

BOTANY.—*Ferns new to the Cuban Flora.*¹ WILLIAM R. MAXON,
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In the course of continued botanical exploration of eastern Cuba, Brother Léon collected extensively in the high Sierra Maestra, Oriente Province, during July of the present year and ascended Pico Turquino, the culminating point of the range, which has an altitude of approximately 2,300 meters. His collections were sent to the New York Botanical Garden, from which institution a set of the ferns has been forwarded to the National Museum for identification by the writer. Since the region is almost untouched botanically this material proves of exceptional interest, containing several new species as well as numerous others that are rare in Cuba or have been known heretofore only from the Blue Mountains of Jamaica. These are described and listed in the present paper.

The discovery of a pronounced montane Jamaican element at similar elevations in Cuba is not altogether unexpected, and the definite records of extended ranges here given will lead to a certain modification of the current idea of Jamaica as a highly endemic center, at least so far as ferns are concerned. With increasing collections from the high Sierra Maestra an analysis of this relation and of the elements common to Cuba and Hispaniola should prove of the highest interest from several points of view.

In addition to records afforded by Brother Léon's collection of 1922 there are included a few based upon material collected by Brother Léon and his associates a year or two earlier in other parts of the Sierra Maestra, mainly at a lower altitude.

CYATHEACEAE

Culcita coniiifolia (Hook.) Maxon.

Near top of Pico Turquino, among shrubs (11155).

This is the only Cuban material seen by the writer. Known from Hispaniola and Jamaica, and on the continent from Mexico to Brazil and Ecuador.

Cyathea araneosa Maxon, N. Amer. Fl. 16: 74. 1909.

Sierra Maestra (11089).

Described from the Gran Piedra, Oriente, Cuba, on specimens collected by the writer (no. 4035), and since gathered by other collectors. The present specimen is the most completely fertile one seen, the segments throughout the pinnae all bearing 4 to 6 pairs of sori, instead of 1 to 3 basal pairs. The specific name was unfortunately chosen, inasmuch as the delicate, whitish-araneose inner border of the indusium, though evident enough in the

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type specimens, disappears at a very early stage, upon the ripening of the sporangia. Only the merest trace is discernible in the other specimens.

Cyathea producta Maxon, sp. nov.

Caudex erect, 4 to 6 meters high; fronds apparently ample; stipe 75 cm. long, olivaceous from a brown densely scurfy base, aculeate throughout, the spines numerous, 1 to 2 mm. long, conical, straight or antrorsely curved; basal part of stipe persistently paleaceous, the scales densely imbricate, 2 to 3.5 cm. long, acicular-caudate from a lanceolate base, atropurpureous, highly lustrous, with narrow yellowish brown, scarious, subentire borders; blade at least 1 meter broad, subtripinnate; rachis and middle pinnae wanting; basal pinnae oblong, 43 cm. long, 18 cm. broad, abruptly short-acuminate, long-petiolate (3 cm.), the secondary rachis dull olivaceous, closely yellowish-strigose above, beneath laxly and sparsely yellowish-hirsutulous, muricate toward the base; pinnules about 17 pairs, slightly apart, sessile or nearly so, 9 to 11 cm. long, 14 to 18 mm. broad, linear-oblong, in the apical third abruptly acuminate and conspicuously attenuate-caudate (the attenuate tip 2.5 to 3.5 cm. long), pinnatifid to about 1 mm. from the costa, the costa yellowish-strigose above, beneath laxly glandular-puberulous and deciduously paleaceous, the scales membranous, yellowish brown, broadly ovate, hair-pointed, subbullate, caducous; segments 14 to 16 pairs, oblong, rounded-obtuse, broadly connected by their strongly dilatate bases, 7 to 10 mm. long, 3.5 mm. broad at their middle, 5 mm. broad at base, spreading, falcate, membrano-herbaceous, glabrous above except for 1 to 3 stiff spinous hairs near the apex, thinly hirsute beneath along and between the veins to the freely long-ciliate, broadly crenate, slightly recurved margin; costules minutely paleaceous beneath, the scales like those of the costae; veins 8 or 9 pairs, acutely once forked near the base; sori 5 to 7 pairs, borne against the costa; indusia globose, transparent, membranous, rupturing irregularly; receptacle large, dark, depressed; paraphyses numerous, short, griseous-hyaline.

Type in the U. S. National Herbarium, no. 1,049,972, collected along a small stream near Palma Mocha Peak, Sierra Maestra, Oriente, Cuba, at 1,300 meters altitude, July, 1922, by Brother Léon (no. 11181).

In minute characters, such as the structure and disposition of hairs and scales upon the under surface of the blade, *C. producta* is most nearly related to *C. dissoluta* Baker, a rare plant of the Blue Mountain region of Jamaica, at 1,500 to 1,800 meters altitude. That species differs notably in having the pinnules closer, shorter (5 to 8 cm. long), and merely acuminate, the segments close, not at all dilatate, and not ciliate, the veins very oblique, partly simple, and running to obliquely crenate marginal teeth, and the scales of the costae and costules beneath highly colored and lustrous. Among related species *C. producta* is readily distinguished by its abruptly caudate pinnules alone.

Cyathea pubescens Mett.

Pico Turquino; trunk 4 to 6 meters tall (11151).

New to Cuba. Known heretofore from the mountains of Porto Rico, Hispaniola and Jamaica (the original region). Variable and perhaps needing segregation.

GLEICHENIACEAE

Dicranopteris furcata (L.) Underw.

Pico Turquino (11106).

The specimens are referred tentatively to this species, which Underwood

reports only from the Lesser Antilles (Martinique, Guadeloupe, and St. Kitts). The Cuban plant is essentially like recent Haitian specimens (Leonard 4273, 4273a), which will be discussed shortly in reporting on Mr. Leonard's collections.

Dicranopteris jamaicensis Underw. Bull. Torrey Club 34: 258. 1907.

Northwestern spur of Pico Turquino, altitude 1,900 meters (11112).

Known hitherto only from Jamaica, where it is abundant at 1,600 to 2,225 meters, forming extensive thickets on the half-open ridges, along with *D. palmata*.

Dicranopteris leonis Maxon, sp. nov.

Plant of medium size, sparingly branched; rhizome not seen; primary leaf-axis (incomplete) olivaceous, mottled with brown, about 3 mm. thick, dull, deciduously scurfy-paleaceous. Primary branches apparently 1 or 2 pairs, 35 to 40 cm. long, twice pseudodichotomous, the included buds all dormant, the scales firm, up to 7 mm. long, narrowly deltoid, flexuous at the long-attenuate apex, bright castaneous and lustrous with pale borders, or paler and concolorous, the friable borders obliquely and laxly long-ciliate; first internode of the branches 2 to 3.5 cm. long, naked, subtended by 1 or 2 small segments; second internodes 2 to 8 cm. long, diverging at an angle of 60 to 80°, completely pectinate except at the outer side near the base, the lower segments gradually shorter; pinnae diverging at an angle of 60°, linear-lanceolate, 25 to 32 cm. long, 3.5 to 5 cm. broad, abruptly narrowed at the base, attenuate at the apex, pectinate throughout, cut nearly to the rachis, the sinuses linear, acute; rachises of pinnae brownish or (in the outer part) greenish, persistently paleaceous beneath, the scales spreading, light castaneous, firm, freely long-ciliate; segments 90 or more on each side, close, linear, 1.8 to 2.8 cm. long, 4 mm. broad at the base, 3 to 3.5 mm. broad at the middle, acutish or narrowly obtuse, herbaceous, minutely pale-papillate beneath; margins entire, narrowly revolute; veins 30 to 35 pairs, close, once forked, green, elevated both above and beneath, these and the strongly elevated, stramineous costae minutely paleaceous beneath, the scales castaneous, reduced, substellate, with firm spreading cilia, minute ones extending sparingly almost to the margin, 4 or 5 larger ones invariably borne close against the leaf surface from the base of the receptacle of the sori in a close radiating indusium-like group, the scales otherwise all distinct, never forming a tomentum or obscuring the leaf surface; sori mostly 4-sporangiate, inframedial.

Type in the U. S. National Herbarium, no. 1,049,896, collected in the Turquino region of the high Sierra Maestra, Oriente, Cuba, July, 1922, by Brother Léon (no. 11092). The description is partly drawn from another specimen of the same number in the Underwood Herbarium, New York Botanical Garden.

In gross structural characters *D. leonis* is not very unlike *D. palmata* (Schaffn.) Underw., *D. mellifera* (Christ) Underw., and *D. brittonii* Maxon, in all of which the stellate scales of the under surface are very greatly reduced and truly capillary, even flaccid. In the presence and distribution of firm true scales beneath it is nearer *D. longipinnata* (Hook.) Maxon, of Surinam, but the scales are utterly different in color and structure.²

² Cfr. Contr. U. S. Nat. Herb. 24: 47-49. 1922.

POLYPODIACEAE

Elaphoglossum inaequalifolium (Jenman) C. Chr.

Pico Turquino, on trees (11166).

Described from Jamaica and known heretofore only from that island, where it is an abundant high-mountain species.

Polypodium gramineum Swartz.

Palma Mocha Peak, Sierra Maestra, at 1,400 meters elevation (11160).

Apparently not heretofore reported from Cuba. Agreeing closely with the present specimens are small plants collected on or near Pico Turquino by S. H. Hamilton in 1902. Both collections differ uniformly from the typical Jamaican plant in having much smaller and more delicate fronds, the stipes being more slender and the blades only 1 to 2 mm. broad, of thinner substance, and with some of the veins simple to the marginal connecting-vein; but in minute structural characters, such as those afforded by the rhizome scales and the once-forked glandular hairs of the leaf margin, the agreement is too close to justify the segregation of the Cuban plants as a distinct species. The extremes in width of blade do not, however, overlap. In Jamaica *P. gramineum* is abundant in the Blue Mountain region at 750 to 1,700 meters altitude.

Polypodium jenmani Underw.

East of Palma Mocha, Sierra Maestra, at 1,300 meters altitude, on tree trunks along a small stream (11101). Loma del Gato and vicinity, Cobre Range, Sierra Maestra, December, 1920, *Clement* 370.

New to Cuba, being known otherwise only from Jamaica, where it is very rare in the eastern part of the island at 500 to 900 meters elevation (*Maxon* 961, 1535; *Underwood* 2606; *Maxon & Killip* 173). The relationship is with *P. flexuosum* Maxon, of Cuba, which it resembles in scale structure.

Polypodium calvum Maxon, sp. nov.

Plants epiphytic, the fronds numerous, subfasciculate, rigidly ascending, 10 to 20 cm. long. Rhizome oblique or short-creeping, 1 cm. long or more, 3 or 4 mm. thick, coarsely long-radicate beneath, conspicuously paleaceous above, the scales ascending, loosely imbricate, 2.5 to 3 mm. long, 0.5 to 0.8 mm. broad, narrowly oblong-lanceolate, long-attenuate, attached just above the rounded subcordate base, entire, conspicuously clathrate, the cells with strongly sclerotic, dark reddish brown lateral walls, the outer walls pale yellowish, hyaline, greatly depressed; stipes short (0.5 to 1.5 cm. long), brown, nonsetose, bearing a few short branched glandular hairs, narrowly greenish-alate ventrally, the wings brownish with age; blades pinnatisect, 10 to 18 cm. long, 1 to 1.5 cm. broad near the middle, evenly attenuate in both directions, the apex not produced, the rachis nearly concealed above, beneath very prominent, black, lustrous, nonsetose, bearing a few branched glandular hairs, these evident mainly in the sinuses; pinnae 35 to 50 pairs, contiguous but not joined, spreading, the middle ones oblong or slightly triangular-oblong, broadest at base (3 to 4 mm.), rounded-obtuse or rarely acutish, rigidly coriaceous, nearly plane, entire, opaque, pale beneath, the venation wholly concealed; lower pinnae gradually shorter, triangular, the lowermost ones broader than long, short-decurrent; midveins of pinnae decurved at base, subflexuous; veins of larger pinnae 4 or 5 pairs, all but the proximal basal one diverging at about 45°, simple, ending in minute depressed-punctiform hydathodes remote from the margin; sori 3 or 4 pairs,

large, borne half way to the margin; sporangia numerous, glabrous, sometimes concealing 2 or 3 minute reddish setiform hairs.

Type in the U. S. National Herbarium, no. 1,049,931, collected in the high Sierra Maestra, Oriente, Cuba, in July, 1922, by Brother Léon (no. 11131). Collected also in the vicinity of Loma del Gato, Cobre Range, Sierra Maestra, altitude 1,100 meters, by Léon, Clement, and Roca (no. 10504).

A member of the group of *P. moniliforme* Lag., differing from the typical Jamaican form of that species in its short rhizome, its thick, short, rigid stipes, its numerous, mostly oblong pinnae, and its dark, heavily sclerotic rhizome scales. It is more nearly related to continental forms that are still erroneously retained in *P. moniliforme*.

Polypodium senile Fée.

Pico Turquino, on trees (11127).

New to the West Indian flora. Specimens are at hand from Costa Rica, Panama, Columbia, and Venezuela.³

Polypodium sherringii Baker.

Pico Turquino (11115).

Known hitherto only from the original collection, which came from the Newton District, Port Royal Mountains, Jamaica, at 1,200 to 1,500 meters altitude. This has recently been discussed by the writer.⁴ The present specimens, which agree absolutely with a photograph of the type, show that the relationship with *P. basiattenuatum* Jenman is much more remote than previously supposed, Jenman's redescription⁵ being accurate in every respect. The rigid, spongy, dark green leaf-substance, with few, rigid, dark brown setae, the distant, oblique, decurrent lobes, and the decurrent foliaceous wing arising from the basal lobes at once distinguish this diminutive plant.

Cheilanthes harrisii Maxon, Contr. U. S. Nat. Herb. 24: 51. 1922.

High Sierra Maestra (11184).

Known previously only from the vicinity of Cinchona, Jamaica, at 1,500 meters elevation. Allied to *C. marginata* H. B. K.

Paesia viscosa St. Hil.

Sierra Maestra, at 1,300 meters elevation; in woods (11159).

New to Cuba. An andine species of continental America, known hitherto in the West Indies only from the higher peaks of the Blue Mountains of Jamaica.

Psilogramme cubensis Maxon, sp. nov.

Rhizome stout, decumbent, 6 cm. long, 1.5 to 2 cm. thick (including the imbricate stipe-bases of old fronds), with numerous coarse wiry roots; rhizome hairs concealed, about 1.5 mm. long, dark purplish brown, opaque, rigid, simple, turgid, septate. Fronds several, clustered, arching, 40 to 60 cm. long; stipes nearly straight above the curved base, 20 to 28 cm. long, dark purplish brown, subscabrous, at first thinly short-villous with flattish septate hairs; blades oblong-lanceolate, acuminate, 20 to 32 cm. long, 8 to 13 cm. broad, subtripinnate, the primary rachis similar to the stipe, more freely villous, lightly flexuous throughout; larger primary pinnae 8 or 9 on each side, alternate, slightly oblique, subfalcate, inequilateral, those of the basal third the largest, triangular, acutish, 4 to 7 cm. long, 3 to 4.5 cm. broad,

³ Cfr. Contr. U. S. Nat. Herb. 13: 43. 1909.

⁴ Contr. U. S. Nat. Herb. 17: 552. 1916.

⁵ Bull. Bot. Dept. Jamaica II. 4: 113. 1897.

short-stalked (2 to 3 mm.), fully pinnate at base, the flexuous secondary rachis greenish-alate outward, bearing numerous pale, spreading, glistening, septate hairs; pinnules of larger pinnae 7 or 8 pairs below the pinnately lobed apex, pinnately parted, or the large basal ones fully pinnate at the base, with 4 or 5 pairs of spreading segments; larger segments in general broadly cuneate or cuneate-rhombic, 5 to 8 mm. long, 3 to 5 mm. broad (the base as broad as the common wing), obliquely cleft into 2 or 3 lobes, these simple or shallowly bilobate at tip; ultimate lobes 1.7 to 2 mm. broad; segments bright green, delicately membrano-herbaceous, bearing numerous stiff oblique tawny hairs above (both on and between the veins), the hairs of the lower side whitish, spreading, often gland-tipped, borne mainly on the veins; venation evident, the branches ending in the minutely emarginate tips of the lobes; sporangia relatively few, falling far short of the tips of the lobes, not long-decurrent.

Type in the U. S. National Herbarium, no. 1,049,913, collected on Pico Turquino, Sierra Maestra, Oriente, Cuba, in July, 1922, by Brother Léon (no. 11111).

A close ally of *Psilogramme chiapensis* Maxon,⁶ of Mexico, belonging to the group of *P. hirta* and *P. glandulosa*, of South America. That species is similar to *P. cubensis* in structure, but differs in its much smaller pinnules and narrower segments (the ultimate lobes mostly 1 mm. broad, or less), and in its more copious hairy covering, this largely of a distinctly glandular type.

Asplenium diplosceuum Hieron. *Hedwigia* 60: 232. 1918.

Loma del Gato and vicinity, Cobre Range, Sierra Maestra, at 1,000 meters altitude; in woods (*Léon, Clement & Roca* 10179).

Founded on Wright's no. 849, collected in some part of eastern Cuba, and known heretofore only on material of that collection.

Plagiogyria semicordata (Presl) Christ.

Near Pico Turquino (11126).

Apparently new to Cuba. It occurs on the summit of Blue Mountain Peak, Jamaica, altitude 2,225 meters, and on the continent from Mexico to the Andes of South America.

Struthiopteris shaferi Broadh. *Bull. Torrey Club* 39: 374. 1912.

Slopes of Pico Turquino, at 1,800 to 1,900 meters altitude (11148).

Originally described from much smaller specimens, collected at Camp La Gloria, south of Sierra Mocha, Oriente, Cuba, by J. A. Shafer (no. 8106). The present specimens are about 1 meter high and apparently represent a full development of the species. The sterile blade tapers gradually in the lower third, the lowermost pinnae being less than 1 mm. long. In other respects the plant agrees with the original material, the form of the sterile pinnae being especially distinctive.

Dryopteris grisebachii (Baker) Kuntze.

Near Palma Mocha, Sierra Maestra, at 1,300 meters altitude, along banks of small stream (11137). Vicinity of Loma del Gato, Cobre Range, Sierra Maestra, altitude 1,050 meters, in forest (*Léon, Clement & Roca* 10169).

Known from Cuba otherwise, apparently, only on Wright's no. 1055, the type collection. It occurs sparingly in the Blue Mountain region of Jamaica at elevations of 750 to 1,500 meters.

⁶ *Bull. Torrey Club* 42: 81. 1915.

Dryopteris hemiptera Maxon, Contr. U. S. Nat. Herb. 24: 59. 1922.

Ridge of the Sierra Maestra, at 1,300 meters elevation, in forest (11133). Cobre range of the Sierra Maestra (*Léon, Clement & Roca* 10311, 10409, 10486).

When described this species of the subgenus *Stigmatopteris* was known only from the original collection (*Wright* 1053), from some part of eastern Cuba. No. 10486 is viviparous in the axils of most of the pinnae, bearing young plants with leaves 1 to 2.5 cm. long.

Dennstedtia globulifera (Poir.) Hieron. Bot. Jahrb. Engler 34: 455. 1904.

Loma del Gato and vicinity, Cobre Range, Sierra Maestra, at 1,000 to 1,100 meters elevation (*Léon, Clement & Roca* 10177).

New to Cuba; originally described from Hispaniola. The history and relationship of this species will be discussed shortly in another connection.

HYMENOPHYLLACEAE

Hymenophyllum lineare Swartz.

Pico Turquino; on tree trunk (11116).

The only undoubted Cuban specimen of this species seen by the writer, though it has previously been ascribed to the island. Described originally from Jamaica, where it grows commonly in large mats on tree trunks of the upper forested slopes of the Blue Mountains, at 1,600 to 2,225 meters altitude. On the continent *H. lineare* is reported from Mexico to Brazil and Peru, but the name is very loosely used for several species of this group, which needs critical revision. The Cuban and Jamaican plants are identical.

LYCOPODIACEAE

Lycopodium montanum Underw. & Lloyd, Bull. Torrey Club 33: 107. 1906.

Turquino region; terrestrial (11099).

Known previously only from the summit of Blue Mountain Peak, Jamaica, altitude 2,225 meters.

Lycopodium serratum Thunb.

Pico Turquino, in woods; terrestrial (11161).

A widely distributed Old World species known in America, hitherto, only from Mexico, whence it was described as *L. sargassifolium* Liebm.