subglobose,

¹ Nov. App., 321. 1883.

the apex slightly depressed, glabrous, about 1 cm. in diameter, golden-yellow when mature, the bracts 2 mm. long or less. Fertile female flowers sessile or pedicelled, the perianth of four free, brown, lanceolate segments, 2 to 2.5 mm. long, which exceed the ovary, which is oblong-elliptical, 1.5 mm. long, slightly compressed and keeled, the style short. Male and gall flowers not seen.

Type specimen No. 6521 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, June, 1904.

A species apparently closely related to *Ficus villosa* Blume, from the Malayan region, differing especially in its entirely glabrous receptacles.

***Ficus gigantifolia* sp. nov. § *Eusyce*.**

A tree about 12 m. high, with broadly ovate, cordate, bluntly acute, subcoriaceous, glabrous leaves, 42 cm. long or less, the receptacles solitary, axillary, on the ultimate branchlets. Branches glabrous, annular, the ultimate branchlets somewhat thickened, the leaf scars prominent. Leaves alternate, 20 to 42 cm. long, 16 to 23 cm. wide, shining above; nerves about 14 on each side of the midrib, prominent beneath, spreading, curved upwards; petioles stout, glabrous, 2 to 4 cm. long. Receptacles globose, 2 to 2.5 cm. in diameter, glabrous, each subtended by three glabrous, ovate, acuminate bracts, 8 mm. long, 6 mm. wide. Male flowers about 3 mm. long, few and only near the umbilical scales, the perianth of five free, subequal, brown segments, 2 to 2.5 mm. long, exceeding and inclosing the stamens. Stamens, 2; filaments very stout, the anthers 0.8 mm. long. Gall flowers 3 to 6 mm. long, sessile, pedicelled, the perianth of five free subequal segments 2 to 2.5 mm. long, exceeding and inclosing the ovary. Ovary ellipsoid, 1.2 mm. long, the style sublateral, bifid, 1.5 mm. long.

Type specimen. No. 1728 (Forestry Bureau), collected by W. W. Clark, Burias Island, June, 1904; also Nos. 392 and 606 (G. P. Ahern), Province of Zamboanga, Mindanao, 1901.

This tree reaches a diameter of 45 cm., growing on forested slopes, but little above the sea level. The bark is gray, smooth, and about 1 cm. thick. It is known to the Bicolis of Burias as *Talitigang* and to the Moros of Zamboanga as *Marang-marang*.

***Ficus elmeri* sp. nov. § *Sycidium*.**

A shrub 3 or 4 m. high, hispid throughout, with very unequal sided, ovate, falcate, abruptly short acuminate, slightly dentate leaves 10 cm. long or less, the receptacles fasciculate on very short branchlets on the branches below the leaves. Branches brownish, densely pubescent. Leaves 5 to 10 cm. long, 3 to 6 cm. wide, the base strongly semisaggitate, on one side of the midrib oblique, on the other with a large, rounded lobe, with about 5 radiating nerves, both surfaces harsh, hispid pubescent, the lower surface very densely so; nerves excluding basal, 6 to 7 on each side of the midrib, rather prominent, the reticulations subparallel; petioles densely hispid pubescent, 1 cm. long. Branchlets bearing the receptacles, from the ultimate branches, 2 to 3 cm. long, simple, densely pubescent, each with few, 3 to 6, receptacles. Receptacles slightly narrowed at both ends, yellow to brick red, about 1.5 cm. long, glabrous. Male flowers few,

immediately below umbilical scales, the perianth of three distinct subequal segments, 2 to 3.5 mm. long, exceeding and enveloping the single stamen; filament 1.5 mm. long; anther 1 mm. long. Gall flowers about 3 mm. long, pedicellate the perianth of four unequal, free segments, 2 to 2.5 mm. long, enveloping and exceeding the ovary, which is 1.5 mm. long, the style sublateral less than 1 mm. long.

Type specimen No. 6643 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, March, 1904.

A species closely related to *Ficus semicordata* Miq., from Celebes, differing from that species in its short peduncled receptacles, which are differently disposed, smaller; more numerous nerved leaves, few male flowers, and other characters.

***Ficus elmeri*, var. *subintegra* Merrill, sp. nov.**

A species similar to the type in general appearance, shape, and size of the leaves, etc., differing in its harsh, but not pubescent, nearly entire leaves, and reddish, glabrous branches.

Type specimen No. 6317 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, May, 1904. A shrub about 5 m. high.

***Ficus benguetense* sp. nov. § *Sycidium*.**

A shrub or small tree 3 to 10 m. high, with ovate, lanceolate, acuminate, glabrous, submembranous leaves, and axillary, peduncled subglobose or somewhat pyriform, glabrous, axillary receptacles, 1 to 1.5 cm. long. Branches dark brown, glabrous, the branchlets strigose pubescent. Leaves submembranous, 8 to 14 cm. long, 4 cm. wide, tapering above to the blunt acumen, and below to the inequilateral base, one side of the lamina acute at the base the other more or less rounded, both surfaces smooth, the lower densely punctate; nerves about 8 on each side of the midrib, curved, ascending, prominent, somewhat anastomosing, the reticulations rather dense, valid; petioles 1 to 2 cm. long, slightly strigose pubescent, the stipules ovate, lanceolate, acuminate, 6 mm. long, slightly pubescent. Receptacles solitary or two or three from the same axil, glabrous, when fresh with few scattered whitish tubercles, yellowish when mature, the peduncles 3 to 8 mm. long, glabrous or slightly pubescent, the three ovate, acute bracts at the base of the receptacle, glabrous, about 3 mm. long. Male flowers only near the ostiole, 3 mm. long, short pedicelled; the perianth of three distinct, brown segments about 1.5 mm. long, about equaling the thickened filament. Stamen 1, the anther nearly 1 mm. long, just exerted from the perianth. Gall flowers pedicelled, the ovary subglobose, about 1.5 mm. in diameter, the style sublateral, very short, the segments of the perianth short, not, or but slightly, inclosing the ovary.

Specimens examined all from the Province of Benguet, Luzon: Baguio, Nos. 5847, 5789, 6038 (Elmer), March, 1904; Nos. 926 and 944 (Forestry Bureau), collected by Barnes, May-June, 1904; No. 1059 (Merrill), January, 1903; Sablan, No. 6111 (Elmer), April, 1904.

Apparently very common in Benguet, growing in ravines and along streams. Among the numerous specimens of *Ficus* at present in the herbarium from various portions of the Archipelago there are none from the other localities closely related to this species.

***Ficus angustissima* sp. nov. § *Sycidium*.**

A shrub, with linear, slightly scabrous leaves, 10 to 25 cm. long, and 8 mm. wide or less, and axillary, short peduncled, subglobose, glabrous receptacles, 8 to 10 mm. in diameter. Branches slender, light gray, glabrous, the ultimate branches more or less hispid, scabrous. Leaves alternate or opposite, pale beneath, shining, the apex attenuate, blunt acuminate, the base acute, slightly inequilateral; nerves very many, spreading at right angles from the midrib, at intervals of 2 or 3 mm; petioles 5 to 10 mm. long. Receptacles solitary, pale when dry. Fertile female flowers only seen, sessile or pedicelled, the perianth segments inclosing and usually exceeding the ovary, rather copiously ciliate with long white hairs. Ovary subellipsoid, 1 to 1.3 mm. long, the style lateral, filiform, 1 to 1.5 mm. long.

Type specimen No. 2696 (Merrill), Bosoboso, Province of Rizal, Luzon, June, 1903. A most distinct species, at once recognized by its very narrow elongated leaves.

***Ficus bordeni* sp. nov. § *Synoccia*.**

A scandent shrub, with narrowly ovate or oblong ovate, acuminate, cordate, slightly scabrous leaves, 13 cm. long or less and subglobose receptacles, 5 to 6 cm. in diameter. Branches slender, appressed to the trunk of the supporting tree, freely rooting, light brown, striate, glabrous, or sparingly strigose pubescent. Leaves 8 to 13 cm. long, 3 to 5.5 cm. wide subcoriaceous, slightly rough, but not at all pubescent, the under surface tessellate, the apex short acuminate, the base somewhat cordate, rarely only rounded; nerves about 8 on each side of the midrib, ascending, prominent beneath; petioles 1 to 2 cm. long, ferruginous scaly. Receptacles brown, very sparingly strigose, pedunculate. Male flowers numerous, 8 to 9 mm. long, the pedicel about 4 mm. long, the perianth brown, 1.5 mm. long, of three narrow distinct segments, the single stamen long exserted; filament 3 mm. long; anther 1.5 mm. long. Gall flowers numerous, the pedicel long or short; ovary 2 to 2.5 mm. long; the style 1 mm. long.

Type specimen No. 1211 (Forestry Bureau), collected by T. E. Borden, Lamao River, Province of Bataan, Luzon, June, 1904. A vine in the hill forests at an altitude of about 650 m. above the sea.

***Ficus chrysolepis* Miq. var. *longipedunculata* var. nov. § *Urostigma*.**

A form strongly resembling the type, differing in its longer petioles, 3 to 4.5 cm., longer peduncles, 2.5 to 3 cm., nearly glabrous stipules and smaller, slightly obovoid receptacles, 2.5 to 3 cm. in diameter.

Type specimen No. 6176 (A. D. E. Elmer), Sablan, Province of Benguet, Luzon, April, 1904. A tree about 7 m. high. *Ficus chrysolepis* Miq., is known only from Celebes.

***Ficus palauanense* sp. nov. § *Urostigma*.**

A medium-sized or large tree, 15 m. high or more, with coriaceous, glabrous, slightly cordate, ovate elliptical, acuminate leaves, 2 to 2.5 cm. long. Branches thickened, subannular at the leaf scars, grayish-brown, glabrous, the tips densely pubescent, the leaf scars prominent. Leaves 20 to 27 cm. long, 6 to 13 cm. wide, entirely glabrous, except the slightly

pubescent nerves beneath, the upper surface shining, the lower surface dull, the apex abruptly sharp acuminate, the acumen 1 to 1.5 cm. long, narrowed below to the rounded, cordate base, the sinus sharp, very narrow, shallow; nerves from the base five, the inner ones ascending, lateral nerves about 12 on each side of the midrib, curved, ascending, very prominent beneath, anastomosing in a submarginal nerve, the primary reticulations lax, prominent, the secondary fine; petioles 2.5 to 3.5 cm. long, slightly pubescent, becoming glabrous. Receptacles near the tips of the branchlets, bright red, the umbilicus obscure, bracts green, orbicular-ovate, rounded, about 8 mm. in diameter, coriaceous, glabrous. Male flowers few, only near the ostiole, 3 to 4 mm. long, the perianth of three broad, unequal segments inclosing the single stamen, the anther sessile, 1.2 to 1.4 mm. long. Gall flowers 4 to 5 mm. long, the perianth of the three subequal free segments about 3 mm. long, closely investing the ovary, which is ovoid, about 2 mm. long, the style subterminal, 2 mm. long or less. Fertile female flowers similar to the gall flowers, but usually sessile, the style much longer.

Type specimen No. 761 (Merrill), Ewiig River, Island of Paragua (Palauan), February 15, 1903. A tree growing in the forests along the river bank at an altitude of about 100 m. above the sea.

CARYOPHYLLACEÆ.

***Stellaria laxa* sp. nov. § *Eustellaria*.**

A diffuse, prostrate, spreading plant, rooting at the nodes, the leaves, young branches, and inflorescence densely, or only slightly stellate pubescent. Stems glabrous or with few stellate hairs, shining, 60 to 80 cm. long, branched, forming large, lax mats, the flower bearing branches suberect, 25 cm. long or less. Leaves thin, ovate-lanceolate, or lanceolate, acuminate, rounded at the base, sometimes acute, sessile or nearly so, 10 to 30 mm. long, 4 to 10 mm. wide; nerves faint, about 5 or 6 on each side of the midrib, the reticulations very lax, obscure. Cymes on slender peduncles, axillary, few (3 to 6) flowered; the pedicels 1 to 1.5 cm. long, the bracts lanceolate, acuminate, pubescent, 3 mm. long or less. Flowers white, about 8 mm. in diameter. Sepals 5, free to the base, lanceolate, acuminate, 4 mm. long, 1.5 mm. wide, 3-nerved, glabrous or with few stellate hairs. Petals 5, membranaceous, about 4 mm. long, cleft nearly to the base, the segments 0.5 to 0.8 mm. wide, obtuse. Stamens 10, hypogynous; filaments filiform, 2 to 3 mm. long; anthers 0.4 mm. long. Ovary 1-celled; styles three, 1.5 mm. long. Capsule about 5 mm. long, slightly exceeding the calyx, 6-valved. Seeds few, 5 to 6, light brown, minutely tubercled or reticulate, 1.5 to 1.8 mm. long.

Type specimen No. 6612 (A. D. E. Elmer), Kias, Province of Benguet, Luzon, June, 1904.

Another species of this genus, *Stellaria saxatilis* Hamilt., has been found in northern Luzon, No. 1623 (Loher), according to the manuscript list of identification of his collection made at Kew.

MAGNOLIACEÆ.

Talauma grandiflora sp. nov.

A small tree about 7 m. high, with oblong lanceolate or ovate lanceolate, acuminate, glabrous, subcoriaceous leaves, solitary fragrant flowers 9 to 10 cm. long, and ovoid or ellipsoid fruit of about the same length. Branches dark brown, striate, glabrous, or with few appressed hairs, the terminal bud densely appressed pubescent. Leaves 15 to 27 cm. long, 6 to 9 cm. wide, both surfaces shining, the base acute, the acumen short, blunt; nerves 15 to 18 pairs, prominent, the reticulations rather dense, prominent; petioles glabrous, or with few appressed hairs, 12 to 18 mm. long. Flowers before opening ovoid, obtuse, 4.5 cm. in diameter on an annulate pubescent peduncle 2 cm. long, 7 mm. thick. Sepals 3, ovate or obovate, obtuse, 9 cm. long, 5 to 6 cm. wide, glabrous, or at first slightly pubescent, and densely so at the very base. Petals 6, in two whorls, the outer ones obovate, 9 cm. long, 5 to 5.5 cm. wide, glabrous, obtuse, fleshy, the inner ones thicker and narrower. Ovaries 2 ovuled; styles pubescent. Anthers sessile, about 15 mm. long. Ripe fruit 9 to 10 cm. long, 6 cm. thick, obtuse, glabrous, the individual carpels about 75 in each fruit, 2.5 to 3 cm. long, the beak terminal, 5 mm. long.

Type specimen No. 314 (Forestry Bureau), collected by J. A. Gammill, Nagaba, Guimaras Island, February, 1904; No. 861 (Forestry Bureau), collected by Gammill, same locality, June, 1904, is the same. A small tree reaching a diameter of 15 cm., growing in dry soil at an elevation of about 200 m. above the sea, the trunk straight, cylindrical, 2 m. to the first branches, the branches ascending, bark gray, wood white. V., *Tabhisan*.

ANONACEÆ.

Goniothalamus elmeri sp. nov.

A shrub 3 or 4 m. high, with oblong, narrowly oblong or rather broadly oblanceolate abruptly blunt acuminate glabrous leaves, and solitary axillary pendulous, dull red flowers, the style cylindrical, the stigma minutely and equally 2-toothed. Branches light brown or grayish, striate, glabrous. Leaves 12 to 18 cm. long, 4 to 6 cm. wide, subcoriaceous, the base acute; nerves 12 to 15 on each side of the midrib, not prominent, the reticulations lax, obscure; petioles glabrous, rugose, 5 mm. long. Flowers 3 cm. long, solitary, from the axils of fallen leaves, their pedicels 1.5 cm. long, nearly glabrous, or with very few scattered appressed rufous hairs, and with 4 to 6 pairs of small distichous, ovate, acute, sparingly rufous pubescent bracts 2 mm. long or less, near the base of the pedicel. Sepals broadly ovate or suborbicular, obtuse, about 1 cm. long, very slightly pubescent with appressed, scattered, rufous hairs. Petals with very few appressed, scattered, rufous hairs, the outer ones ovate, acute, 3 cm. long, 15 to 18 mm. wide, the keel scarcely evident; inner petals broadly ovate, acute, 1 cm. long, the keel slightly evident. Stamens numerous, 3 mm. long, the apical appendage orbicular, 0.5 mm. long. Ovaries indefinite,

1-ovuled, oblong, about 2 mm. long, densely rufous pubescent in part, one side glabrous; style slender, glabrous, 3 mm. long; stigma slightly bifid.

Type specimen No. 6105 (A. D. E. Elmer), Sablan, Province of Benguet, Luzon, April, 1904. Apparently also represented by Nos. 277 and 324 (H. N. Whitford), Lamao River, Province of Bataan, Luzon, May, 1904. A shrub or small tree growing in the hill forests.

***Orophea glabra* sp. nov.**

A small tree about 10 m. high, with ovate-lanceolate, acuminate, glabrous leaves, solitary, yellow, odorless flowers about 1 cm. long with 9 to 12 stamens, the ripe carpels globose. Branches slender, brown or brownish gray, glabrous, the ultimate branchlets with very few scattered ferruginous hairs. Leaves membranous, 5 to 10 cm. long, 2 to 4 cm. wide, the apex slender acuminate, the base acute; nerves about 6 on each side of the midrib, not prominent, the reticulations very lax; petioles glabrous, 1 to 2 mm. long. Flowers axillary, the pedicels about 5 mm. long, rusty pubescent and with 4 to 5 alternate distichous bracts 1 mm. long or less. Sepals red, broadly ovate or suborbicular, blunt, about 1 mm. long, the margins rusty pubescent. Outer petals broadly obovate or suborbicular, glabrous, except the pubescent margins, 3.5 mm. long, 3 mm. wide. Inner petals 9 cm. long, the claw 4 mm. long, the lamina trapezoidal 5 mm. long, 4 mm. wide, glabrous except the cohering margins above which are pubescent. Stamens 9 or 12, 0.6 to 0.8 mm. long, the connective with a short, conical, apical point. Ovaries 6 to 7, each 2-ovuled, ellipsoid or oblong, 1 mm. long, sparingly pubescent, the stigmas sessile, subglobose or oblong. Carpels (immature) globose, smooth and shining, 8 mm. in diameter.

Type specimen No. 1017 (Forestry Bureau), collected by W. W. Clark, Island of Ticao, May 31, 1904. A small tree reaching a diameter of about 15 cm., growing in open hill forests, the timber being used for rafters and frames in house construction, common in Ticao and known to the Visayans as *Lanutan*, a name commonly applied to many different species of the *Anonaceæ*. A species apparently most closely related to *Orophea uniflora* Hook. f. et Thoms., a species of British India.

***Uvaria stellata* sp. nov.**

A stout scandent shrub with subcoriaceous, entirely glabrous oblong, acuminate or nearly acute leaves, and solitary, axillary or subterminal dark-red flowers 4 cm. in diameter, the petals outside, densely fulvous lepidote-stellate pubescent. Branches dark, nearly black when dry, striate, glabrous. Leaves 12 to 17 cm. long, 5 to 6.5 cm. wide, both surfaces smooth and shining, slightly narrowed to the rounded base, the apex bluntly acuminate; nerves about 15 on each side of the midrib, not prominent, the reticulations lax; petioles rugose, glabrous, thickened, 5 mm. long. Flowers solitary, their pedicels thick, densely fulvous stellate pubescent, about 1 cm. long. Calyx deeply lobed, densely stellate pubescent outside, pubescent inside, the lobes broadly ovate, acute, about 1 cm. long, 1 cm. wide below. Petals ovate or elliptical, the apex rounded,

2 cm. long, 12 to 15 mm. wide, subequal, the outside densely ferruginous stellate-lepidote pubescent, the inside sparingly pubescent with scattered short hairs. Stamens indefinite, the anthers sessile, 3 mm. long, the connective somewhat produced, the apex truncate, somewhat oblique, less than 1 mm. in diameter. Ovaries many, 4 mm. long, ferruginous stellate pubescent, each with 8 to 10 ovules.

Type specimen No. 6322 (A. D. E. Elmer), Twin Peaks, Province of Benguet, Luzon, May, 1904. A species growing in the forests along streams, the flowers with the odor of ripe apples. It is apparently most closely related to *Uvaria ovalifolia* Blume, but is especially characterized by the peculiar stellate-lepidote pubescence of the petals.

MONEMIACEÆ.

Kibara grandifolia sp. nov.

A tree about 5 m. high, with subcoriaceous, broadly ovate leaves 20 to 28 cm. long. Branches yellowish, glabrous. Leaves 11 to 18 cm. wide, the base broadly rounded, the apex obscurely acuminate or subacute, the margins entire below, above more or less coarsely, shallowly toothed or merely undulate, the upper surface smooth and shining, except along the midrib and main nerves, which are more or less pubescent, the lower surface uniformly pubescent with scattered, straight, short hairs; main nerves about 6 or 7 on each side of the midrib, prominent, freely anastomosing, the reticulations lax; petioles stout, about 1.5 cm. long, pubescent. Inflorescence axillary, about 8 cm. long, the axis and branches densely pubescent. Flowers not known. Drupes broadly ellipsoid, obtuse, glabrous, sessile, 1.5 cm. long, about 12 mm. thick, the peduncles of the thickened, pubescent receptacles 3 to 4 cm. long.

Type specimen No. 1158 (Forestry Bureau), collected by Ahern's collector, mountains near Bosoboso, Province of Rizal, Luzon, June, 1904.

LAURACEÆ.

Beilschmiedia glomerata sp. nov.

A tree about 30 m. high, with alternate, broadly ovate, or ovate-elliptical, obtuse, glabrous leaves, and axillary, densely flowered almost spikelike panicles, 2 to 4 cm. long. Branches glabrous, scaly, gray, the tips brownish, the leaf scars numerous, rather prominent. Leaves 11 to 15 cm. long, 5 to 9 cm. wide, subcoriaceous, the base acute or rounded, equal or nearly so, the apex rounded, the upper surface smooth and shining, the lower surface brownish when dry, especially the nerves, which are not prominent, about 9 pairs, the reticulations rather lax; petioles 1.5 to 2 cm. long. Panicles densely pubescent, glomerate, the peduncle nearly obsolete, subtended by many imbricated, suborbicular bracts, the bracts, rhachis, and branches densely pubescent; bracts 5 to 6 mm. in diameter; branchlets 0.5 cm. long. Flowers greenish yellow, slightly fragrant, 5 to 6 mm. in diameter, the pedicles 2 mm. long, pubescent. Calyx 6-lobed, densely pubescent outside, minutely pubescent inside, cleft nearly to the base,

the lobes 3 mm. long, 2 mm. wide, obtuse, 3-nerved. Fertile stamens 9, the anthers 1 mm. long, filament 0.5 mm. long; sterile stamens 3 mm. long, pubescent. Ovary sparingly pubescent, the style simple, 2 mm. long.

Type specimen No. 335 (Forestry Bureau), collected by Barnes, Lamao River, Province of Bataan, Luzon, February, 1904. A tree reaching a diameter of 40 cm., with gray bark and white wood, growing in the hill forests at an altitude of about 100 m. above the sea. T., *Terukan*.

CRASSULACEÆ.

Sedum australis sp. nov.

A slender, succulent, erect or suberect, simple or sparingly branched glabrous biennial (?), from slender roots, with oblanceolate obovate or spathulate leaves 2 cm. long or less, and few (three to seven) flowered terminal, once or twice branched cymes, the flowers 5-partite. Leaves 5 to 20 mm. long, 3 to 6 mm. wide, entire, obtuse, alternate, fleshy. Flowers short pedicelled, the branches of the cyme 1 cm. long or less, each flower subtended by a rosette of three or four reduced leaves, hermaphrodite, golden yellow, 5 to 6 mm. long. Sepals oblong, 2.5 to 4 mm. long, 1 mm. wide, obtuse. Petals 5, ovate-lanceolate, 5 to 6 mm. long, acute or acuminate. Stamens 10, the filaments 5 to 4 mm. long, the anthers elliptical or subglobose, 0.5 mm. long. Carpels 5, ovate, acuminate, 5 mm. long, 2.5 mm. wide, more or less divaricate when mature, marked with few purplish dashes, the style less than 1 mm. long. Seeds 12 to 15 in each carpel, oblong, cylindrical, minutely apiculate, minutely punctate throughout, 0.8 mm. long, 0.3 mm. in diameter.

Type specimen No. 6568 (A. D. E. Elmer), Mount Santo Tomas, Province of Benguet, Luzon, June, 1904. No. 6314 (Elmer), Baguio, Benguet, May, 1904, is the same. A species growing in wet rock crevices, etc., from 1,500 to 2,500 m. above the sea.

No species of this genus has previously been reported from the Philippines, nor is the genus represented in the Malayan region, and therefore the discovery of this species in northern Luzon is especially interesting, as the genus is characteristic of the north temperate zone. A single species, *Sedum formosanum* N. E. Br., is known from the Island of Formosa to the north of Luzon.

SAXIFRAGACEÆ.

Polyosma philippinensis sp. nov.

A small tree, with usually oblong-lanceolate, nearly glabrous, membranous, remotely glandular-toothed, or subentire leaves, and terminal racemes 12 to 20 cm. long. Branches grayish or reddish-brown, striate, glabrous, the tips densely yellowish-brown pubescent. Leaves opposite, 8 to 13 cm. long, 2 to 5 cm. wide, the apex rather slender-acuminate, the base acute, upper surface smooth and shining, the lower glabrous, except the more or less puberulous midrib and nerves, teeth mostly obscure, 1 to 1.5 cm. apart; nerves about 10 on each side of the midrib, spreading,

prominent beneath, anastomosing, the reticulations lax; petioles 1.5 to 3.5 cm. long, densely pubescent, becoming glabrous. Racemes erect, the rhachis pubescent. Flowers 10 to 12 mm. long, numerous, white or slightly pink, faintly fragrant, the pedicels about 2 mm. long, densely pubescent, the bracteoles very small. Calyx 2 to 3 mm. long, pubescent, the teeth 4, acute, less than 1 mm. long. Corolla densely pubescent outside, the petals valvate, 10 to 12 mm. long, 1.5 mm. wide, much recurved above in anthesis. Stamens 4, about 10 mm. long. Ovary inferior, 1-celled, many-ovuled. Fruit immature, 5 to 6 mm. long, pubescent.

Specimens examined, all from Mount Mariveles, Province of Bataan, Luzon: No. 828 (Forestry Bureau), collected by T. E. Borden, June, 1904, flower (type); No. 1509 (Forestry Bureau), Ahern's collector, July, 1904, flower; No. 3877 (Merrill), August, 1904, flower.

A species apparently most closely related to *Polyosma ilicifolia* Blume, from Java and Sumatra, differing especially in its leaf characters, shorter pedicels, etc., reaching a height of about 10 m., growing in dense hill forests at an elevation of from 600 to 800 m. above the sea. No species of this genus has previously been reported from the Philippines.

LEGUMINOSÆ.

Bauhinia kappleri Sagot.

This species is discussed at length by Dr. J. Perkins,¹ having been collected at Arayat, Province of Pampanga, Luzon, by Dr. O. Warburg in the year 1888, No. 13743. As the home of the species is not definitely known, and Dr. Warburg's notes did not show whether the species was cultivated or native at Arayat, Dr. Perkins offered the suggestion that it might be a native of the Philippines. Recently I had an opportunity to collect botanical material at Arayat, and discovered the species in question in a small "barrio" at the foot of Mount Arayat, about one and one-half miles distant from the town, and can definitely state that the plant is not a native of the Philippines, but that it has been introduced from some other country, probably tropical America, and is only cultivated in the Philippines for ornamental purposes, although it is apparently now somewhat spontaneous. The Arayat plant, No. 3934 (Merrill), was in flower, also with immature fruit, in October, 1904, and was observed only in the vicinity of houses. Careful inquiry of the natives brought out the information that the species was to be found only in the town, and that it did not grow on the neighboring mountain, or in the thickets or forests. The residents of the little villiage, where the plant was found, speak the Pampangan dialect, and not one was found who had even a rudimentary knowledge of the Spanish language, yet they have no name for this very striking species other than one of Spanish origin, "Rosas de Francia." In addition to the Arayat locality I also have this species from Manila, a single unnumbered specimen in fruit, collected in November, 1903.

¹ Frag. Fl. Philip., 13. 1904.

Fernandez-Villar¹ erroneously identifies this species with *Bauhinia subrotundifolia* Cav., and the species is figured under this name in the third edition of Blanco's Flora de Filipinas, *pl.* 82. This citation should be added to the synonymy of the species above. While the material on which Cavanilles based his *Bauhinia subrotundifolia* may have been collected in the Philippines, still it is more probable that it was of Mexican origin, although Cavanilles cites Calauan (Province of Laguna, Luzon) and Acapulco (Mexico) as the localities from which he received his material. His description however does not apply to the species here considered.

Blanco does not describe this species in his Flora de Filipinas, and it is scarcely possible that he would have overlooked such a prominent species had it been commonly cultivated in the Philippines at the time when he did his work. It seems probable that the species has been introduced into the Philippines at a comparatively recent date, certainly since Blanco's death in 1845, as even at the present time, although very ornamental, it is not at all common or widely distributed in the Philippines, having been observed by the author but twice, while no other collector other than Warburg has secured specimens in the Philippines.

Millettia piscatoria (Blanco) Merrill, Govt. Lab. Publ., 20:37. 1905.
(*Cylista piscatoria* Blanco, Fl. Filip. ed. 1, 589. 1837; *Galactia* (?)
terminaliflora Blanco, l. c., ed. 2, 411. 1845; ed. 3. 2:390; *Millettia*
splendens F. Vill. Nov. App. 59. 1880, non W. et A.

This species is represented by No. 60 (Whitford), Lamao River, Mount Mariveles, Province of Bataan, Luzon, April, 1904, and No. 473 (Forestry Bureau), Ahern's collector, Antipolo, Province of Rizal, Luzon, April, 1904, both specimens in flower. Blanco's description is quite complete, and according to that author the natives employ the macerated leaves and branches for stupifying fish, whence his specific name. T., *Tubli*.

Millettia merrillii Perkins, Frag. Fl. Philip. 81. 1904.

This species, which reaches a height of 6 or 8 m., is common in the thickets and broken forests in the foothills in central Luzon, and is well represented by *pl.* 79, of the third edition of Blanco's Flora de Filipinas. Accordingly the following synonyms should be added: *Millettia caerulea* F. Vill. Nov. App. 59. 1880, non Baker; *Millettia xylocarpa* Naves, Fl. Filip. ed. 3, *pl.* 79, non Miq. Additional material of this species: No. 3831 (Merrill), Mount Arayat, Province of Pampanga, Luzon, May, 1904 (fruit); Bosoboso, Province of Rizal, Luzon, No. 2673 (Merrill), June, 1903 (fruit); No. 1147 (Forestry Bureau), Ahern's collector, June, 1904 (fruit), and No. 6166 (Elmer), Sablan, Province of Benguet, Luzon, April, 1904 (flower).

Mucuna longipedunculata sp. nov.

A vine reaching a height of 10 or 12 m. or more, with pendant inflorescence, the slender peduncles 1.5 to 4 or 5 m. long, the flowers ivory white, 8 cm. long. Branches slender, brown, appressed pubescent. Leaves trifoliate, about 20 cm. long, the petiole appressed pubescent, 7 cm. long; leaflets 10

¹Nov. App., 72. 1880.

to 12 cm. long, 6 to 8 cm. wide, acuminate, nearly glabrous above, except the somewhat pubescent midrib, hirsute beneath with scattered hairs, the nerves 5 to 6 on each side of the midrib; stipules 2 to 3 mm. long, the stipels 6 to 8 mm. long, subulate. Inflorescence axillary, the flowers crowded at the apex of the much elongated peduncle in a racemose panicle, the flower-bearing portion 15 cm. long or less, the branches about 7 cm. long; pedicels densely pubescent, 1.5 cm. long, three or four from the tip of each branchlet; bracteoles at the base of the calyx very slightly pubescent, green, 2.5 cm. long, 1.5 cm. wide, exceeding the calyx in bud, deciduous. Calyx about 2.5 cm. long, 2 cm. in diameter, densely grayish pubescent but without stinging hairs, the teeth very unequal, the upper one broad, 8 mm. long, the apex emarginate, the lower one very broad, short, also emarginate, the lateral ones broadly ovate, acute or subobtus. Corolla white, the keel 8 cm. long, inflexed at the tip; wings 7 to 7.5 cm. long, 1.5 cm. wide; standard 5 cm. long, 3 cm. wide, the apex rounded.

Type specimen No. 6233 (A. D. E. Elmer), Sablan, Province of Benguet, Luzon, April, 1904, a vine in thickets and forests.

This species is apparently in the section *Carpopogon*, but in the absence of fruits this can not be definitely determined. In his notes Mr. Elmer describes the fruit as a pod 6 inches long covered with brown stinging hairs, but has no notes as to whether or not the pod was smooth or plaited, but is of the opinion that it was smooth. No specimens of the fruit were preserved.

***Pithecolobium parvifolium* sp. nov.**

A shrub or small tree 4 to 6 m. high, with evenly bipinnate leaves, 6 to 12 pairs of pinnae, and 10 to 28 jugate leaflets, the leaflets 5 to 10 mm. long, the terminal pair similar to the others in shape and size. Branches dark brown, striate, more or less pubescent, becoming glabrous. Leaves 8 to 18 cm. long, the rhachis ferruginous pubescent, 6 to 12 cm. long, the petiolar portion 1.5 to 3 cm. long, with a rather prominent sessile gland below each pair of pinnae; pinnae 8 to 10 mm. apart, their rhachises ferruginous pubescent, the upper ones gradually longer, the distal 5 to 8, the basal 2 to 3 cm. long; leaflets 5 to 8, rarely 10 mm. long, 2 to 4 mm. wide, those on the upper pinnae 18 to 28 jugate, on the lower pinnae about 10 jugate, trapeziform, the apex acute or subobtus, the base inequilaterally truncate, the upper and lower margins parallel, the midrib diagonal, shining above, dull and brown beneath, both surfaces with scattered ferruginous hairs; petiolules 0 or very short. Inflorescence a terminal panicle about 15 cm. long, the branches ascending, angular, and with the axis densely ferruginous pubescent. Flowers in small subumbellate corymbs 1 cm. across or less, the peduncles 1 to 2 cm. long, vertically superposed above bracts on the branches and on the axis. Calyx campanulate, 2 mm. long, externally ferruginous pubescent, with 5 short deltoid teeth. Corolla white or yellowish, densely ferruginous pubescent externally, 6 to 7 mm. long, the lobes ovate, acute or subobtus, nearly half as long as the tube. Filaments glabrous, united below into a short tube, the free portions 8 to 9 mm. long. Ovary pubescent, stipitate. Pod spirally twisted, 7 to 9 cm. long, 1 cm. wide, dark red, densely rusty pubescent,

becoming glabrous, dehiscing along the lower suture, more or less sinuate between the seeds on the lower margin. Seeds 5 to 10, ovoid, compressed, 8 mm. long, 6 mm. across.

Type specimen No. 5863 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, March, 1904 (flower); also No. 128 (D. L. Topping), same locality, February, 1903 (fruit); No. 3876 (Merrill), Mount Arayat, Province of Bataan, Luzon, August, 1904 (fruit). No. 3836 (Merrill), Mount Mariveles, Province of Bataan, Luzon, May, 1904, is closely related if not identical.

This species grows in Benguet in thickets along streams in the pine region at an elevation of about 1,700 m. above the sea, and on Mount Mariveles and Mount Arayat on exposed wind-swept ridges near the summit of the mountain in each case. It is apparently related to *Pithecolobium subacutum* Benth., and *P. montanum* Benth., differing from both especially in its very small leaflets.

***Strongylodon elmeri* sp. nov.**

A woody vine with trifoliolate glabrous leaves, the leaflets oblong, acuminate, the flowers in axillary racemes, the axis 20 cm. long or less, the flowers a peculiar dark greenish blue color, 2.5 to 3 cm. long. Stems light brown, striate, glabrous. Leaves 20 to 25 cm. long, the common petiole glabrous, 8 to 9 cm. long, the petiolules 5 to 7 mm. long; leaflets 11 to 17 cm. long, 4 to 6.5 cm. wide, abruptly acuminate, the acumen short, blunt; terminal leaflets with a slightly rounded or subacute base, the lateral ones strongly inequilateral, rounded or truncate at the base; nerves 5 or 6 on each side of the midrib, freely anastomosing. Racemes 20 cm. long or less, the peduncle glabrous, 15 cm. long, the flower-bearing portion 5 to 6 cm. long, the flowers many from each protuberance, forming a rather dense, subglobose inflorescence. Flowers 2.5 to 3 cm. long, their pedicels slender, glabrous, about 3 cm. long. Calyx tubular, slightly inflated, 6 to 9 mm. long, 5 to 6 mm. wide, glabrous, the teeth very short, rounded, the bracts, if present, caducous. Corolla glabrous; standard 2 cm. long, 1.5 cm. wide, strongly reflexed, acute, wings 1.5 cm. long, clawed, the claw 5 mm. long, the blade obtuse, 10 mm. long, 6 mm. wide, slightly attached to the lamina of the keel; keel 2.5 to 3 cm. long, strongly curved, clawed. Ovary pedicellate, densely and minutely pubescent and with 5 or 6 ovules. Pod (immature) fleshy, oblong lanceolate, 5 to 7 cm. long, 2 cm. wide, compressed, the apex with a short, curved apicula.

Type specimen No. 6260 (A. D. E. Elmer), Sablan, Province of Benguet, Luzon, April, 1904.

***Strongylodon caerulea* sp. nov.**

A vine with trifoliolate glabrous leaves about 30 cm. long, the inflorescence an axillary racemose panicle about 20 cm. long, the axis thickened, horizontal, the flowers 3 to 3.5 cm. long, the calyx indigo blue, the corolla light azure blue. Stem about 2.5 cm. in diameter, soft and ropelike, the bark dark brown, rough, the branches light brown, glabrous, striate. Leaves alternate, the common petiole glabrous, 13 cm. long, the petiolules 1 cm. long or slightly less; leaflets ovate, 15 cm. long, 7 to 9

cm. wide, the apex acuminate, the acumen blunt, the base rounded or truncate, the lateral leaflets strongly inequilateral; nerves 8 or 9 on each side of the midrib, rather prominent beneath, the reticulations lax. Inflorescence glabrous, the peduncle proper 6 cm. long, the branchlets 1 cm. long or less, each bearing numerous flowers, their pedicels slender, glabrous, about 1.8 cm. long. Calyx 5 to 8 mm. long, about 6 mm. in diameter, glabrous, the teeth unequal, very broad, short, rounded, often obscure. Standard 3.5 cm. long, 1.5 cm. wide, acute, wings 2 cm. long, the claw 7 mm. long, the blade 13 mm. long, 6 mm. wide, obtuse, the latter more or less united to the lamina of the keel, keel about as long as the standard. Ovary glabrous, pedicellate, with 4 or 5 ovules. Anthers 1.2 mm. long.

Type specimen No. 6079 (A. D. E. Elmer), Sablan, Province of Benguet, Luzon, April, 1904.

No. 6438 (Elmer), Twin Peaks, Province of Benguet, Luzon, June, 1904, is apparently a fruiting specimen of this species, the pod being fleshy, ovoid, pointed, 6 to 7 cm. long, 3 to 4 cm. wide, somewhat compressed, glabrous, purplish with numerous yellow spots.

MELIACEÆ.

Aglaia parvifolia sp. nov. § *Euaglaia*.

A tree about 12 m. high, with unevenly pinnate, bijugate leaves, the leaflets 6 cm. long or less, and ample many flowered panicles which exceed the leaves in length. Branches light gray, glabrous, the branchlets densely brown or grayish lepidote. Leaves 15 cm. long, the common rhachis densely brown lepidote, 6 to 7 cm. long, leaflets narrowly elliptical-ovate sometimes somewhat oblanceolate, firm, 4 to 6 cm. long, 2 to 2.5 cm. wide, blunt acuminate, the base cuneate, the upper surface entirely glabrous except the sparingly lepidote midrib, the under surface pale, punctate, the midrib densely brown lepidote, a few scattered scales on the blade also; nerves obscure, 8 to 10 on each side of the midrib, not more prominent than the obscure reticulations; petiolules about 1 cm. long, densely brown lepidote. Panicles axillary, 15 to 18 cm. long, the branches spreading or ascending, the lower ones 6 cm. long, densely brown lepidote throughout. Flowers white, 1 to 1.2 mm. in diameter, their pedicels about 2 mm. long. Calyx lepidote, 5-toothed, the teeth short. Petals 5, broadly elliptical, obtuse, glabrous, 1 mm. long. Staminal tube 0.8 mm. long, glabrous, the margin obscurely toothed. Stamens, 5, inserted on the lower half of the staminal tube, the anthers about 0.3 mm. long, not exerted.

Type specimen No. 968 (Forestry Bureau), collected by W. W. Clark, Island of Burias, June, 1904. A small tree reaching a diameter of 18 cm., common in the dry hill forests and thickets at an altitude of about 50 m. above the sea.

Aglaia clarkii sp. nov. § *Euaglaia*.

A tree about 12 m. high, with 8 to 12 jugate leaves, 70 cm. long or less, and oblong, or oblong-elliptical leaflets, which are dark brown, glabrous and shining above, densely ferruginous lepidote pubescent beneath, their

apices usually obtuse, their bases strongly cordate. Branches much thickened, 2 to 2.5 cm. thick immediately below the leaves, which are crowded at the apices of the branches, densely dark brown pubescent, the leaf scars very prominent, about 2 cm. wide. Leaves alternate, the rachis densely dark brown lepidote pubescent; leaflets 9 to 16 cm. long, 4 to 6 cm. wide, the upper surface densely punctate, the apex obtuse, subacute, or obscurely broadly acuminate, the sinus at the base acute, 1 cm. deep or less, the basal lobes overlapping, rounded; nerves parallel, spreading, prominent beneath, 18 to 30 on each side of the midrib; petiolules stout, densely ferruginous pubescent about 1 cm. long. Panicles axillary, densely dark brown lepidote pubescent, 25 cm. long or less, subpyramidal, the peduncle 7 to 11 cm. long, the branches spreading or ascending, the lower ones 8 cm. long, the branchlets 2 cm. long or less, the flowers numerous, crowded in fascicles of four or five. Flowers about 2 mm. long, sessile. Calyx ferruginous pubescent, the lobes rounded or subreniform, 1 mm. long. Petals 5, glabrous, oblong, about 2 mm. long, 0.8 to 1 mm. wide, the apex obtuse. Staminal tube 1.2 mm. long, glabrous, minutely toothed, the five stamens inserted near the base of the tube, included, the anthers broadly ovate, 0.7 mm. long. Ovary glabrous. Fruit reddish brown, densely lepidote pubescent, pear shaped, about 5 cm. long.

Type specimen No. 1717 (Forestry Bureau), collected by W. W. Clark, Island of Burias, August, 1904 (flower); also No. 988 (Forestry Bureau), collected by Clark, Island of Masbate, June, 1904; No. 2028 (Merrill), Guinayangan, Province of Tayabas, Luzon, May 5, 1903 (fruit); No. 18 (Ahern), Pasacao, Province of Camarines, Luzon, February, 1902.

A tree reaching a diameter of 40 cm., locally common in hill forests, the leaves and fruits containing more or less milk sap. The bark is nearly smooth, about 2 cm. thick, and somewhat fragrant. The dark reddish brown timber is used in house and naval construction and also in the manufacture of furniture. T., *Tucancao*, B., *Consuyod*.

***Aglaia micrantha* sp. nov. § *Hearnia*.**

A small tree, 9 m. high or less, with unequally 2 to 3 pinnate leaves, nearly glabrous above, more or less ferruginous stellate pubescent beneath, the rachis very densely rusty tomentose, the flowers minute, yellow. Branches nearly glabrous, striate, the ultimate branchlets very densely ferruginous tomentose. Leaves 20 to 35 cm. long, the rachis 17 cm. long or less, the petiole proper 3 to 7 cm. long, and with the petiolules very densely ferruginous tomentose, the hairs being stellate, but so dense is the pubescence that the stellate arrangement is obscure; leaflets opposite, the upper ones larger than the lower, elliptical-lanceolate or broadly oblanceolate, the base acute, more or less unequal, the apex acuminate, 10 to 16 cm. long, 3 to 5 cm. wide, the upper surface glabrous except for the densely ferruginous stellate midrib, the under surface more or less ferruginous stellate pubescent throughout, the midrib and nerves very densely so; nerves about 12 pairs, ascending, rather prominent beneath; petiolules about 5 mm. long, that of the terminal leaflet about 1 cm. long. Panicles 15 cm. long or less, elongated in fruit, the peduncle 2 cm. long, the rachis and branches very densely ferruginous stellate pubescent, the lower branches

spreading, about 5 cm. long, the secondary branchlets 1.5 cm. long or less. Flowers subglobose, minute, about 1.5 mm. long, their pedicels about 1 mm. long. Calyx densely ferruginous stellate pubescent, deeply 5-toothed, the teeth acute. Petals 5, obovate, obtuse, 1.3 mm. long, about 1 mm. wide or less, glabrous. Staminal tube 0.7 mm. long, glabrous, the margin entire. Stamens 5, inserted on the edge of the tube but scarcely exerted, the anthers less than 0.3 mm. in diameter. Fruit bright red, globose or somewhat pear shaped, 2 cm. in diameter, sparingly stellate pubescent, becoming glabrous. Seed solitary, large, surrounded by a soft, transparent integument.

Type specimen No. 477 (H. N. Whitford), Lamao River, Province of Bataan, Luzon, July, 1904 (flower); also, from the same locality, No. 3724 (Merrill), January 1, 1904 (fruit); and No. 1195 (Forestry Bureau), collected by Borden, June, 1904 (fruit and immature flowers); Nos. 104, 215 (Whitford), April, May, 1904 (fruit).

This species is not common in the forests, growing in the more open portions of the forest at from 400 to 600 m. above the sea, the fruit being edible, the fleshy integument surrounding the seed having the appearance and taste of similar portions of the fruit of *Euphoria cinerea* Radlk.

***Amoora elmeri* sp. nov.**

A small tree about 5 m. high, entirely glabrous, with 5 to 6 jugate, even or odd pinnate leaves 20 to 30 cm. long, and axillary panicles 25 cm. long or less, the spikelike branches spreading. Branches glabrous, reddish brown. Leaves alternate, the petiole 7 cm. long, the rachis, including the petiole, 20 to 25 cm. long; leaflets opposite, oblong, 7 to 13 cm. long, 3 to 4.5 cm. wide, subcoriaceous, opaque, the base acute, strongly inequilateral, the apex shortly and abruptly blunt acuminate, shining above, dull beneath, brownish when dry; nerves 9 to 12 pairs, prominent beneath, obscure above, the reticulations nearly obsolete; petiolules 2 to 3 mm. long. Panicles pyramidal, the axis glabrous, reddish brown, the lower branches 10 to 11 cm. long, the upper gradually shorter. Flowers yellow, globose, about 6 mm. in diameter, nearly sessile, each subtended by 1 or 2 small triangular bracteoles. Calyx 4 to 5 lobed, the lobes slightly imbricate, rounded, 2 mm. long or less, the margins ciliate. Petals 3, broadly ovate or nearly orbicular, concave, 5 mm. long, glabrous. Staminal tube cylindrical, 4 mm. long, entire. Stamens 6, the anthers 2.5 mm. long, included. Ovary 3-celled, the stigma sessile, conical.

Type specimen No. 6306 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, May 17, 1904, a small tree with dark-gray, rather smooth bark, not common, in dry thickets, the leaves crowded toward the ends of the elongated branches.

***Dysoxylum grandifolium* sp. nov.**

A small or medium-sized tree, about 7 m. high, with 6-jugate leaves about 120 cm. long, the leaflets 15 to 20 cm. long, and elongated panicles, 120 cm. long or more. Leaflets opposite or subopposite, glabrous, subcoriaceous, oblong-ovate to oblong-elliptical, the apex abruptly short, blunt acu-

minate, the base broad, rounded; nerves prominent, parallel, about 20 pairs; petiolules stout, rugose, slightly pubescent, about 1 cm. long. Branches and branchlets of the inflorescence densely appressed, grayish-brown pubescent, the ultimate branchlets 10 to 25 cm. long. Flowers solitary or in fascicles of 3 to 5 on the branchlets, sessile or nearly so. Calyx about 3 mm. long, appressed grayish-brown pubescent, with four broad, obscure teeth. Petals 4, 1.5 cm. long, 3 mm. wide, acute, valvate in bud, the outside densely appressed grayish-brown pubescent. Staminal tube free, about 14 mm. long, tubular, the apex obscurely toothed. Stamens 8, inserted near the top of the tube; anthers 1.4 mm. long. Ovary pubescent, 4-celled; style filiform, glabrous; disc 8 mm. long, tubular, ciliate at the apex.

Type specimen No. 632 (H. N. Whitford), Atimonan, Province of Tayabas, Luzon, August 15, 1904. A small tree growing along streams at an altitude of about 100 m. above the sea.

SABIACEÆ.

Meliosma luzonensis sp. nov.

A tree with odd pinnate 4 to 5 jugate leaves 20 cm. long or less, the leaflets glabrous or nearly so, their margins entire or distantly spinulose serrate above, and many flowered panicles which are shorter than the leaves. Branches thick, dark brown, glabrous, the tips more or less deciduously tomentose, the terminal bud densely ferruginous pubescent. Leaves opposite or subopposite, the rhachis 7 to 13 cm. long, deciduously ferruginous tomentose; leaflets firm, opposite or subopposite, ovate, ovate lanceolate or oblong, 3 to 7 cm. long, 2 to 3 cm. wide, the base rounded or rarely subacute, the apex acuminate, upper surface glabrous, shining, the lower surface pale, at first with few hairs on the midrib and prominent veins, soon becoming glabrous except for the barbate vein axils, the margins entire below, above distantly spinulous serrate; nerves 8 to 10 on each side of the midrib, rather prominent beneath, anastomosing, the reticulations lax; petiolules about 5 mm. long, that of the terminal leaflet 1 cm. long, at first sparingly pilose, becoming glabrous. Panicles erect, 15 cm. long, the rhachis and branches dark brown pubescent, the peduncle 6 cm. long becoming nearly glabrous, the branches spreading, the lower ones 5 to 6 cm. long, the upper ones gradually shorter. Flowers dull white, 2 to 2.5 mm. long, the pedicels densely ferruginous pubescent, 1 mm. long or less. Sepals ovate, 2 mm. long, subacute glabrous except the slightly ciliate margins, the bracteole about equaling the sepals. Outer petals three, orbicular, glabrous, 2.5 to 3 mm. in diameter, the inner two opposite the fertile stamens and slightly adnate to them, deeply cleft, forming two slender teeth 0.8 mm. long. Fertile stamens 2, 2 mm. long, the anther 1 mm. broad; sterile stamens 3, opposite the outer petals, about 1 mm. long. Ovary 1-celled, 2-ovuled, glabrous.

Type specimen No. 6267 (A. D. E. Elmer), Mount Santo Tomas, Province of Benguet, Luzon, May, 1904. A tree 8 to 10 m. high and 30 cm. in diameter, with soft wood and thick, checked bark growing on exposed ridges

near the summit of the mountain at an elevation of about 2,500 m. above the sea.

Meliosma multiflora sp. nov.

A tree with odd pinnate 3 to 5 jugate leaves, 35 cm. long or less, the leaflets glabrous or nearly so, their margins spinulose serrate, and erect, many flowered, terminal and axillary panicles 20 cm. long. Branches thickened, dark brown, glabrous, the lenticels prominent, the tips ferruginous pubescent. Leaves alternate, the rhachis 23 cm. long or less, sparingly ferruginous pilose, the upper surface flattened in the petiolar portion, deeply channelled above; leaflets opposite, lanceolate, ovate lanceolate or oblong lanceolate, 5 to 11 cm. long, 3 to 4 cm. wide, the base slightly inequilateral, rounded, rarely subacute, the apex slender acuminate, the margins below entire, above spinulose serrate, the teeth distant 5 to 8 or 10 mm., upper surface glabrous, shining, the lower surface pale, glabrous or with few scattered hairs and the midrib sparingly pilose, the axils of the veins not bearded; nerves 10 to 11 on each side of the midrib, prominent beneath, anastomosing, the reticulations lax, prominent; petiolules sparingly pubescent, becoming glabrous, 1 cm. long. Panicles erect the axis and ascending branches densely ferruginous pubescent, the lower branches 10 cm. long, the upper gradually shorter. Flowers yellowish, sessile, fasciculate, the buds globose. Sepals four, ovate, obtuse, glabrous except the sparingly ciliate margins, 2 mm. long, the bracteole similar but one-half smaller than the sepals. Three outer petals (immature) orbicular, glabrous, 2 mm. in diameter, the two inner ones opposite the fertile stamens, 0.3 mm. long, 0.4 mm. wide, regularly 3-toothed. Fertile stamens 2, less than 1 mm. long, the sterile ones nearly as long. Ovary glabrous.

Type specimen No. 930 (Forestry Bureau), collected by P. T. Barnes, Mount Santo Tomas, Province of Benguet, Luzon, May 11, 1904. A tree about 10 m. high and 20 cm. in diameter, growing in damp forests at an altitude of about 1,800 m. above the sea. Apparently related to *Meliosma luzonensis* Merrill, but differing in its longer leaves and petiolules, very different panicles, sessile flowers, and much smaller, differently shaped inner petals.

Meliosma pendula sp. nov.

A tree with pinnate leaves about 50 cm. long, the rhachis densely ferruginous tomentose, the leaflets more or less pubescent, the margins entire or spinulose toothed, and drooping elongated panicles 60 to 70 cm. in length. Branches densely ferruginous tomentose. Leaves unevenly pinnate, about 5-jugate, the lower leaflets much smaller than the upper, spinulose toothed, the teeth distant 1 to 2 cm., 2 mm. long or less, the upper leaflets entire; common rhachis about 30 cm. long, the leaflets opposite or subopposite, abruptly, sharp, short acuminate, the base rounded, or that of the terminal leaflet acute, elliptical, ovate, or obovate, 8 to 15 cm. long, 5 to 8 cm. wide, both surfaces with few scattered hairs on the reticulations, densely ferruginous pubescent on the midrib and veins; nerves 8 to 13 on each side of the midrib, anastomosing, very prominent beneath, the reticulations prominent; petiolules densely ferruginous tomentose, 1 to 1.5 cm. long.

Panicles axillary and terminal, the axis and branches ferruginous pubescent, the primary branches alternate, 25 cm. long, the secondary branches 12 cm. long or less. Flowers white, 3 mm. long, the pedicels 1 to 1.5 mm. long, thick, ferruginous pubescent, the bracteoles about 1 mm. long, ferruginous pubescent, lanceolate. Sepals 4, ovate, obtuse, 1.5 mm. long, the margins ciliate. Outer three petals broadly ovate or orbicular, glabrous, 2.5 to 3 mm. long, faintly 5-nerved, the inner two opposite the fertile stamens, about 1 mm. long, the apex coarsely three toothed. Fertile stamens 2, 2 mm. long, the anthers 1.3 mm. broad, the filaments broad, flattened, 1 mm. long; sterile filaments opposite the three outer petals, 0.8 mm. long. Ovary glabrous, 2-celled, each cell with 2 ovules.

Type specimen No. 6245 (A. D. E. Elmer), Mount Santo Tomas, Province of Benguet, Luzon, May, 1904. A tree 8 to 10 m. high, and 45 cm. in diameter, growing on exposed slopes at an altitude of about 2,500 m., above the sea. Apparently related to the Formosan species *Meliosma rhoifolia* Maxim., and to *M. wallichii* Planch.

CELASTRACEÆ.

Evonymus benguetense sp. nov.

A shrub or small tree with ovate, elliptical ovate, or ovate, acuminate slightly crenate, glabrous leaves, the four-parted flowers in extra-axillary 5 to 7 flowered cymes, the petals entire. Branches grayish, rough, the ultimate branchlets slender, glabrous, light gray or greenish. Leaves opposite, 3 to 7 cm. long, 1.5 to 4 cm. wide, submembranous, the base acute, the margins entire below, crenate-serrate above; nerves 4 to 5 on each side of the midrib, anastomosing, the reticulations lax, obscure; petioles glabrous, 2 to 3 mm. long. Cymes opposite, on the branchlets below the leaves, the peduncle glabrous 1 to 1.5 cm. long, the pedicels 1 cm. long or somewhat less. Flowers about 1 cm. in diameter when spread. Sepals 4, broadly ovate, obtuse, 2 mm. long. Petals 4, obovate, obtuse, 4.5 mm. long, 3 mm. wide. Stamens 4, the filament 3 mm. long, slender, glabrous, the anther 0.7 mm. long. Disk thick, about 3 mm. in diameter, fleshy. Ovary 4 celled, densely covered with short, stout tubercles; style 2 mm. long.

Type specimen No. 5977 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, March, 1904.

ELAEOCARPACÆ.

Elaeocarpus argentea sp. nov.

A small tree, about 3 m. high, with obovate or oblanceolate, glabrous, subcoriaceous leaves, the flowers about 5 mm. long, pendulous, crowded in erect, silvery pubescent racemes from the axils of the upper leaves, forming a terminal, nearly leafless inflorescence. Branches thick, brownish gray, rough, striate, the tips dark brown, glabrous. Leaves alternate, 3 to 5 cm. long, 2 to 3 cm. wide, the base cuneate, the apex acute or rather blunt, usually slightly emarginate, the margins finely crenate; veins 5 to

6 on each side, prominent beneath, ascending; petioles glabrous, 1 cm. long or less. Racemes 6 to 10 or more at the tip of each branchlet, 6 to 7 cm. long, erect, the axis, pedicels, bracts, calyx, and corolla appressed silvery pubescent, the peduncle 2 to 3 cm. long. Flowers white, the pedicel 5 mm. long, the bract 4 mm. long, lanceolate, the margins slightly toothed. Sepals 5, lanceolate, acuminate, 5 to 5.5 mm. long, 1.5 to 2 mm. wide, glabrous inside. Petals 5 mm. long, 2 to 2.5 mm. wide, the apex lacinate for 1.5 to 2 mm., on the inside pilose in the median portion and near the margins below, glabrous above, the base not cucullate. Torus thick, lobed, densely pubescent. Stamens about 30, the filaments about 1 mm. long, very sparingly pubescent, the anthers 2 mm. long, minutely and sparingly pubescent with very short hairs, the outer cell slightly exceeding the inner, but not awned. Ovary ovoid, 2 mm. long, densely silvery pubescent, 2-celled; style minutely pubescent, 3 mm. long. Young fruit ovoid or ellipsoid, rugose, pubescent, apparently 2-celled.

Type specimen No. 6237 (A. D. E. Elmer), Mount Santo Tomas, Province of Benguet, Luzon, May, 1904. A stunted tree with hard wood and gray, tubercled bark, growing on exposed ridges at and near the summit of the mountain at an altitude of about 2,500 m. above the sea.

***Elaeocarpus pendulus* sp. nov. § *Monocera*.**

A small shrubby tree 3 m. high or less, with lanceolate, acuminate, glabrous, subcoriaceous leaves, the flowers 12 mm. long, pendulous in small few flowered racemes which are borne on the branches below the leaves. Branches gray, rough, the ultimate branchlets glabrous, brown. Leaves alternate, 5 to 8 cm. long, 1.5 to 2.8 cm. wide, the base rounded or subacute, the apex long acuminate; nerves 6 to 8 on each side of the midrib, obscure, the reticulations lax, obscure; petioles 1.5 to 2 cm. long, slender, glabrous. Racemes few, 3 to 4 cm. long, glabrous, each with from three to six flowers, their pedicels slender, glabrous, about 1 cm. long. Flowers lanceolate, acuminate in bud. Sepals five, lanceolate, acuminate, equaling the petals, 2.5 to 3 mm. wide below, brownish red when dry, minutely appressed pubescent outside, rather densely pubescent inside, especially above and on the margins. Petals white, 5 mm. wide or less above, narrowed below, the base cucullate from the infolding of the edges and with a fleshy villous gland in the center, the apex lacinate for 5 mm. or less, glabrous above on both sides, below pilose in the median portion outside, and densely pilose inside. Torus thick fleshy, glabrous, grooved, 3 mm. in diameter. Stamens 35 to 40, the filaments 2 mm. long, pubescent, the anthers 3 to 4.5 mm. long, puberulous, the apex slightly cleft, the outer cell with a somewhat bent and curved, slender, somewhat scabrous awn 2 mm. long. Ovary ovoid, glabrous, pointed, 2.5 mm. long, 2-celled. Style slender, glabrous, 10 mm. long. Fruit elliptic, blunt at both ends, glabrous, rugose when dry, 1.5 cm. long, 1 cm. in diameter, the pulp thin, the stone strongly rugose, very hard, 1-celled, 1-seeded.

Type specimen No. 5801 (A. D. E. Elmer), Mount Santo Tomas, Province of Benguet, Luzon, March, 1904. This species is not common, growing only on the exposed summit of the mountain at an elevation of about 2,500 m. above the sea.

STERCULIACEÆ.

***Sterculia crassiramea* sp. nov.**

A large tree with entire, oblong-ovate, cordate leaves, which are densely stellate-pilose beneath, and axillary many-flowered panicles, crowded with the leaves at the ends of the thickened branches. Branches grayish-brown, glabrous, the branchlets much thickened, especially at the pubescent tips. Leaves 10 to 22 cm. long, 8 to 16 cm. wide, the base broadly cordate, very slightly narrowed, the apex acute or slightly acuminate, the upper surface shining, glabrous, except for a few scattered stellate hairs, the under surface very densely light brown stellate-pilose throughout; basal nerves 5, prominent, with usually 2 additional short, obscure, marginal nerves, lateral nerves 8 or 9 on each side, prominent, straight, ascending, the reticulations rather lax, prominent beneath; petioles 3 to 7 cm. long, very densely pilose; stipules deciduous, subulate, pilose, about 1 cm. long. Panicles densely rusty-pubescent throughout, 12 to 18 cm. long, the branches spreading, about 3 cm. long. Flowers yellow, 4 mm. long. Calyx densely rusty-pubescent outside, purplish-pubescent within, 5-lobed, the lobes ovate-acute, about 25 mm. long. Staminal column slender, 25 mm. long, bearing at its cernuous apex about 8 sessile anthers.

Type specimen No. 1882 (Forestry Bureau), Ahern's collector, Bosoboso, Province of Rizal, Luzon, October 15, 1904. This is undoubtedly the species enumerated by F. Villar¹ as *Sterculia macrophylla* Vent. T., *Banilad*.

***Sterculia obovata* sp. nov.**

A small tree about 5 m. high, with narrowly obovate, abruptly acuminate, more or less pubescent leaves 10 cm. long or less, the inflorescence paniculate, fascicled at the tips of small specialized, leafless branchlets which are borne on the branches below the leaves. Branches light gray, glabrous, striate, the tips more or less ferruginous tomentose. Leaves 7 to 10 cm. long, 3.5 to 4 cm. wide, widest at the upper two-thirds, the apex abruptly short acuminate, tapering below to the abruptly acute or somewhat narrowly rounded base, the upper surface glabrous, except for the pubescent midrib, the lower surface with scattered stellate ferruginous hairs on the midrib, nerves, and reticulations; nerves about 8 pairs, prominent beneath, obscure above, the reticulations prominent beneath; petioles 1 cm. long, densely ferruginous tomentose; stipules lanceolate, acuminate, ferruginous pubescent, 6 to 7 mm. long. Panicles 7 cm. long or less, the axis, branches, and outside of the calyx densely rufous tomentose, the longest branches about 1.5 cm., spreading, slender, bearing two or three flowers only. Male flowers obovoid, the calyx lobes cohering by their apices, 6 to 7 mm. in diameter, the tube shorter than the lobes, the lobes densely rufous tomentose outside, whitish tomentose within, lanceolate, acute, 5 to 6 mm. long. Staminal column glabrous, 2 to 3 mm. long, the anthers 10, sessile, about 0.5 mm. long. Female flowers and fruit not seen.

¹Nov. App. 27. 1883.

Type specimen No. 5999 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, March, 1904, growing in thickets in gulches along streams. A small tree reaching a diameter of about 15 cm.; not common.

THEACEÆ.

Adinandra luzonica sp. nov.

A small tree 7 to 9 m. high, with subcoriaceous, oblong, acute, rarely slightly acuminate, nearly glabrous leaves, and solitary white fragrant flowers about 2 cm. in diameter. Branches dark grayish brown, striate, glabrous, the ultimate branchlets more or less appressed pubescent. Leaves 5 to 8 cm. long, 1.5 to 3.5 cm. wide, the base acute, the margins revolute, and minutely and obscurely distantly serrate, nearly entire, the upper surface glabrous except for the more or less pubescent midrib, the lower surface slightly pubescent, with few scattered hairs, becoming glabrous; nerves 14 to 15 pairs, not prominent, freely anastomosing, the secondary nerves and the reticulations nearly as prominent as the primary nerves; petioles about 3 mm. long, slightly pubescent. Flowers axillary, the peduncle pubescent, becoming glabrous, 10 to 12 mm. long. Sepals densely appressed villous outside, glabrous inside, broadly ovate, obtuse, 1 cm. long, 9 mm. wide, the two outer ones thicker, the margins thin, entire, minutely ciliate. Petals obovate, obtuse, slightly united at the base, 10 mm. long, 9 mm. wide, the median portions outside, densely appressed villous, the broad margins glabrous. Stamens epipetalous, about 50, 6 to 8 mm. long, the anthers 3 to 3.5 mm. long, villous, the filaments more or less united, villous. Ovary ovoid, densely villous, 5-celled, each cell with many ovules; style glabrous. Fruit unknown.

Type specimens: No. 446 (Whitford), growing on exposed, wind-swept ridges, Mount Mariveles, Province of Bataan, Luzon, July 21, 1904, altitude, 1,200 m.; No. 1360 (Forestry Bureau), collected by Borden, same locality, July, 1904.

A species apparently closely related to *Adinandra integerrima* T. Anders., but differing especially in its leaf characters and its obovate obtuse petals.

DIPTEROCARPACEÆ.

Shorea polysperma (Blanco) Merrill, Govt. Lab. Publ. 20:22, 1905. (*Mocanera polysperma* Blanco, Fl. Filip. ed. 1, 448. 1837; *Dipterocarpus polyspermus* Blanco, l. c., ed. 2, 312. 1845; ed. 3, 2:213; *Hopea tangili* Blume, Mus. Bot. Lugd. Bat. 2:35, 1856; *Shorea talura* F.-Vill. Nov. App. 21, 1880, non Roxb.)

A very large tree, with narrowly ovate, or ovate lanceolate, acuminate leaves, pubescent imbricate sepals, and pubescent ovary. Branches dark brown, glabrous. Leaves 8 to 11 cm. long, 3 to 5 mm. wide, shining, subcoriaceous, the base rounded, rarely somewhat acute, the apex usually rather long acuminate; nerves 10 to 12 pairs, subprominent, ascending; petioles 2 cm. long, glabrous, or at first pubescent. Panicles 20 cm. long

or less, the branches ascending, the lower ones often 15 cm. long, densely pubescent with gray hairs. Flowers small, yellowish. Sepals imbricate, broadly ovate, obtuse or subacute, 3 mm. long, 2.5 mm. wide, densely pubescent, the three outer ones inclosing the two inner. Petals 8 mm. long, 3.5 mm. wide, obtuse. Stamens 15, in two series, the filaments broad, 1 mm. long; anthers broadly ovate, 0.6 mm. long, the appendix to the connective slender, as long as the anther. Ovary pubescent, the stylopod very obscure or wanting. Style slender, 1.5 mm. long. In the fruit all the sepals are accrescent, the three outer ones being 4.5 cm. long, and 8 to 10 mm. wide, obtuse, the two inner ones about 2 cm. long or less, and 3 mm. wide.

A tree growing in the hill forests, at from 100 to 800 m. above the sea, reaching a height of 50 m. and a diameter of 1 m. more or less. It is especially common in the forests of the Province of Bataan and is universally known to the Tagalogs of that Province as *Tanguili*, and on account of its great size is much prized by them for making canoes; facts also noted by Blanco, in the original description of the species.

Shorea polysperma belongs in the section *Pinanga*, and is represented by the following specimens, all from the Lamao River region, Mount Mariveles, Province of Bataan, Luzon: No. 606 (Forestry Bureau), collected by Barnes, April, 1904; Nos. 734, 784, and 819 (Forestry Bureau), collected by Borden, May, 1904 (flower); No. 1410 (Forestry Bureau), collected by Borden, July, 1904 (fruit); No. 132 (Whitford), May, 1904 (flower).

Blanco's material, on which this species was based was in part from Balanga, Province of Bataan, and his description applies to the above specimens except in one or two particulars. The petioles are not particularly short, as described by Blanco, nor is the fruit more than one-seeded, it being described by Blanco as follows, "*Baya? con dos? aposentos, y en cada uno algunos semillas,*" it being evident that either Blanco had mutilated or very imperfect fruits, or that he was not sure that his fruits were really from this tree. Inasmuch as the fruit of *Shorea polysperma* is one-seeded, and not with several seeds as described by Blanco, his specific name does not well apply to the species.

Dipterocarpus lasiopodus Perkins, Frag. Fl. Philip. 22. 1904.

The fruit of this species is figured by Vidal, Sinopsis, Atlas, t. 14. f. D., under the name *Dipterocarpus pilosus* Roxb., this figure being mentioned by Brandis¹ sub. *Dipterocarpus affinis*, accordingly the following synonym should be added. *Dipterocarpus pilosus*, F.-Vill. Nov. App. 20. 1880; Vidal, Sinopsis, Atlas, t. 14. f. D. 1883, non Roxb.

Hopea acuminata sp. nov. § *Petalandra*.

A tree reaching a height of 40 m., with broadly lanceolate, narrowly acuminate, glabrous leaves, 8 cm. long or less, and small flowers in unilateral racemes, which are arranged in terminal and axillary panicles. Branches nearly black when dry, glabrous, striate. Leaves 4 to 8 cm. long, 2 to 3 cm. wide, submembranous, shining above, the base inequilateral, rounded

¹ Journ. Linn. Soc. Bot. 31: 32. 1895.

at least on one side of the lamina, the apex long slender acuminate; nerves 8 to 10 pairs, rather prominent beneath; petioles 5 to 8 mm. long, rugose, glabrous. Inflorescence grayish stellate pubescent, the panicles 5 to 6 cm. long or less, the spicate branches 1.5 cm. long or less. Calyx rusty-pubescent, the sepals 5, imbricate, the outer two slightly larger than the inner. Petals slightly pubescent on the outside, falcate, 4 mm. long, 1.8 mm. wide, obtuse. Stamens 10; filaments thick; anthers 0.4 mm. long, the single appendage slender, equaling the anther in length. Ovary glabrous, 3-celled, each cell 2-ovuled; style short; stylopodium 0. Fruit glabrous, the two wings oblong, about 2 cm. long, 5 mm. wide, the apex rounded.

Specimens examined all from Lamao River, Mount Mariveles, Province of Bataan, Luzon: No. 786 (Forestry Bureau), collected by Borden, May, 1904 (flower); No. 335 (Whitford), May, 1904 (flower); No. 3864 (Merrill), and No. 1592 (Forestry Bureau), Borden, August, 1904 (fruit); Nos. 825, 1175, and 1245 (Forestry Bureau), Borden, May-June, 1904 (sterile).

A tall tree, with a slender, straight trunk, growing in the hill forests from an altitude of 100 to about 800 m. above the sea. T., *Dalindingan*.

THYMELEACEÆ.

Wikstroemia lanceolata, sp. nov. § *Euwikstroemia*.

An undershrub, 1 m. high or less, with glabrous or nearly glabrous, membranous, lanceolate leaves, the branchlets and flowers pubescent. Branches slender, dark brown, glabrous, the branchlets rather densely grayish-pubescent. Leaves 3 to 5 cm. long, 8 to 15 mm. wide, often with very few scattered hairs beneath, becoming entirely glabrous, gradually narrowed above to the slightly acuminate apex, the base obtuse; nerves not prominent; petioles pubescent, 1 to 2 mm. long. Flowers in terminal, subsessile, 3 to 5 flowered fascicles, green or yellowish-green. Perianth tubular, 6.5 to 7 mm. long, appressed-pubescent outside throughout; lobes 4, 1 mm. long, rounded. Anthers yellow, 0.7 mm. long. Ovary ovoid, glabrous, except the slightly pubescent apex, 1-celled, 1-ovuled; style very short; stigma yellow, subglobose. Fruit ovoid, bright red, 8 mm. long, glabrous, except the slightly pubescent apex, the pericarp fleshy; seed 6 mm. long, shaped like the fruit, but slightly acuminate.

Type specimen No. 3931 Merrill, Mount Arayat, Province of Pampanga, Luzon, October 23, 1904. A branched, slender undershrub, common on forested slopes at an elevation of from 600 to 750 m. above the sea.

MELASTOMATACEÆ.

Astronia glauca, sp. nov.

A shrub 2 to 4 m. high, with elliptical-lanceolate, glabrous, acuminate, 3 to 5 nerved leaves, which are glaucous beneath, and terminal panicles shorter than the leaves. The flowers 5-merous. Branches light gray, glabrous, striate. Leaves subcoriaceous, 10 to 15 cm. long, 3 to 5.5 cm.

wide, widest in the middle, the apex short acuminate, the base cuneate, the upper surface shining, the lower surface pale, the two outer nerves faint, the other three prominent. Petioles 2 to 4 cm. long. Panicles 6 to 12 cm. long, the axis and branches grayish or brown lepidote pubescent, the lower branches 3 to 8 cm. long. Calyx tube 3 mm. long, 2 mm. in diameter, brown or grayish lepidote, with five very short, broad, obscure teeth. Petals 5, broadly ovate, suborbicular, or subreniform, 2 mm. long. The anthers subglobose, 1.2 mm. long. Ovary 2-celled; style 3.5 mm. long; stigma capitate.

Type specimen No. 6294 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, May, 1904; also apparently No. 6055 (Elmer), same locality, March, 1904. A small shrub in thickets, with smooth grayish-white or dull yellow bark and soft, brittle wood, apparently most closely related to *Astronia rolfei* Vidal.

***Creochiton rosea*, sp. nov.**

A scandent shrub, the young branches densely furfuraceous tomentose, the leaves more or less furfuraceous tomentose on the nerves beneath, the inflorescence axillary, cymose. Branches reddish-brown, the older ones glabrous. Leaves opposite, submembranous, elliptical ovate, acute or obscurely acuminate, the base rounded, 7 to 11 cm. long, 3.5 to 5 cm. wide, the upper surface glabrous, the lower surface pale; nerves 5, the transverse reticulations quite prominent beneath; petioles 1.5 to 2 cm. long. Cymes axillary, 4 to 5 cm. long, deciduously furfuraceous tomentose, becoming glabrous, each about 3-flowered, the peduncle 2 cm. long, the pedicels 1.5 to 2 cm. long. Flowers pale pink, the inclosing bracts deciduous, membranous, slightly furfuraceous, obovate, obtuse, 10 to 15 mm. long, 7 to 10 mm. wide. Calyx furfuraceous, globose urceolate, 5 mm. long, truncate, furfuraceous. Petals 4, broadly ovate, firm, obtuse, 6 mm. long or more. Stamens 8; filaments about 5 mm; anthers about 6 mm. long, the conical appendage at the base of the anther about 1.5 mm. long. Fruit globose, about 8 mm. in diameter; seeds less than 1 mm. long.

Type specimen No. 1297 (Copeland), Todaya, District of Davao, Mindanao, April, 1904. A scandent shrub growing in forests at an altitude of about 1,200 m. above the sea. The genus has previously been known only from Java, where it is represented by two species.

***Melastoma parvifolia*, sp. nov.**

A lax spreading shrub, about 3 m. high, with elliptical lanceolate, more or less strigose, 5-nerved leaves, 5 cm. long or less, the flowers in terminal fascicles of about 5, the young flowers subtended by lanceolate bracts, the lobes of the calyx with minute alternating teeth, the lobes exceeding the calyx tube. Branches grayish-brown, rough, the branchlets slender, densely covered with imbricated, brownish scales, which are 0.8 mm. long or less, and more or less lacerate. Leaves 2.5 to 5 cm. long, 0.8 to 1.5 cm. wide, the apex acute, mucronate, the base acute, both surfaces with scattered, strigose hairs, the nerves on under surface with appressed scales, the two marginal nerves much less distinct than the other three; petioles scaly, 5 mm. long. Flowers crowded in fascicles of about 5 at the ends of the

branches. Calyx densely clothed with pale, lanceolate, acuminate, imbricated, more or less toothed scales, 1 to 2 mm. long, the tube 6 to 7 mm. long, the calyx teeth 10 mm. long, 3.5 mm. wide, lanceolate, acuminate, the alternating, narrowly lanceolate, long acuminate appendages similar to the scales, 3 mm. long. Petals pink, narrowly obovate, obtuse, 2 cm. long, 12 to 14 mm. wide, their margins ciliate. Longer stamens 2 cm., the connective 6 mm; the anthers 7 mm.

Type specimen No. 5836 (A. D. E. Elmer), Baguio, Benguet, Province of Luzon, March, 1904. A shrub with smooth bark, in thickets along streams.

Key to the Philippine species of Medinilla.

1. Whole plant glabrous or nearly so.
 2. Panicles or cymes axillary.
 3. Leaves verticillate.
 4. Flowers 4-merous (1) *M. pendula*
 4. Flowers 5-merous.
 5. Cymes fascicled; petals 12 mm. long (2) *M. verticillata*
 5. Cymes solitary; petals 15 mm. long (3) *M. mindanaensis*
 3. Leaves opposite.
 4. Flowers 5-merous (4) *M. coriacea*
 4. Flowers 4-merous.
 5. Inflorescence elongate, paniced (5) *M. multiflora*
 5. Inflorescence fasciculate or cymose.
 6. Flowers fascicled (6) *M. ramiflora*
 6. Flowers cymose (7) *M. myrtiformis*
 2. Panicles or cymes terminal.
 3. Leaves verticillate.
 4. Inflorescence cymose, 5 cm. long or less.... (8) *M. megacalyx*
 4. Inflorescence paniculate, 12 to 25 cm. long.
 5. Flowers 5-merous (9) *M. elmeri*
 5. Flowers 4-merous (10) *M. cumingii*
 3. Leaves opposite.
 4. Flowers 4-merous (11) *M. amplifolia*
 4. Flowers 5-merous.
 5. Leaves 9 to 13 nerved (12) *M. magnifica*
 5. Leaves 7-nerved (13) *M. astronioides*
 5. Leaves 5-nerved (14) *M. intermedia*
 5. Leaves 3-nerved (15) *M. whitfordi*
 1. Young branches, leaves, and inflorescence more or less tomentose or stellate-tomentose.
 2. Leaves 3-nerved (16) *M. cordata*
 2. Leaves 5 to 9 nerved.
 3. Leaves opposite.
 4. Floral bracts small or wanting.
 5. Petioles 1 to 2 cm. long (17) *M. venosa*
 5. Leaves sessile or subsessile (18) *M. lagunae*
 4. Floral bracts large, persistent.
 5. Leaves 7 to 11 cm. long, membranous; calyx 4 mm. long (19) *M. bracteata*
 5. Leaves 5 to 8 cm. long, subcoriaceous; calyx 3 mm. long (20) *M. luzonensis*
 3. Leaves whorled (21) *M. ternifolia*

(1) ***Medinilla pendula***, sp. nov.

A subscaudent shrub, with elliptical lanceolate, narrowly elliptical, or oblanceolate elliptical, acute, glabrous, 5-nerved, whorled leaves, the inflorescence in long peduncle axillary and terminal panicles. Branches light gray, slender, glabrous, shining. Leaves in whorls of three or four, 6 to 12 cm. long, 2 to 5 cm. wide, the base acute; petioles 1 to 2 cm. long. Panicles pendulous, 12 to 14 cm. long, ebracteolate, the peduncles, axis, and branches bright red, the peduncle slender, 6 to 9 cm. long, the branches whorled, spreading or ascending, 2 cm. long or less, the branchlets and pedicels more or less brown pubescent. Calyx truncate, 3 mm. long, about 3 mm. thick. Petals 4, pink, strongly inequilateral, orbicular, or broadly ovate, 5 to 6 mm. long. Stamens 8, the filaments deep red, the anthers 3 mm. long, the spur slightly exceeding 1 mm. in length.

Type specimen No. 6037 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, March, 1904.

(2) ***Medinilla verticillata***, sp. nov.

A scandent shrub about 6 m. high, with elliptical ovate, short acuminate, glabrous, verticillate, 5 to 7 nerved leaves, and axillary, fascicled, few-flowered cymes, 2.5 cm. long or less. Branches light gray, glabrous, shining. Leaves in whorls of three or four, subcoriaceous, 10 to 12 cm. long, 5 to 6.5 cm. wide, the apex abruptly short sharp acuminate, the base acute, the two outer nerves often obscure; petioles 2 cm. long. Cymes in fascicles of from 3 to 5 from the branches, the peduncles, branches, pedicels, and calyx, red, glabrous, the peduncle 1.5 cm. long or less, the pedicels 3 mm. long, the bracts 5 mm. long. Calyx 5 to 7 mm. long, 5 mm. in diameter, truncate, entire. Petals 5, rarely 4, pink, 12 mm. long, 8 mm. wide, inequilaterally ovate, or ovate-oblong, truncate. Stamens 10, five 15 mm. long, the anthers 10 mm. long, and five 22 mm. long, the anthers 12 mm. long.

Type specimen No. 6080 (A. D. E. Elmer), Sablan, Province of Benguet, Luzon, April, 1904. A scandent shrub, the stem about 2 cm. in diameter.

(3) ***Medinilla mindanaensis***, sp. nov.

A glabrous, scandent shrub, with elliptical ovate, membranous, 5-nerved, whorled leaves, and axillary, cymose inflorescence, the cymes about 3 cm. long, the flowers 5-merous. Branches slender, terete, light gray, glabrous, often freely rooting along the side appressed to the supporting trees. Leaves in whorls of fours or threes, 8 to 18 cm. long, 3 to 9 cm. wide, the apex abruptly short acuminate, or sometimes deformed and retuse, the base acute; petioles 0.5 to 1.5 cm. long. Cymes few-flowered, the peduncles and pedicels about 1 cm. long, the bracts minute. Calyx urceolate-campanulate, 7 mm. long, truncate. Petals 5, pink, obovate-oblong, 15 mm. long, 9 mm. wide, the apex truncate, somewhat inequilateral. Stamens 10, subequal, the anthers 10 to 12 mm. long, the spur 1.5 to 2 mm. long.

Type specimen No. 439 (Copeland), Davao, District of Mindanao, March, 1904. A vine climbing along the trunks of trees, attached by adventitious roots, thought by the collector to be mymecophilous.

(4) *Medinilla coriacea*, sp. nov.

An epiphytic shrub, with elliptical, ovate, glabrous, petioled, opposite 5-nerved leaves, and axillary, ebracteolate, cymose inflorescence. Branches light gray, glabrous, terete. Leaves coriaceous, 6 to 9 cm. long, 3.5 to 5.5 cm. wide, the apex blunt short acuminate, the base acute; petioles 1 to 1.5 cm. long. Cymes about 2 cm. long, few-flowered, often 2 or more from the same axil, the peduncle 1 cm. long, the pedicels about 8 mm. long. Calyx urceolate, truncate, 6 mm. long. Petals 5, obliquely obovate, tapering to the base, 13 mm. long, 8 mm. wide, obtuse. Stamens 10; filaments 11 mm. long; anthers 11 to 12 mm. long, the spur and the appendages about 1 mm. long.

Type specimen No. 228 (Whitford), Mount Mariveles, Province of Bataan, Luzon, May, 1904. An epiphyte, growing at an altitude of about 1,000 m. above the sea, the leaves fleshy when fresh.

(5) *Medinilla multiflora*, sp. nov.

A glabrous, erect or subscandent shrub, 3 to 4 m. high, with opposite, 3 to 5 nerved, subcoriaceous leaves, and axillary, elongated, many-flowered panicles, about 35 cm. long, the flowers 4-merous. Branches thickened, slightly 4-angular, light gray, glabrous, densely setose at the nodes. Leaves elliptical oblong, subsessile, acute or blunt, the base tapering to the flattened, nearly obsolete petiole. Panicles drooping, pink, succulent, the branches whorled, the lower ones 6 to 8 cm. long, the upper gradually shorter; bracts lanceolate or linear-lanceolate, 5 to 6 mm. long. Flowers pale pink. Calyx 3 mm. long, truncate. Petals 4, about 5 mm. long. Stamens 8; filaments about 3 mm. long; anthers 3 mm. long, the spur very short. Fruit globose, black-purple, about 6 mm. in diameter.

Type specimen collected by Merrill, Mount Arayat, Province of Pangasinana, Luzon, May 15, 1904, without number (flower); also No. 3915 (Merrill), same locality, October, 1904 (fruit). Observed only at the summit of the mountain at an altitude of 870 m.

(6) *Medinilla ramiflora*, sp. nov.

A glabrous, erect shrub or undershrub, with ovate or ovate-lanceolate, acuminate, sessile or subsessile, 3-nerved, opposite leaves, the flowers in axillary fascicles on the branchlets or on the larger branchlets below the leaves. Branches grayish-brown, striate, the ultimate branchlets glabrous brownish-red, terete. Leaves 4 to 7 cm. long, 1.5 to 3 cm. wide, subcoriaceous, the apex long slender acuminate, the acumen blunt or retuse, the base somewhat rounded, minutely cordate, the three nerves prominent beneath, often also two very obscure submarginal nerves; petioles 1 mm. or wanting. Flowers pedicelled or nearly sessile, fasciculate on protuberances from the branches, 3 to 8 flowers in a fascicle, the pedicels in fruit 5 mm. long or less. Calyx red, 3 mm. long, the 4 teeth acute, about 1 mm. long. Petals four, pink, ovate-lanceolate, acute or somewhat acuminate, 6 mm. long, 2.5 mm. wide. Stamens 8, subequal, filaments 3 mm. long; anthers 3 mm. long, acuminate. Style filiform, 7 mm. long. Fruit ovoid, 5 mm. in diameter, bright red; seeds less than 1 mm. long.

Type specimen: No. 148 (Whitford), Mount Mariveles, Province of Bataan, Luzon, May, 1904 (flower); from the same locality, No. 3222 (Merrill), October, 1903 (fruit); No. 1590 (Forestry Bureau), collected by Borden, August, 1904 (fruit), and No. 267 (Copeland), January, 1904 (fruit); Mount Santo Tomas, Province of Benguet, Luzon, No. 6546 (Elmer), June, 1904 (fruit); Mount Banahao, Province of Tayabas, No. 935 (Whitford), September, 1904; Mount Apo, District of Davao, Mindanao, No. 1027 (Copeland), April, 1904 (flower).

A undershrub or shrub, 1 to 2 m. high, very common on exposed forested ridges on Mount Mariveles, from an altitude of about 900 m. to the summit of the mountain. Apparently related to *Medinilla myrtiformis* Triana, but differing in its fasciculate, not cymose, inflorescence.

- (7) ***Medinilla myrtiformis*** Triana, Cogn. in DC. Monog. Phan 7:583. 1891. Luzon, Cuming No. 753, not seen; Mindanao, Mount Apo, Copeland, No. 1028. Amboinia.

- (8) ***Medinilla megacalyx***, sp. nov.

A scandent shrub, with coriaceous, glabrous, whorled, obovate or elliptical-ovate, 3-nerved, petioled leaves, and short, terminal few-flowered cymes, the flowers 5-merous, the calyx 1 cm. long. Branches light gray, glabrous, terete, the ultimate branchlets dark brown, glabrous. Leaves in whorls of fours or threes, 5 to 9 cm. long, 2 to 4 cm. wide, the apex abruptly acuminate, the base cuneate; petioles 1 to 1.5 cm. long. Cymes terminal, about 5 cm. long, few-flowered, the peduncles 2.5 to 3 cm. long, the pedicels stout, 2 to 3 mm. long. Calyx yellowish-brown and minutely rugose when dry, about 7 mm. in diameter, urceolate, truncate. Petals 5, obliquely oblong, obtuse, 2 cm. long, 1 cm. wide. Stamens 10, the filaments about 8 mm. long, the anthers 13 mm. long.

Type specimen No. 1514 (Forestry Bureau), Ahern's collector, Mount Mariveles, Province of Bataan, Luzon, July-August, 1904.

- (9) ***Medinilla elmeri***, sp. nov.

A much-branched, subscaudent shrub, about 3 m. high, with glabrous, whorled, elliptical lanceolate, 5-nerved, petioled leaves and terminal, elongated panicles. Branches light gray, glabrous. Leaves in whorls of three or four, 7 to 11 cm. long, 2.5 to 3.5 cm. wide, the apex acute or acuminate, the base acute; petioles about 1 cm. long. Panicles pendulous, 12 to 25 cm. long, the peduncle often 10 cm. long, the branches whorled, spreading or ascending, 2.5 cm. long or less, the bracts lanceolate, 4.5 mm. long. Calyx truncate, 3 mm. long, 2.5 mm. wide. Petals 5, irregularly obovate, 7 mm. long, 5 to 6 mm. wide, pink. Stamens 10, 6 to 7 mm. long, the filaments deep pink, 3.5 mm. long, the anthers azure blue, 3 to 3.5 mm. long. Style 6 mm. long. Fruit globose, 6 to 7 mm. in diameter, black. Seeds many, narrowly ovoid, 1 to 1.2 mm. long.

Type specimen No. 5848 (A. D. E. Elmer), Mount Santo Tomas, Province of Benguet, Luzon, March, 1904.

A much-branched shrub along water courses.

- (10) ***Medinilla cumingii*** Naud., Cogn. l. c., 592, Luzon, Cuming, No. 836, not seen.

(11) ***Medinilla amplifolia***, sp. nov.

A clambering shrub, about 3 m. high, with glabrous, coriaceous, 5 to 7 nerved, elliptical ovate, or broadly elliptical, shortly and abruptly acuminate leaves, about 22 cm. long and 11 to 18 cm. wide, the flowers 4-merous. Branchlets thickened, light gray, glabrous, 4-angled, the angles narrowly winged. Leaves opposite, the base somewhat cordate, the marginal nerves obscure, the other five prominent. Panicles terminal, about 20 cm. long, the axis and branches red, glabrous, branches few, opposite or whorled, the longer ones 10 cm. long, the bracts about 1 cm. long, ovate-acuminate. Calyx blue, truncate, 5 to 6 mm. long, about 3 to 4 mm. in diameter. Corolla pink, the petals 4, obovate-oblong, obtuse, inequilateral, narrowed below, 14 mm. long, 6 to 8 mm. wide. Stamens 8; filaments 8 mm. long, the anthers about 10 mm. long.

Type specimen No. 6112 (A. D. E. Elmer), Sablan, Province of Benguet, Luzon, April, 1904. A clambering shrub in ravines, etc.

(12) ***Medinilla magnifica*** Lindl., Cogn. 1. c., 593. Baco River, Mindoro, No. 4046 (Merrill), March, 1905.(13) ***Medinilla astronioides*** Triana, Cogn. 1. c., 594. Philippines, Cum-ing, No. 758, not seen. Luzon, Mount Mariveles, Province of Bataan, No. 3895, Merrill, August, 1904.(14) ***Medinilla intermedia*** Blume, Cogn. 1. c., 597.

A species apparently represented by No. 3965 (Merrill); No. 2405 (Meyer) and No. 125 (Whitford), all from Mount Mariveles, Province of Bataan, Luzon, flowering January to May. Java.

(15) ***Medinilla whitfordi***, sp. nov.

An erect, glabrous shrub, 3 to 5 m. high, with opposite, 3-nerved, coriaceous leaves and terminal, single, or at most, 3-flowered inflorescence and 5-merous flowers. Branches slender, glabrous. Leaves opposite, 4 to 6 cm. long, 1.5 to 2 cm. wide, elliptical oblong, tapering to the acute base, the apex short acuminate; petiole flattened, 2 mm. long or less. Cymes terminal, very short. Calyx glabrous, truncate, 8 to 10 mm. long, 5 to 6 mm. thick. Petals 2.5 cm. long, about 1.2 cm. wide, obtuse, inequilaterally oblong, obovate. Stamens 10, equal; filaments 10 mm. long or slightly less; anthers 6 mm. long. Style about 18 mm. long. Fruit unknown.

Type specimen No. 961 (H. N. Whitford), Mount Banahao, Province of Tayabas, Luzon, September 19, 1904. A species evidently closely related to *Medinilla megacalyx*, differing in its opposite leaves, growing only at and near the summit of one of the peaks, at an elevation of about 1,700 m., forming dense thickets with *Homalanthus populneus* and two species of *Rhododendron*.

(16) ***Medinilla cordata***, sp. nov.

A spreading or subscandent shrub, 2 to 3 m. high, with elliptical, ovate, opposite, subcoriaceous, 3-nerved, more or less pilose leaves, which are cordate or rounded at the base, abruptly short acuminate, and terminal, erect panicles 5 to 6 cm. long. Branches light gray, shining, glabrous, the branchlets more or less densely pilose. Leaves 4 to 8 cm. long, 2 to 4 cm. wide, when young densely pilose, becoming nearly glabrous; basal nerves three. Panicles more or less pilose, the axis and branches slender, the

latter verticillate, 1 to 2 cm. long, the bracts persistent, ovate, lanceolate, acute or acuminate, 8 to 10 mm. long, the bracteoles smaller. Calyx 4 mm. long, truncate. Petals 4, pink, inequilaterally broadly obovate, obtuse, 6 to 7 mm. long, 5 to 6 mm. wide. Stamens 8, the filaments 3 mm., the anthers 2 mm.; style slender, 7 mm. long.

Type specimen No. 5805 (A. D. E. Elmer), Mount Santo Tomas, Province of Benguet, Luzon, March, 1904; also No. 937 (Forestry Bureau), collected by Barnes, same locality, May, 1904.

The structure of the hairs in this species is very peculiar; none of them exceed 1 mm. in length, being thickened and subplumose.

(17) *Medinilla venosa* Blume, Cogn., 1. c., 600. Luzon (Cuming), not seen. Moluccas and Ternate.

(18) *Medinilla lagunæ* Vidal, Cogn. 1. c., 600. Baguio, Province of Benguet, Luzon, No. 6291 (Elmer), May, 1904.

(19) *Medinilla bracteata* Blume, Cogn., 1. c., 601.

This species is represented by No. 4035 Merrill, Baco River, Mindoro, March, 1905, and No. 1487 Cuming, Philippines, in Herb. Govt. Lab. Cogniaux describes the species as having axillary racemes, but both numbers cited above have terminal racemes. New Guinea.

(20) *Medinilla luzonensis* Hook f. Cogn. 1. c., 602. Luzon, Lobb, not seen.

(21) *Medinilla ternifolia* Triana, Cogn. 1. c., 602. Luzon, Jager, not seen.

CLETHRACEÆ.

Clethra luzonica, sp. nov.

A shrub with elliptical ovate or somewhat obovate acute subcoriaceous leaves, the young branches, under surface of the leaves, panicles, and calyx densely ferruginous stellate pubescent. Branches grayish brown, striate, glabrous except the ultimate branchlets. Leaves 2.5 to 6 cm. long, 1.5 to 3 cm. wide, the base rounded, the margins above slightly serrate, the upper surface with scattered stellate hairs, sometimes nearly glabrous; nerves 10 to 12 on each side of the midrib, prominent beneath and especially densely stellate pubescent; petioles stout 5 mm. long. Inflorescence a terminal panicle, 6 to 8 cm. long, the branches racemose, spreading, the lower ones 5 to 6 cm. long. Calyx, in fruit, 3 mm. long, the lobes lanceolate or ovate, acute. Petals slightly united at the base, 3.5 mm. long, 1.8 mm. wide, obtuse, glabrous. Stamens 10, not exserted, the filaments flattened at the base, 2.8 mm. long, the anthers 0.5 mm. long. Capsule globose, densely pubescent, 3 mm. in diameter, the persistent style glabrous, 2 mm. long.

Type specimen No. 5810 (A. D. E. Elmer), Mount Santo Tomas, Province of Benguet, Luzon, March, 1904. A small stunted shrub growing on the exposed summit of the mountain at an altitude of about 2,500 m. above the sea; in fruit, March, 1904, but with few subsistent corollas. A species apparently most closely related to *Clethra lancifolia* Turcz., but differing from that species in its smaller, differently shaped leaves, and its peculiar stellate pubescence.

ERICACEÆ.

***Vaccinium apoanum*, sp. nov.**

A tree reaching a height of 10 m. with elliptical-oblong, sharply acuminate leaves, the flowers in axillary bracteate fascicles of from 3 to 6 in a fascicle. Branches reddish brown, glabrous. Leaves 7 to 11 cm. long, 3.5 to 6 cm. wide, glabrous, coriaceous, the base acute, 5 to 7 nerved from near the base, the outer pair of nerves obscure, the inner ones very prominent, especially beneath, sharply ascending; petioles 1 cm. long. Fascicles axillary, the peduncles glabrous, 1 cm. long, the bracts imbricate, ovate, rusty pubescent on the outside. Calyx cylindrical, 4 mm. long, 3 mm. in diameter, truncate, glabrous, the teeth small. Corolla 13 mm. long, pubescent, tubular-campanulate, the lobes about 3 mm. long, rounded, reflexed. Stamens 10, the filaments thick, 2.5 mm. long, the anthers 3 to 4 mm. long. Fruit unknown.

Type specimen No. 1103 (Copeland), Mount Apo, District of Davao, Mindanao, April, 1904. A tree reaching a height of 10 m. and a diameter of 30 cm., the wood white. The vegetative characters are very similar to those of *Vaccinium barandanum* Vidal.

THE PHILIPPINE SPECIES OF RHODODENDRON.

The genus *Rhododendron* in the Philippines is apparently confined entirely to the higher mountains, and accordingly the early botanical collectors in the Archipelago failed to secure specimens of this interesting genus, although Cuming, between the years 1836 and 1840, collected a single species of the genus, probably on Mount Banahao, Province of Tayabas, Luzon, the species not being described, however, until the year 1886.

The first Philippine *Rhododendrons* described were the two species *R. kochii* and *R. apoanum* by Stein in Gartenflora, 1885, although the latter had previously been figured by Vidal. In 1883 Vidal figured two species of *Rhododendron* in his Synopsis, but without specific names, and in the same year Fernandez-Villar, in his Novissima Appendix to the Flora de Filipinas, erroneously credited to the Philippines three species of the genus, *Rhododendron javanicum* Blume, *R. retusum* R. Br., and *R. jasminiflorum* Hook. f., these three species erroneously identified by F. Villar undoubtedly being referable to the species indicated in the following consideration. In 1886 Vidal enumerated six species of Philippine *Rhododendron* in his Revision de Plantas Vasculares Filipinas, of which three, *R. quadrasianum*, *R. verticillatum*, and *R. rosmarinifolium*, were described as new. In the same year Rolfe, finding the specific name *verticillatum* preoccupied, proposed the new name, *Rhododendron vidalii* for Vidal's *Rhododendron verticillatum*. In 1896 Rendle, in the Journal of Botany, described three species of Philippine *Rhododendron* from Whitehead's collections, *R. subsessile*, *R. lussoniense*, and *R. whiteheadii*, and credited to the Philippines a fourth species, previously known only from Borneo. In 1905 Warburg described a single species, *R. schadenbergii*, from northern Luzon. In the following consideration fourteen species are enumerated

from the Philippines, of which four are proposed as new. Of these fourteen species, so far as is known to-day, thirteen are endemic to the Philippines, a single species, *Rhododendron cuneifolium*, being known from outside the Archipelago, this species having originally been described from specimens collected on Mount Kinabalu, British North Borneo.

Artificial key to the Philippine species of Rhododendron.

1. Leaves acute or acuminate.
 2. Leaves and branches setose (1) *R. subsessile*
 2. Leaves and branches glabrous, or at least only lepidote.
 3. Flowers 3 cm. long or less.
 4. Flowers 1.5 to 2 cm. long, red; leaves 6 cm. long. An erect shrub..... (10) *R. apoanum*
 4. Flowers 3 cm. long, white or pink; leaves 4.5 to 5.5 cm. long. An erect shrub..... (8) *R. lussoniense*
 4. Flowers 3 cm. long, yellow; leaves 8 to 10 cm. long. An epiphytic shrub.. (4) *R. xanthopetalum*
 3. Flowers 4 to 6 cm. long.
 4. Flowers 5 to 6 cm. long, red..... (6) *R. spectabile*
 4. Flowers 4 to 4.5 cm. long, white.
 5. Leaves acute or only slightly acuminate, 8 to 11 cm. long..... (2) *R. schadenbergii*
 5. Leaves slender acuminate, 12 to 18 cm. long (3) *R. kochii*
 1. Leaves obtuse, rounded or emarginate.
 2. Flowers 3 to 4.5 cm. long, white.
 3. Flowers 3 cm. long; leaves 2.5 to 4.5 cm. long (9) *R. vidalii*
 3. Flowers 4 cm. long, campanulate; leaves 6 to 8 cm. long..... (5) *R. mindanaense*
 3. Flowers 4.5 cm. long, tubular; leaves 4 to 6 cm. long..... (7) *R. copelandii*
 2. Flowers 1 to 2.5 cm. long, red.
 3. Flowers 2.5 cm. long; leaves 2.5 to 4.5 cm. long (11) *R. whiteheadii*
 3. Flowers 1.5 cm. long or less.
 4. Leaves mostly 5 to 9 mm. wide; flowers 1.5 cm. long..... (12) *R. quadrastanum*
 4. Leaves mostly 2 to 4 mm. wide; flowers 1 cm. long.
 5. Pedicels densely lepidote (14) *R. cuneifolium*
 5. Pedicels pubescent (13) *R. rosmarinifolium*

(1) ***Rhododendron subsessile*** Rendle, Journ. Bot. 34:357. 1896.

A species related to *Rhododendron ledifolium* G. Don., represented by No. 5799 (Elmer), and No. 922 (Forestry Bureau) collected by Barnes, both numbers from Mount Santo Tomas, Province of Benguet, Luzon, March and May, 1904 (flower). A shrub reaching a height of 3 m., previously known only from the District of Lepanto, Luzon.

(2) ***Rhododendron schadenbergii*** Warb. in Perk. Frag. Fl. Philip. 172. 1905; *R. javanicum* Vidal, Sinopsis, Atlas, t. 60, f. F. 1883; Rev. Pl. Vasc. Filip. 170. 1886; F.-Vill. Nov. App. 353. 1883, non Blume.

This species recently described from specimens collected in the Province of Abra, Luzon, is apparently represented by the following specimens, all from the Island of Luzon: Province of Benguet, Baguio, No. 6519 (Elmer), June, 1904 (flower); Province of Bataan, Mount Mariveles, No. 3255 (Merrill), October, 1904 (flower); No. 450 (Whitford), July, 1904 (flower); No. 6856 (Elmer), November, 1904 (flower); Mount Banahao, Province of Tayabas, Luzon, No. 958 (Whitford), October, 1904 (flower). The species (in fruit), represented by Vidal's Synopsis, *t. 60, f. F.* 1883, and later identified by him as *Rhododendron javanicum*, was from Mount Banahao, and is probably referable to the form here considered to represent *Rhododendron schadenbergii*.

- (3) ***Rhododendron kochii*** Stein, Gartenflora, 34:193. *t. 1195.* 1885; Vidal, Rev. Pl. Vasc. Filip. 172. 1886.

A species known to the author only from the original description and plate cited above, which, judging from the figure and description is closely related to *Rhododendron schadenbergii*.

- (4) ***Rhododendron xanthopetalum***, sp. nov.

A glabrous epiphytic shrub, 80 cm. high or less, with a stout, simple or but slightly branched stem, coriaceous, scattered, alternate, slightly acuminate or merely acute, oblong-elliptical leaves, the flowers yellow, 3 cm. long, 3 or 4 in a terminal fascicle. Stem 1 cm. in diameter below, the bark light gray, glabrous, the younger parts reddish brown. Leaves 9 to 12 cm. long, 3.5 to 5 cm. wide, the base acute, the upper surface glabrous, the lower surface somewhat paler, glandular-punctate, the margins revolute, the midrib very stout and prominent; petioles very stout, 1.5 cm. long. Peduncles glabrous, 1.5 cm. long. Calyx reduced to an obscure disk. Corolla 5-lobed, campanulate, 3 to 3.4 cm. long and about as wide, the tube 1.5 cm. long, 5 mm. in diameter below, the lobes 1.5 cm. long, rounded. Stamens 10, the filaments pubescent below, 18 mm. long, the anthers 4 mm. long. Ovary 8 mm. long, lepidote, 5-celled; style 12 mm. long, glabrous.

Type specimen No. 322 (Whitford), Mount Mariveles, Province of Bataan, Luzon, May, 1904. A small shrub growing on mossy tree trunks at an altitude of 1,200 m. Apparently rare, as only a single specimen was found.

- (5) ***Rhododendron mindanaense***, sp. nov.

A shrub about 1 m. high, with glabrous, coriaceous, oblong-obovate obtuse leaves, the white flowers 4 to 4.5 cm. long, crowded in fascicles at the apices of the branches. Branches reddish or somewhat grayish, the ultimate branchlets sparingly lepidote. Leaves crowded at the upper nodes and at the apices of the branchlets, 5 to 7 cm. long, 2 to 3.5 cm. wide, tapering below to the cuneate base, the apex obtuse, often slightly emarginate, beneath with few scattered, obscure glands; petioles about 1 cm. long, sparingly lepidote. Flowers many, the peduncles 2 cm. long, lepidote, the deciduous bracts 2 to 3 cm. long. Calyx reduced to an obscure disk. Corolla 4 to 4.5 cm. long, narrowly campanulate, the tube 2.5 cm. long, 5 mm. in diameter below, very slightly enlarged above, the

limb 3 to 3.5 cm. in diameter, 5-lobed, the lobes erect-spreading, obovate, obtuse, 2 cm. long. Stamens 10, the filaments pubescent below, glabrous above, 2.5 cm. long, the anthers 3 mm. long. Ovary densely velvety yellowish brown pubescent, 6 mm. long. Style pubescent below, glabrous above, 2 cm. long.

Type specimen No. 1042 (Copeland), Mount Apo, District of Davao, Mindanao, April, 1904; also No. 73 (DeVore and Hoover), same locality, May, 1903, erroneously localized as from the Island of Basilan. A shrub growing at the summit of the mountain at an altitude of 3,100 m. above the sea.

(6) *Rhododendron spectabile*, sp. nov.

A glabrous shrub about 1 m. high, with coriaceous, elliptical-ovate to elliptical-oblong, scattered, alternate, acuminate or merely acute leaves, and large, red odorless flowers, 5 to 5.5 cm. long, in terminal 3-flowered fascicles. Branches glabrous, the ultimate ones reddish brown. Leaves 7 to 9 cm. long, 3.5 to 4.5 cm. wide, glabrous above, glandular-punctate beneath, the base acute or somewhat rounded, the midrib very prominent; petioles very stout, 1 to 1.5 cm. long. Peduncles glabrous, 2.5 cm. long. Calyx reduced to an obscure disk. Corolla campanulate, the tube 2 cm. long, 6 mm. in diameter below, the limb spreading, 5 to 6 cm. in diameter, 5-lobed, the lobes 2.5 cm. long, elliptical-ovate, rounded. Stamens 10, the filaments sparingly pubescent below, 2.5 cm. long, the anthers 5 mm. long. Ovary glabrous, oblong, 8 mm. long; style glabrous, 2.5 cm. long.

Type specimen No. 1438 (Copeland), Mount Apo, District of Davao, Mindanao, October, 1904; also No. 369 (in part) (DeVore and Hoover), same locality, May, 1903. A shrub growing in ravines at an altitude of 2,500 m., apparently closely related to *Rhododendron javanicum* Blume.

(7) *Rhododendron copelandi*, sp. nov.

A glabrous shrub 1 to 2 m. high, with narrowly obovate to oblanceolate coriaceous, obtuse or slightly acute, verticillate leaves, and many flowered terminal fascicles of white, fragrant tubular flowers 4 cm. long. Branches reddish brown, glabrous, the branchlets verticillate. Leaves in whorls at the nodes and apices of the branchlets, 4 to 6 cm. long, 1 to 2 cm. wide, glandular-punctate beneath, the apex abruptly acute or rounded, the base cuneate, tapering gradually to the stout petiole which is 8 mm long. Peduncles 18 mm. long, sparingly brown lepidote and minutely pubescent. Calyx a small crenate disk 2 mm. in diameter. Corolla tube 4 cm. long, tubular, 4 mm. in diameter, not enlarged or inflated above, the limb abruptly spreading, 1.5 cm. in diameter, 5-lobed, the lobes obovate, obtuse, 5 to 6 mm. long. Stamens 10, the filaments filiform, glabrous, 4 cm. long, the anthers 1.5 mm. long. Ovary oblong, 5 to 6 mm. long, densely pubescent with short spreading hairs; style slightly pubescent throughout, 3.8 cm. long.

Type specimen No. 1439 (Copeland), Mount Apo, District of Davao, Mindanao, October, 1904; also from the same locality, all specimens in flower, No. 1034 (Copeland), April, 1904, and Nos. 292, 382 (DeVore and Hoover), May, 1903. A shrub 1 to 2 m. high, growing at an altitude of from 2,500 m. to the summit of the mountain, 3,100 m.

- (8) **Rhododendron lussoniense** Rendle, Journ. Bot. 34:356. 1896.

A species known only from the original collection by Whitehead, district of Lepanto, Luzon, the type at the British museum.

- (9) **Rhododendron vidalii** Rolfe, Journ. Bot. 24:348. 1886. (*R. verticillatum* Vidal, Rev. Pl. Vasc. Filip. 171. 1886, non Low.)

This species, previously known only from the district of Bontoe, Luzon, is represented by the following specimens, all from Mount Mariveles, Province of Bataan, Luzon: No. 2743 (Merrill), January, 1904 (fruit); No. 3868 (Merrill), August, 1904 (flower); No. 452 (Whitford), July, 1904 (flower); No. 1591 (Forestry Bureau), collected by Borden, August, 1904 (flower).

- (10) **Rhododendron apoanum** Stein, Gartenflora 34:194. pl. 1196. 1885; Vidal, Rev. Pl. Vasc. Filip. 172. 1886; *Rhododendron* sp. affine *R. retuso* Benn., Vidal, Sinopsis, Atlas, t. 53. f. E. 1883; *R. jasminiflorum* F.-Vill., Nov. App. 353. 1883, non Hook.

A characteristic endemic species known only from Mount Apo, District of Davao, Mindanao, represented by the following specimens: Nos. 293, 375 (DeVore and Hoover), May, 1903; No. 1045 (Copeland), April, and No. 1440 (Copeland), October, 1904. A shrub extending from an altitude of 2,500 m. to the summit of the mountain, 3,100 m.

- (11) **Rhododendron whiteheadii** Rendle, Journ. Bot. 34:356. 1896.

A species known only from the original collection by Whitehead, district of Lepanto, Luzon, the type at the British museum.

- (12) **Rhododendron quadrasianum** Vidal, Rev. Pl. Vasc. Filip. 170. 1886; *R. retusum* F.-Vill., Nov. App. 353. 1883, non R. Br.

This species, previously known only from Mount Manahao, Tayabas Province, Luzon, and Mayon Volcano, Albay Province, Luzon, is represented by the following specimens: Luzon, Province of Bataan, Mount Mariveles, No. 3215 (Merrill), October, 1903; No. 278 (Whitford), May, 1904; No. 6765 (Elmer), November, 1904; No. 2090 (Forestry Bureau), collected by Borden, Nov., 1904; Province of Tayabas, Mount Banahao, No. 872 (Forestry Bureau), collected by Klemme, June, 1904; No. 804 (Cuming), 1836-40, in Herb. Govt. Laboratory; Mindanao, District of Davao, Mount Apo, No. 287 (DeVore and Hoover), May, 1903; No. 1036 (Copeland), April, 1904—all specimens in flower, and some with mature fruit.

- (13) **Rhododendron rosmarinifolium** Vidal, Rev. Pl. Vasc. Filip. 172. 1886.

A characteristic species represented by Nos. 5798 and 6377 (Elmer), Province of Benguet, Luzon, the former from Mount Santo Tomas and the latter from Baguio, both specimens in flower. A species previously known only from the district of Bontoe, Luzon. Dr. O. Stapf has kindly compared specimens of No. 5798 Elmer with the type of the species at Kew.

- (14) **Rhododendron cuneifolium** Stapf, Trans. Linn. Soc. Bot. II. 4:198. pl. 15. f. B. 3. 1894.

This species was described from material collected on Mount Kinabalu, British North Borneo, and has been reported from the Philippines by

Rendle,¹ Mount Dulangau, Mindoro, collected by Whitehead. It is closely related to the preceding species, and is the only species of *Rhododendron* known from the Philippines that is also found outside of the Archipelago, all the other species enumerated above being endemic so far as is known at present.

MYRSINACEÆ.

Embelia bataanensis, sp. nov. § *Pattara*.

A scandent shrub 2 to 3 m. high, with glabrous, submembranous, elliptical-lanceolate leaves, short, axillary racemose inflorescence and 5-merous flowers. Branches brownish, striate, the branchlets more or less densely dark brown puberulous. Leaves 5 to 7 cm. long, 2 to 2.5 cm. wide, the base acute, the apex obscurely acuminate, the tip blunt, the margins entire or slightly subcrenate above; nerves about 12 on each side of midrib, not prominent, freely anastomosing; petioles 5 mm. long, densely dark brown puberulous. Racemes axillary, puberulous, 2 cm. long or less, the pedicels slender, 3 mm. long, the bracteoles about 1 mm. long. Flowers pink, odorless, 2 mm. long. Calyx 5-cleft, the lobes narrowly ovate, obtuse, 0.8 mm. long, densely glandular, the margins minutely ciliate. Petals 5, free, oblong-obovate, 1.8 mm. long, with few glands above, the apex rounded. Stamens (male flowers) inserted near the base of the petals; filaments 1.7 mm. long; anthers 0.5 mm. long, the rudimentary ovary glabrous.

Type specimen No. 3207 (Merrill), Mount Mariveles, Province of Bataan, Luzon, October 21, 1903. Not common, on forested, exposed ridges at an altitude of about 1,000 m. above the sea.

SAPOTACEÆ.

Sideroxylon coriaceum, sp. nov.

A small tree with obovate, or oblanceolate, coriaceous, glabrous, obtuse, rarely subacute leaves 11 cm. long or less, the flowers in fascicles of from 6 to 23 in the axils of the leaves or in the axils of fallen leaves, the staminodes nearly obsolete. Branches brown, glabrous, striate, the ultimate branchlets minutely and obscurely pubescent. Leaves alternate, 9 to 11 cm. long, 3 to 4.5 cm. wide, the base cuneate, the apex usually rounded, rarely subacute, the upper surface smooth and shining, the lower surface pale, glabrous; nerves 8 to 12 on each side of the midrib, not prominent; petioles 1 to 1.5 cm. long, glabrous or nearly so. Flowers dull white, their pedicels rusty pubescent, 5 to 6 mm. long. Sepals broadly ovate, obtuse, 4 mm. long, 3 to 3.5 mm. wide, appressed rusty pubescent below. Corolla glabrous, the lobes ovate, obtuse, 4 mm. long, 3 mm. wide. Filaments 3 mm. long, the anthers 1.5 mm. long, 1 mm. thick. Staminodes very small, linear, less than 1 mm. long, or sometimes in part wanting. Ovary 5, or by abortion 4-celled, glabrous above, pubescent below.

Type specimen No. 6071 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, March, 1904. A small tree in dry thickets, apparently belonging

¹ Journ. Bot. 34:355. 1896.

to the genus *Sideroxylon*, although the very small, or often aborted staminodes, and the pubescent base of the ovary are characters that tend toward the genus *Chrysophyllum*.

SYMPLOCACEÆ.

• *Symplocos depauperata*, sp. nov.

A shrub about 3 m. high, with small, ovate, serrate leaves, and axillary simple, racemose inflorescence, 3 cm. long or less, and white flowers, the ovary pubescent. Branches dark reddish brown, more or less pubescent, becoming glabrous, the ultimate branchlets densely appressed ferruginous pubescent. Leaves subcoriaceous, 1.5 to 4 cm. long, 1.8 cm. wide or less, the base acute, the apex acuminate, margins finely serrate, or entire near the base, the upper surface glabrous except for the pubescent midrib, the lower surface with few scattered hairs, each hair from a small dark colored papilla, the midrib rather densely pubescent; nerves obscure, not more prominent than the reticulations; petioles densely pubescent, 2 to 3 mm. long. Racemes axillary, densely ferruginous pubescent, 10 to 15 flowered. Flowers white, 7 to 8 mm. in diameter, the bracts pubescent, broadly ovate, acute, slightly exceeding 1 mm. in length, the pedicels 1 to 2 mm. long, pubescent. Calyx tube 1.5 mm. long, glabrous or with very few scattered hairs, the lobes ovate, subobtuse, about 1.2 mm. long, the margins minutely ciliate, the median portion more or less pubescent, otherwise glabrous. Corolla lobes 4 mm. long, 2 to 2.5 mm. wide, elliptical-ovate, obtuse. Stamens many, the filaments glabrous, the longer ones 4 mm. long, very slightly united at the base; anthers 0.8 mm. in diameter. Ovary 3-celled, pubescent; style about 3 mm. long. Fruit glabrous, ovoid, 4 to 5 mm. long.

Type specimens: No. 5909 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, March 4, 1904 (flower); No. 6508 (Elmer), same locality, June, 1904 (fruit); No. 10 (Topping), same locality, February, 1903 (immature fruit).

A small shrub growing in the open plain region along streams, evidently most closely related to *Symplocos luzoniensis* Rolfe, differing from that species in its smaller leaves, longer, more numerous flowered spikes, pubescent ovary, and nearly glabrous calyx.

APOCINACEÆ.

Choneomorpha macrophylla G. Don. (*Tabernaemontana elliptica* Blanco, Fl. Filip. ed. 1, 115; ed. 2, 83.; ed. 3, 1:152; F. Vill. Nov. App. 132.)

This species has recently been collected in the Philippines, Bosoboso, Province of Rizal, Luzon, No. 1141 (Forestry Bureau), Ahern's collector, June, 1904; also No. 2704 (Merrill), the same locality, June, 1903, its previously definitely known range having been from the Himalayan region to Ceylon, Malayan Peninsula, Andaman Islands, and Java. Blanco's *Tabernaemontana elliptica* is certainly referable to this species, its identification with this genus having been suggested by Fernandez-Villar.

GYNOPOGON Forst.

(Alyxia R. Br.)

In the second edition of his *Flora de Filipinas*, Blanco described four species of *Brabejum*, of which three, *Brabejum concatenatum*, *B. lucidum*, and *B. pinnatum*, are certainly referable to the genus *Gynopogon* (*Alyxia*), and were reduced by F.-Villar¹ respectively to *Alyxia laurina* Gaud., *A. stellata* R. et S., and *A. odorata* Wall., which reductions are certainly erroneous, none of these species extending to the Philippines. Of Blanco's species, one only, *Brabejum lucidum*, is at present definitely known, this certainly being a synonym of *Alyxia monilifera* Vidal. F.-Villar also enumerates *Alyxia torresiana* Gaud., a species of the Marianne Islands, as a Philippine plant, which is undoubtedly erroneous.

Key to the Philippine species of Gynopogon.

1. Leaves opposite, 7 to 10 cm. long..... *Brabejum pinnatum*
1. Leaves whorled.
 2. Leaves in whorls of threes, about 5 cm. long;
calyx subtended by two bracts..... *Gynopogon monilifera*
 2. Leaves in whorls of fours or fives; calyx subtended
by five or more bracts.
 3. Leaves 10 cm. long *Brabejum concatenatum*
 3. Leaves 2.5 cm. long or less..... *Gynopogon parvifolia*

Gynopogon monilifera (Vidal). (*Brabejum lucidum* Blanco, Fl. Filip. ed. 2, 40. 1845, ed. 3, 1:74, non *Alyxia lucida* Wall.; *Alyxia stellata* Vidal, Sinopsis, Atlas, t. 67. f. B. 1883; F.-Vill. Nov. App. 129, non R. et S.; *Alyxia monilifera* Vidal, Rev. Pl. Vasc. Filip. 183. 1885.)

This species is represented by No. 3857 (Merrill), Mount Mariveles, Province of Bataan, Luzon, August, 1904 (fruit); also No. 224 (Whitford), same locality, May, 1904 (flower). The type material of Blanco's *Brabejum lucidum* was from Cebu, while that of Vidal's *Alyxia monilifera* was from Mount Banahao, Province of Tayabas, Luzon, No. 461 (Vidal).

Gynopogon parvifolia, sp. nov.

A scandent shrub with whorled, coriaceous leaves 2.5 cm. or less in length, and axillary solitary flowers about 12 mm. long. Branches yellowish gray, pustular, glabrous, the ultimate branchlets sharply angled. Leaves in whorls of from three to five, elliptical lanceolate, 1 to 2.5 cm. long, 0.5 to 10 mm. wide coriaceous, glabrous, the apex and base acute or subacute, the upper surface dark when dry, shining, the lower surface pale, the nerves nearly obsolete; petioles glabrous, 2 to 3 mm. long. Flowers white, solitary in the axils of the leaves, short pedicelled, subtended by a double whorl of ovate acute, pubescent bracts, 4 or 5 bracts in a whorl, and about one-half as long as the calyx. Calyx about 3.5 mm. long, deeply 5-lobed, the lobes ovate lanceolate, acute, pubescent. Corolla glabrous, about 10 mm. long, the tube cylindrical, about 8 mm. long, slightly enlarged above, the limb spreading, 5-lobed, the lobes ovate, acute, 4 mm. long. Stamens 5, inserted near the apex of the tube, the filaments about

¹ Nov. App. 129.

0.5 mm. long, the anthers ovate lanceolate, 1.5 mm. long, included. Ovary ovoid, pubescent, of 2 distinct carpels, the style filiform, glabrous, slightly thickened above, 4 mm. long. Disk wanting.

Type specimen No. 5800 (A. D. E. Elmer), Mount Santo Tomas, Province of Benguet, Luzon, March, 1904. A small, scandent shrub, fragrant when dry, growing at and near the summit of the mountain at an altitude of about 2,500 m. above the sea.

A fifth species of *Gynopogon* is represented by No. 614 (Merrill), Island of Culion, December, 1902, differing from the other Philippine species of the genus in its subglobose, not jointed, fruits. Flowers are necessary in order to accurately identify the species.

***Kopsia longiflora*, sp. nov.**

A tree about 9 m. high, with narrowly oblong, lanceolate to elliptical-lanceolate, glabrous leaves, and terminal cymes of elongated, white flowers. Branches brown, glabrous. Leaves opposite, 10 to 18 cm. long, 3 to 6 cm. wide, submembranous, shining, the base acute, the apex slightly blunt acuminate; nerves 16 to 18 on each side of the midrib, not prominent; petioles 5 to 10 mm. long. Cymes peduncled, the peduncle 1 to 3 cm. long; bracts ovate, blunt, or acute, about 2 mm. long, the margins ciliate. Flowers short pedicelled, bracteolate. Calyx segments ovate, blunt, about 2 mm. long, eglandular inside, but with glandular tips, glabrous. Corolla tube very slender, 2.5 cm. long, villous at the throat inside, the lobes spreading, 1.5 cm. long, 5 mm. wide, blunt. Stamens inserted near the top of the tube, included, the anthers less than 2 mm. long. Ovary of 2 distinct glabrous carpels united by the style, the disk of 2 alternating glands; style filiform; stigma cylindrical, 1 mm. long. Ripe carpels usually solitary, 2-seeded, narrowly ovoid, about 1.5 cm. long, 7 to 9 mm. thick, glabrous, blue when mature.

Type specimen No. 611 (Forestry Bureau), collected by Borden, Mount Mariweles, Province of Bataan, Luzon, April, 1904, (flowers and fruit); also from the same locality, No. 1448 (Forestry Bureau), Ahern's collector, August, 1904, (fruit); and No. 1802 (Forestry Bureau), collected by Ahern's collector, September, 1904 (fruit).

A tree reaching a height of 9 m. and a diameter of 10 to 12 cm., with light gray, scaly bark, growing in the hill forests at about 250 m. above the sea.

VERBENACEÆ.

***Callicarpa longipetiolata*, sp. nov.**

A small tree 6 to 7 m. high, with elliptical lanceolate, acute or slightly acuminate, long petioled leaves 8 cm. long or less, the upper surface shining, nearly glabrous, the under surface very densely and uniformly pale ferruginous stellate-lepidote pubescent, the cymes 4 to 5 cm. long. Branches brownish gray, striate, lenticellate, becoming glabrous, the ultimate branchlets very densely pale ferruginous lepidote-stellate pubescent, as are the petioles and inflorescence. Leaves 4 to 8 cm. long, 1.5 to 2 cm. wide, the margins entire, the base acute, the upper surface dark when dry, with few scattered lepidote-stellate scales, especially on the midrib,

the lower surface pale, the areolæ between the reticulations very densely lepidote stellate, the glands entirely obscured; nerves prominent, beneath, 7 to 8 on each side of the midrib, curved, ascending, at first pale and densely lepidote-stellate, later dark colored and nearly glabrous; petioles 1.5 to 1.8 mm. long. Cymes in the axils of the upper leaves, their peduncles 2 cm. long, the bracteoles 3 to 5 mm. long. Flowers white. Calyx stellate-lepidote, 1.5 mm. long, the teeth short, acute. Corolla glabrous, 3.5 mm. long, the lobes 1 mm. long, rounded, the tips slightly lepidote on the outside. Stamens 4, the filaments 4 mm. long, the anthers about 1 mm. long. Style 6 mm. long. Fruit unknown.

Type specimen No. 6266 (A. D. E. Elmer), Mount Santo Tomas, Province of Benguet, Luzon, May, 1904. A tree growing in the forests with very hard yellowish wood and thick yellowish-white, irregularly checked bark.

***Premna oblongifolia*, sp. nov.**

A subscandent nearly glabrous shrub with glabrous, oblong, acute or slightly acuminate leaves 9 cm. long or less, the calyx regularly 4-toothed, the corolla regularly or slightly irregularly 4-lobed. Branches brownish, glabrous, the ultimate branchlets very sparingly puberulous. Leaves membranous, opposite, elliptical oblong, the base often slightly irregular, rounded, the margins entire, both surfaces glabrous, shining, 5 to 9 cm. long, 2.5 to 4 cm. wide; nerves prominent on both surfaces, dark brown, sharply ascending, 4 to 5 on each side of the midrib; petioles glabrous or nearly so, 1.5 to 2 cm. long. Corymbs 4 to 6 cm. in diameter, the axis and branches minutely ferruginous pubescent, the bracts lanceolate, nearly glabrous, 1 cm. long or less. Calyx 1.8 mm. long, glabrous or nearly so, 4-toothed, the teeth short, obtuse or subacute, their margins minutely ciliate. Corolla 4 mm. long, greenish white, the throat densely pilose, otherwise glabrous, 4-lobed, the lobes subequal, 1.5 to 2 mm. long, rounded. Stamens four, the filaments subequal, 3 mm. long, the anthers 0.4 mm. long, wider than long. Ovary glabrous or nearly so, the style 3.5 mm. long. Stigma bifid.

Type specimen No. 5990 (A. D. E. Elmer), Baguio, Province of Benguet, Luzon, March, 1904. A subscandent shrub reclining on cliffs and bluffs, the stem 6 or 7 cm. in diameter, with soft, brittle wood and yellowish, smooth bark.

BIGNONIACEÆ.

***Radermachera elmeri*, sp. nov.**

A small tree about 6 m. high, with bipinnate glabrous leaves, and pendant panicle inflorescence, the pink flowers 5 cm. long, the branchlets, axis of the inflorescence, and leaf rachis glabrous, usually with many small white excrescences. Leaves about 35 cm. long, the leaflets elliptical lanceolate, glabrous, long acuminate, the base acute, 6 to 10 cm. long, 3 to 5.5 cm. wide; nerves about 10 pairs, not prominent, the reticulations lax, obscure; petiolules 5 to 10 mm. long, glabrous. Panicles about 30 cm. long, the branches opposite, spreading, 5 to 6 cm. long, dichotomously branching, few flowered. Flowers few, the pedicels slender, about 1.5 cm. long. Calyx campanulate, glabrous, 1.5 to 1.8 cm. long, 3 to 4 toothed, the

teeth broadly ovate, acute or subobtuse or sometimes rounded, 4 to 5 mm. long, 5 to 10 mm. wide. Corolla 6 cm. long, subcampanulate, the portion inclosed in the calyx tubular, 1 cm. long, then dilated, the mouth 5 to 6 cm. wide, entirely glabrous except near the insertion of the stamens where it is more or less ferruginous pubescent inside, the margins minutely ciliate, 5-lobed, the lobes rounded, about 2 cm. wide, 1.5 cm. long, subequal. Stamens inserted in the tube near the top of the tubular portion of the corolla, the filaments about 2 cm. long, glabrous above, more or less ferruginous pubescent below with capitate hairs. Ovary glabrous, the disk annular, thickened, the style glabrous, 2.5 cm. long. Capsule (immature) cylindrical, about 40 cm. long, 4 mm. in diameter, glabrous. Seeds including wings 8 mm. long, 2 mm. wide.

Type specimen No. 6179 (A. D. E. Elmer), Sablan, Province of Benguet, Luzon, April, 1904. Growing in the hill forests.

CAPRIFOLIACEÆ.

Lonicera rehderi, sp. nov.

A low prostrate shrub with subcordate, ovate-oblong, acute leaves, which are glabrous above, except on the midrib, and sparingly strigose-pubescent beneath, and yellow flowers about 2 cm. long, the corolla setosely pilose. Branches light brown, densely pubescent. Leaves 3 to 4.5 cm. long, 1.5 to 2 cm. wide, ovate oblong; nerves 5 to 6 on each side of the midrib, the reticulations distinct, nearly as prominent as the secondary nerves; petioles 3 to 4 mm. long, densely pubescent. Flowers in axillary pairs, crowded toward the ends of the branches, the bracts subulate. Calyx oblong-ovoid, 3 mm. long, the tube glabrous, the five erect lanceolate teeth setosely pilose, about 1 mm. long. Corolla yellow, marked with pale yellow, setosely pilose, the tube slender, 10 to 12 mm. long, nearly cylindrical, the limb about 10 mm. long, 2-lipped, the upper lip broad, 4-lobed, the lobes oblong ovate, obtuse, 3 mm. long. Stamens and style pilose, the corolla tube pilose within. Ovary 3-celled.

Type specimen No. 6601 (Elmer), Baguio, Province of Benguet, Luzon, June, 1904, a rather common prostrate shrub on limestone outcroppings at an approximate altitude of 1,800 m.

This species was first identified as *Lonicera loureiri* DC., but as the specimens did not agree entirely with the available descriptions of that species, material was sent to Mr. Alfred Rehder, who has recently published a synopsis of the genus.¹ Mr. Rehder kindly examined the specimens and states that although the species is allied to *Lonicera loureiri* and *L. acuminata*, it is a distinct, undescribed species, which is here dedicated to that author. According to Mr. Rehder, the present species differs from both *Lonicera loureiri* DC., and *L. acuminata* Wall., in its yellow, not red, corolla, which is much more densely setose than in those species, more slender, nearly cylindrical tube, smaller, acute, not acuminate, leaves which are glabrous above, except on the midrib, not appressed pilose throughout, also

¹ Rept. Mo. Bot. Gard. 14:27-232, 1904.

differing from *L. loureiri* in its oblong-ovate subcordate leaves. It also shows some affinity to *Lonicera glabrata* Wall., but is readily distinguished from that species by its setosely pilose corolla. A species of the section *Nintooa*, subsection *Breviflorae*.

No specimen of *Lonicera* is credited to the Philippines in Rehder's recent synopsis of the genus, and although several species have been previously reported from the Philippines, such references to Philippine *Loniceras* need verification. F.-Villar¹ credits to the Philippines four species, namely, *Lonicera chinensis* Wats., *L. confusa* DC., *L. macrantha* Spreng., and *L. javanica* DC. The first three species enumerated were observed by that author in cultivation in Manila and Cavite, and whether or not the identifications were correct, the species can be excluded from the Philippine flora as being cultivated only, having been introduced. Regarding the fourth species enumerated by F.-Villar, *Lonicera javanica*, this author cites a specimen in Vidal's Herbarium, from the Caraballo Sur Mountains (North Central Luzon). This specimen is not mentioned by Vidal,² but is cited by Ceron,³ as an undetermined species citing No. 3026 Vidal. Vidal's Herbarium in Manila has been destroyed, and as Rehder does not cite this specimen in his synopsis of the genus, it probably does not exist in the Kew Herbarium, the *Lonicera* material in that herbarium having been examined by Rehder. F.-Villar's identification was undoubtedly erroneous, for had it been correct, the species would have been cited in Ceron's later work. The specimen identified by Villar as *Lonicera javanica* DC., may have been identical with the species here described, or it may have been a distinct species. Future collections from the Caraballo Sur Mountains may settle this point, but at least until such material is secured *Lonicera javanica* DC., can safely be excluded from the Philippine flora.

¹ Nov. App. 104, 1882.

² Revision de Plantas Vasculares Filipinas, 1886.

³ Catalogo de las Plantas del Herbario 91, 1892.

II. THE SOURCE OF MANILA ELEMI.

By ELMER D. MERRILL, *Botanist*.

Manila Elemi has been known in commerce for many years, and especially in Europe, is considerably used in the practice of medicine, yet its source has previously never been definitely determined, although the fact has been known for some years that it is secured from a species of *Canarium*, growing in the Philippines, closely related to *Canarium commune* Linn. Recently much material has been received in this office, consisting of botanical specimens in fruit and flower, and also samples of "brea," as Manila Elemi is locally known, from the same trees from which the botanical material was secured. The specimens of Manila Elemi have been secured chiefly through the efforts of Dr. H. N. Whitford of this office and Mr. W. W. Clark and Mr. W. Klemme of the Forestry Bureau. At the present time Dr. A. M. Clover of this Bureau, in connection with his work on gums, oils, and resins, is making an exhaustive chemical investigation of the various kinds of "brea," as Manila Elemi is locally known, and from his investigations of the material recently secured and a careful examination of the corresponding botanical material in this office, we are able definitely to determine the source of this interesting product.

Trimen and Bently,¹ after a thorough discussion of the source of Manila Elemi, conclude that it is secured from a species of *Canarium*, closely related to *Canarium commune* Linn. The product is discussed by these authors under *Canarium commune*, a figure of this species being given, as well as one drawn from fragmentary material supplied by Mr. H. Ricketts, then British consul at Manila, which was supposed to represent the species yielding Manila Elemi of commerce. From the material and data at hand, including the specimens and information supplied by Mr. Ricketts, as well as drawings and notes which were made by Camell more than two hundred years ago and still preserved in the British Museum, they

¹ Medicinal Plants, 1: pl. 61, 1880.

reached their conclusion regarding the source of Manila Elemi, which has been provisionally accepted by most later authors. Watt¹ confuses *Icica abilo* Blanco and *Canarium commune* Linn., as the source of Manila Elemi. Schneider and Vogl² give a summary of the previous attempts to trace the source of this product, but their conclusions are indefinite, citing *Icica abilo* Blanco as the probable source of the product, but also citing Jagor as authority that it is secured from a species of *Canarium*. The United States Dispensatory³ conjecturally gives *Canarium commune* Linn., as its source. Sawyer⁴ follows Trimen and Bently and reproduces the figure of the latter authors, drawn from the Luzon specimen. Beilstein,⁵ although discussing the sources of *Elemiharz* and giving the identifications of the tropical American trees yielding substances similar to Manila Elemi, does not attempt to give the identity of the species yielding the Philippine product. Cordemoy⁶ follows Blanco and erroneously gives the source of Manila Elemi as *Canarium album* Ræusch. Weisner⁷ confuses *Icica abilo* Blanco and an undetermined species of *Canarium* as its source. Tavera⁸ gives its source as *Canarium commune* Linn., citing *Canarium album* Blanco and *Canarium luzonicum* Miq., as synonyms. Hirsch⁹ gives as its probable source *Canarium commune* Linn.

Canarium commune Linn., according to Engler,¹⁰ extends from the Malayan Peninsula to Java and North Celebes and so far has not been discovered in the Philippines. The specimen from Mindanao, identified by the author as *Canarium commune* Linn.,¹¹ is not that species, but is referable to *Canarium ovatum* Engl. The distribution of *Canarium commune* precludes the possibility of this species being the source of the Manila Elemi of commerce. The species from which it is secured is, however, closely related to *Canarium commune* Linn., and, so far as known, has not been

¹ Dictionary of the Economic Products of India, 2:94, 1889.

² Commentar zur österr. Pharmakopöe, 447, 1892.

³ 18th ed., p. 1643.

⁴ Odorographia, 2d series, 182, 1894.

⁵ Handbuch der Organischen Chemie, 3:556, 1897.

⁶ Gommès, Resines d'origine exotique, 195, 1900.

⁷ Die Rohstoffe des Pflanzenreichs, 238, 1900.

⁸ Medicinal Plants of the Philippines, English edition, 73, 1901.

⁹ Universal Pharmakopöe, 1:224, 1902.

¹⁰ DC. Monog. Phan. 8:112, 1883.

¹¹ Forestry Bureau, Bull. 1:27, 1903.

discovered outside the Philippine Islands. As no complete description of the species was published until very recently, previous authors have been justified in concluding, from the data and material available, that Manila Elemi was probably secured from *Canarium commune* Linn. The confusion of *Icica abilo* Blanco as the source or one of the sources of this product arose, not from a lack of a knowledge of the Spanish language on the part of later authors, as suggested by Tavera, but from the fact that one or two American species, described in the same genus (*Icica*=*Protium*) yield a substance similar in its properties to Manila Elemi; and these later authors were justified in presuming Blanco's generic identification for *Icica abilo* to be correct and that a species growing in the Philippines would be expected to yield products similar to those of the American species of the same genus. Blanco, however, does not credit his *Icica abilo* as yielding Manila Elemi, and his species, moreover, is not one of *Icica* (*Protium*), but belongs to the genus *Garuga*.

From a careful examination of all data and material available, it is evident that the source of the Manila Elemi of commerce is *Canarium luzonicum* A. Gray, a species apparently closely related to *Canarium commune* Linn. It is certainly the most common and widely distributed species of *Canarium* in the Philippines and the only one which yields in any quantity the pitch locally known as "brea" or "brea blanca" and known in commerce as Manila Elemi. The tree is commonly cultivated in cocoanut plantations in southern Luzon. Considering the fact that there are now no less than twenty-one species of the genus *Canarium* at present known from the Philippines, the native names for this species are remarkably constant, the standard native names "pili" or "pisa" rarely being applied to species other than *Canarium luzonicum*. The synonymy is as follows:

Canarium luzonicum (Blume) A. Gray, Bot. Wilkes U. S. Explor. Exped. 374. 1854; Miq. Fl. Ind. Bat. 1:pt. 2:651. 1859; Engler in DC. Monog. Phan. 8:150. 1883; *Pimela luzonica* Blume, Mus. Bot. Lugd. Bat. 1:220. 1849-51; *Canarium album* Blanco, Fl. Filip. ed. 1, 793; ed. 2, 546. 1845; ed. 3, 3:201. 1879, non Raeusch.; *Terebinthus luzonis altera*, Camell in Ray Hist. Pl. 3: Appendix, 60. 1704; *Almendras ó Piles*, Mercado, Libro de Medic., etc., 25. 1880; *Canarium commune* F. Vill., Nov. App. 40. 1883, and other authors mentioned above, non Linn.; *Canarium carapifolium* Perkins, Frag. Fl. Philip. 92. 1904; *Canarium indicum* Wight, Contr. U. S. Nat. Herb. 9:210. 1905, non Stickman.

Specimens examined: Luzon—Province of Tayabas, Pitoga, No. 2135 (Merrill), in fruit April, 1903, T., *Pili*; Pagbilao, Nos. 1898, 1894, 1915, 1610 (Merrill), in fruit April, 1903, T., *Pili*, *Belis*; Gumaca, No. 858 (Whitford), in fruit, September, 1904, T., *Pili*; Province of Camarines, Pasacao, No. 63 (Ahern), T., *Malapili*; Province of Rizal, Bosoboso, No. 2624 (Merrill), in flower in June, 1903, T., *Pisa*; No. 1160 (Forestry Bureau), Ahern's collector, in flower in June, 1904, T., *Pisa*; Province of Bataan, Lamao River, No. 1753 (Forestry Bureau), collected by Borden, in flower in August, 1904. Mindoro, Pinamalayan, No. 2146 (Merrill), in fruit in May, 1903, T., *Pili*. Ticao Island No. 1070 (Forestry Bureau), collected by Clark, in fruit in May, 1904, V., *Pili*; Masbate, No. 2615 (Merrill), in flower in June, 1903, V., *Pili*.

The earliest consideration of this species is by Camell, and his *Terebinthus luzonis altera* is undoubtedly identical with the species here considered. The next consideration is by Mercado, *Almendras ó Piles*, but, although his notes were written in the last third of the seventeenth century, his work was not published until the year 1880. Blanco gives the first description, which is as follows:

"*Canarium album*, *Canario blanco*, *Arboles* dioicos. **Machos*. *Hojas* opuestas aladas con impar. *Hojuelas* unos cuatro ó cinco pares, aovadas, alargadas, aguzadas, enteras y lampiñas. *Pecioles* mui cortos. Flores axilares en panoja. *Cal.* * * * *Cor.* * * * *Estam.* como in la especie anterior (*Canarium commune* Blanco, non Linn. "Cor. de tres hasta cinco petalos. Cal. persistente, cilindrico, con tres dientes obtusos. Estam. cinco hasta ocho.") **Hembras*, Flores axilares en racimos. *Cal.* y *cor.* como en la especie anterior. Drupa como en la especie anterior, con la diferencia de ser carnosa, mucho mas grande, y algo aguzada por los dos extremos. = Arboles mui communes en todos los bosques de las Islas, y cuyo fruto es del tamaño de una ciruela grande. El zumo, ó resina líquida que destilan, es blanco, á diferencia del otro (*Canarium commune* Blanco, non Linn.), cuyo resina es negruzca. La blanca es que regularmente se vende en el comercio, para calafatear las embarcaciones y alumbrarse los Indios: en este ultimo caso se amasa con la cascara de arroz, y lo envuelven todo con una hoja de *Buli*. Es mui olorosa y se llama brea de piles. Algunos mezclan su fruta, que tiene sabor de almendra con el chocolate, y por tanto trae á Manila. Su aceite es excelente y equivalente de la de almendras dulces. Los emplastos de brea á los pies son útiles en la hinchazon de las piernas. Aplicada la brea (derretida antes y no en crudo) al estomago, sirve de astomaticon, y puesta en las espaldas y quita las toses rebeldes. *Flor.* en Dic.* T., *Pisa*, *Pilauí*; Y., *Anten.* *Nota*: Es el género que Linneo llama *Canarium*, y *Loureiro Pimella*. Estos árboles de Filipinas siempre los he encontrado *dioicos*, y el caliz nunca de dos piezas, sino con tres dientes. Tienen afinidad con la *Bursera*."

The descriptions given by Blume and Miquel are very short, being adapted from Blanco's description given above. Engler's description is also entirely adapted from Blanco's, and the species is included in his monograph of the *Burseraceæ* as a doubtful one. Perkins considers that Miquel's name is a *nomen nudum*, and apparently that Blanco's description

is not sufficient to be considered a publication, although she suggests that her *Canarium carapifolium* may be the same as *Canarium luzonicum*. However, *Canarium luzonicum* is a transfer of *Pimela luzonica* to *Canarium*, and *Pimela luzonica* Blume is only a new name for *Canarium album* Blanco. Dr. Perkins gives the first complete description of the species.

The author is of the opinion that Blume's name should be retained and that Blanco's characterization, together with the properties assigned by him to his species, are sufficient to enable us to identify his species without a shadow of doubt. The species here considered agrees with Blanco's *Canarium album*, so far as his description goes, and, as noted by him, it is very common in the Philippine forests. The Tagalog names are the same, *Pisa* in the regions contiguous to Manila, from which Blanco drew his material, and *Pili* in other provinces, and these names are almost invariably applied to this one species. Blanco credits to his species the white, very fragrant "brea de piles," one of the local names of Manila Elemi, and an intimate knowledge of many species of *Canarium*, as they grow in the Philippine forests, leads us to conclude that this species is the only one, of the many which are now known from these Islands, that yields the white, fragrant Manila Elemi of commerce. The local uses of "brea" are the same to-day as they were in Blanco's time, it being extensively utilized in calking boats and in making torches. The seeds are edible and are commonly sold in the markets, while the oil extracted from them is somewhat utilized, as noted by Blanco.

While it is true that several other species of *Canarium* produce substances known as "brea" in the Philippines, yet each individual species of this genus yields a pitch with characteristic physical and chemical properties, and very little, if any, of the "brea" from species other than the one here considered finds its way into the market as a constituent of Manila Elemi. Specimens of Manila Elemi from some of the definitely identified trees cited above, agree perfectly in all characters, physical and chemical, with the specimens of this product purchased in the open markets of Manila. Among the other species of *Canarium* producing "brea" may be mentioned *Canarium cumingii* Engl., which produces a small quantity of dark-colored pitch, known locally as "brea negra," but which has little or no commercial value. *Canarium pachyphyllum* Perkins yields a certain amount of white brea, but its chemical composition is very different from that of *Canarium luzonicum*. *Canarium connarifolium* Perkins yields a very small amount of dark-colored "brea," as does also *Canarium polyneuron* Perkins. *Canarium bersamifolium* Perkins yields a considerable quantity of an oil-like substance, not at all pitchy, and which is scarcely or not at all utilized by the natives. *Canarium stachyanthum* Perkins yields a "brea" used by the natives for torches. Certain species probably yield no pitch or oil, one of these being *Canarium radlkoferi* Perkins. We have no definite information as to whether or not other species of Philippine *Canarium* yield "brea," but so far *Canarium luzonicum* is the only species known to us which yields the Manila Elemi of commerce, and it is believed that this name should be retained.



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