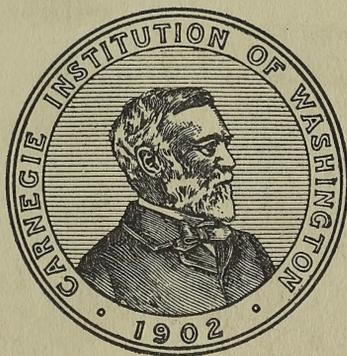

BOTANY
OF THE
MAYA AREA

MISCELLANEOUS PAPERS

XIV-XXI



Publication 522

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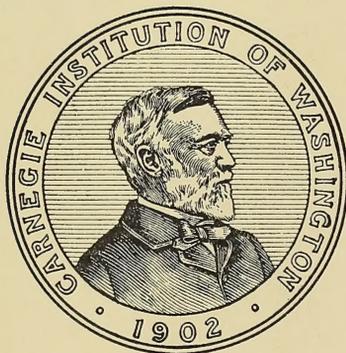
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XIV

The 1936 Michigan-Carnegie Botanical
Expedition to British Honduras

CYRUS LONGWORTH LUNDELL
Carnegie Institution of Washington
University of Michigan Herbarium

With four plates and one map

[Issued June 20, 1940]

PREFACE

Pursuant of the fact that any scientific survey of the vegetation of a region must include a critical taxonomic evaluation of the entities themselves, the Carnegie-Michigan botanical investigations in the Maya area have involved extensive systematic studies. The intricate interrelation of species in many plant families has made imperative the solicitation of aid from specialists who in most instances have devoted years of study to their particular groups. The accurate identification of collections from such areas as the limestone plateau and Mountain Pine Ridge of British Honduras requires far-reaching taxonomic research which no individual alone can hope to accomplish within reasonable time. Many of the plants are poorly understood, some are new to science, and others bear scientific names which are no longer tenable for various reasons.

Through the splendid cooperation of collaborators, it is possible to present, along with this report, another series of critical taxonomic papers, monographic in form. Their publication obviates further delays in coordinate investigations.

In this and the first volume of the series, some of the most difficult as well as largest families are treated in a scholarly manner. When the remaining groups, some now in a chaotic state, have been revised, these materials will form the basis for a comprehensive formal flora.

Although British Honduras has been botanized extensively during the past decade, most of the explorations prior to 1936 were undertaken in coastal areas and along the Belize River through the center of the colony. The interior limestone plateau remained practically untouched. The 1936 expedition of the University of Michigan and the Carnegie Institution of Washington had as its objective a reconnaissance survey of the flora of the limestone plateau and the adjacent granitic Mountain Pine Ridge, both in El Cayo District (fig. 1). The latter area had been visited previously by the 1931 Carnegie-Michigan expedition; hence our studies there were confined to the western borderland which had not been explored.

The writer and Dr. E. B. Mains arrived in Belize on June 12 and remained in the colony through August 23. By river boat we reached El Cayo on June 15, and stayed in that district through August 17.

During the first month explorations centered on the limestone plateau which lies south of El Cayo between the Macal River and the Chiquibul¹ branch of the Mopan River. From El Cayo the expedition went south by mule train passing through Benque Viejo and Arenal on the way to Valentin, where headquarters were established for eighteen days. The entire plateau is criss-crossed by roads cut by mahogany operators which facilitate travel. One trip was made to the *champa* called Retiro, the southernmost point reached. From Valentin we moved to Cohune Ridge, then to Chalillo Crossing on the Macal River. There we were prevented from crossing into the Mountain Pine Ridge by the flooded stream. From Chalillo Crossing we returned to Cohune Ridge, and proceeded from there to El Cayo via the road passing through Camp 6 and Vaca. We reached El Cayo on July

¹ The name of this river is spelled Chequbul on Ower's map (1927) and Checubul by Thompson (1931). Locally the name is pronounced and spelled Chiquibul. It probably is a corruption of "chicle bull," the local name for the inferior chicle obtained on the plateau.

19 and left there on July 22 for the Mountain Pine Ridge by way of Macaw Bank. From our headquarters at San Agustin, explorations extended along the western side of this great pine area southward to Vaquero. We returned to El Cayo on August 15 and left for the coast by river boat the following day.

Collections were made along the Belize River, in the vicinity of El Cayo, and through all the area traversed during our work on the limestone plateau and in the Mountain Pine Ridge. The pteridophytes and phanerogams obtained by the writer total 941 numbers, 6090 to 7031 inclusive, with extensive series of duplicates. Dr. Mains devoted his entire attention to the cryptogamic flora and especially to the Uredinales. Incidental to the botanical work, reptiles, amphibians, and fishes were collected for the Museum of Zoology of the University of Michigan.

The following thirty-four papers have been based at least in part on materials obtained by the 1936 expedition: Epling (1940), Gleason (1940), Hedrick (1939), Lundell (1937*a*, 1937*b*, 1937*c*, 1937*d*, 1937*e*, 1937*f*, 1937*g*, 1938*a*, 1938*c*, 1939*b*, 1939*c*, 1939*d*, 1939*e*, 1940), Mains (1939*a*, 1939*b*, 1939*c*, 1939*d*, 1939*e*, 1939*f*), Moldenke (1940), O'Neill (1940), Seibert (1940), A. H. Smith (1939), Hobart M. Smith (1939), L. B. Smith (1937), L. B. Smith and Lundell (1940), Standley (1937*a*, 1937*b*), Swallen (1938), and Woodson (1940). Although reports on the major part of the collection have been finished and published, some groups, including most of the palms and aroids, as well as miscellaneous fungi and mosses, still remain to be studied.

For funds which made the expedition possible, we are indebted to the Horace H. Rackham School of Graduate Studies of the University of Michigan. To Dr. A. V. Kidder, Chairman of the Division of Historical Research of the Carnegie Institution of Washington, grateful acknowledgment is made for the continued financial support of the writer's studies in both field and herbarium. His unflinching interest in the biological problems of the Maya area has made possible the success of the Michigan-Carnegie cooperative project initiated in 1930. Equipment belonging to the Carnegie Institution was placed at our disposal at El Cayo, and thanks are expressed for this aid.

Mr. Robert K. Masson of Belize, on each of the writer's visits to British Honduras, has greatly facilitated the botanical work through personal and official courtesies. My sincerest thanks are expressed to him for his gracious hospitality as well as the aid he has extended at every opportunity. To Mr. L. M. Sylvestre, who made available the facilities of his logging camps at Valentin and Cohune Ridge, we are indebted for this aid. To Mr. L. E. Hopun of El Cayo, and Mr. Percy H. Gentle, who served as assistant in the field, acknowledgment is made for their contributions to the success of the expedition.

Although a majority of the collections of vascular plants have been identified by the writer, thanks are due to the following persons for their generous aid with special groups: Dr. W. R. Maxon (Pteridophyta); Mr. E. P. Killip (Passifloraceae); Mr. C. V. Morton (Dioscoreaceae, Smilacaceae, Malpighiaceae, Solanaceae); Mr. E. C. Leonard (Acanthaceae); Dr. S. F. Blake (Polygalaceae, Compositae); Mr. Jason R. Swallen (Gramineae); Dr. Hugh O'Neill (Cyperaceae); Dr. L. B. Smith (Bromeliaceae); Mr. Charles Schweinfurth (Orchidaceae); Dr. C. H. Muller (*Quercus*); Dr. Carl Epling (Labiatae); Dr. H. A. Gleason (Melastomaceae); Dr. R. E. Woodson, Jr. (Apocynaceae); Dr. H. N. Moldenke (Verbenaceae); Dr. Francis W. Pennell (Scrophulariaceae); Mr. R. J. Seibert (Bigno-

niaceae); and Dr. I. M. Johnston (Boraginaceae). Dr. P. C. Standley kindly identified the Rubiaceae and various plants of other families submitted to him.

The botanical exploration of El Cayo District, begun in 1927 by Mr. Duncan Stevenson, was continued in 1928 and 1929 by the writer during brief visits the first season to El Cayo and Camp 6, and the second season to Roaring Creek. Since a reconnaissance of the chicle forest was the prime objective, only a limited series of collections resulted from the initial forays in 1928 and 1929. The first large collection in the district was obtained in 1931 by Professor H. H. Bartlett (1935*b*) in the vicinity of El Cayo and in the Mountain Pine Ridge. In 1933, while passing to and from Peten, the writer collected at El Cayo and downstream along the banks of the Belize River (Lundell, 1937*c*). From March to June the same year Mr. Mercedes Chanek obtained a series of 232 numbers in the vicinity of El Cayo. In 1938 Mr. Percy H. Gentle was sent to Vaca to supplement the collections in the Macal River Valley obtained by the 1936 expedition (Lundell, 1939*c*); his series for that area totals 451 numbers.

Aside from the collection of Bartlett in the Mountain Pine Ridge in 1931 and the 1936 expedition's collections on the limestone plateau and in the Mountain Pine Ridge, the greater part of the material available is from the various stages of second growth along the lower reaches of the Macal River, especially at El Cayo, and from the banks of the Belize River. Until the second growth around El Cayo has been systematically studied, publication on that section scarcely seems justified. Therefore this report is restricted to two areas, the limestone plateau and the Mountain Pine Ridge, the objectives of the expedition. Since the two areas differ so widely, each will be discussed separately.

C. L. LUNDELL.

April 1940.

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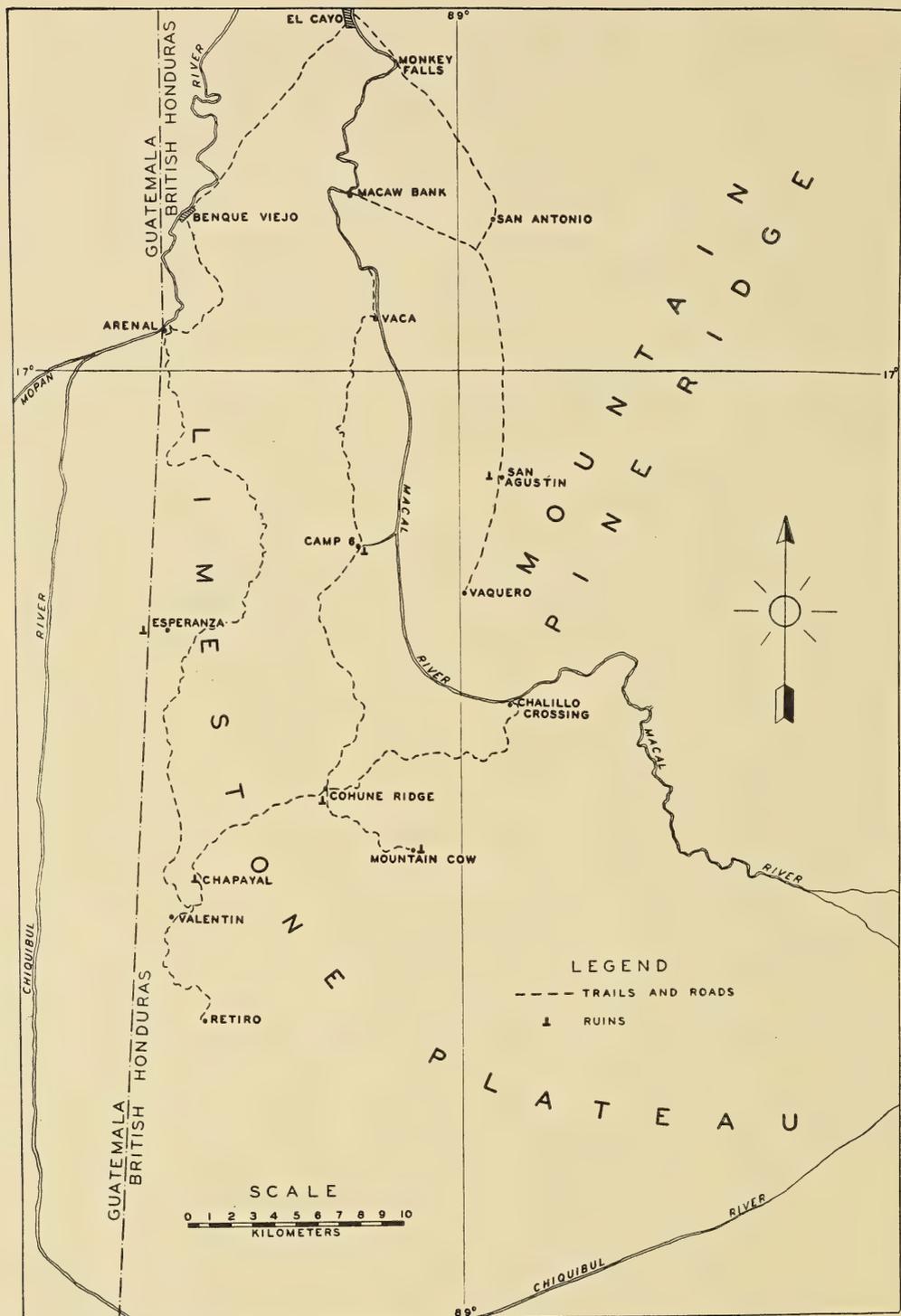


FIG. 1—Areas of El Cayo District, British Honduras, Visited by the 1936 Michigan-Carnegie Expedition
 The map is based on government surveys of British Honduras generously made available by
 Mr. N. S. Stevenson, Conservator of Forests.

THE 1936 MICHIGAN-CARNEGIE BOTANICAL EXPEDITION TO BRITISH HONDURAS

THE LIMESTONE PLATEAU²

DESCRIPTION OF THE REGION

The plateau, which ranges in altitude from 400 to 725 m., is a mass of Oligocene limestone (Ower, 1927; Sapper, 1937). Its terrain is broken by domed hills and low ranges, all usually less than 70 m. high. Although the elevation is comparatively low, it apparently is sufficient to have some effect on the vegetation; otherwise the absence of such species as *Metopium Brownei* would be difficult to explain.

The plateau is surrounded by two rivers, the Chiquibul on the west and south, the Macal on the east and north. Not a single surface stream larger than a brook was found in the section of the interior we traversed. Drainage is almost entirely subterranean. Undrained basins were encountered at Esperanza and Retiro. Near Valentin, Camp 6, and Cohune Ridge there are small all-season springs. Most of the surface water completely disappears during the dry season, and renders travel difficult.

The rainfall at El Cayo at the north end of the plateau is about 2050 mm. annually; at Middlesex to the northeast it is approximately 3600 mm. No stations are available for the plateau, but the precipitation must exceed 2500 mm. over the greater part of the area. The luxuriance of the vegetation alone would justify such a conclusion.

The soil is a black clay containing a high percentage of humus. It is thin on the hills but reaches an observed depth of as much as 3 m. in the valleys. Soil-retaining terraces occur throughout the plateau.

HISTORY OF MAYA OCCUPATION

TERRACES

No other area of similar size in the Yucatan Peninsula shows as much evidence of Maya occupation as the limestone plateau. Apparently there are no great monumental cities, such as occur in Peten, but everywhere the land is terraced. Terraces of similar nature have not been encountered in any part of the Yucatan Peninsula outside of British Honduras. On the plateau, the terraced region, which covers an estimated area of 400 sq. km., begins near Benque Viejo and Arenal on the north, and extends southward and westward to the Chiquibul River, and eastward to the Macal River.

On our inward trip to Valentin, we met the first terraces near Arenal. Over the remainder of the distance to Valentin and on the subsequent trips to Retiro, Cohune Ridge, Chalillo Crossing, and Vaca, terracing was found wherever the terrain was sloping. On one hillside I counted no less than 51 terraces, and this was not an exceptional condition. Although tractors hauling mahogany logs had broken down most of the terraces crossing roads, some were still so steep that dismounting was necessary in order to climb them. Height and proximity of the terraces depend upon the terrain; some are only 0.5 m. high, others exceed 3 m. They are faced with rough blocks of limestone.

² This discussion of the plateau pertains solely to the area lying within British Honduras.

Cook (1909, pp. 17-18) describes terraces of a similar type from Guatemala and eastern Chiapas:

Terracing of the land shows that agriculture was extensively practiced in former times in regions now unoccupied. Two principal forms of prehistoric stone terraces, built evidently for agricultural purposes, may be recognized in the Central American region, in addition to the narrow terraces of earth described in a previous section. There are (1) narrow, high terraces to hold drainage water and prevent erosion in the narrow valleys or on steep slopes of mountains and (2) broad, low terraces apparently leveled to keep rain water from running off rather than to apply irrigation.

Terraces of the first type are frequently met with in the heavily forested region of eastern Guatemala. Similar terraces are used at the present time in the denuded mountains of northwestern Guatemala, between Santo Tomas and Jacaltenango. Terraces of the second type cover many square miles of unoccupied land in the semiarid plateau region of the Mexican State of Chiapas, between the Guatemalan boundary and Comitán, as well as between Comitán and Ocosingo. . . .

Terracing in British Honduras was first reported by Ower (1927, pp. 383-384):

The limestone has usually been cultivated by the Mayas wherever enough soil could be retained. Ruins of agricultural terraces are common amongst the mountain limestone between the Belize and Cheqbul Rivers.

Agricultural terraces are seen on the low limestone area between the Belize and Sibun Rivers, so probably extend into Peten although not recorded.³ Terrace cultivation is not practiced by the present Mayas.

In a later publication, Ower (1929, pp. 1-2) makes the restatement, "On the limestone plateau abandoned agricultural terraces are very frequent wherever a few yards of soil were retainable. . . ."

Thompson (1931, pp. 228-229), who undertook archaeological investigations on the plateau in 1928 and 1929, writes concerning the terraces:

Practically every hillside from between Arenal and Benque Viejo in the north, and the Mountain Cow area in the south, is terraced. The terraces are faced with rough blocks of limestone, and vary in width according to the slope of the hill on which they are situated. They were, undoubtedly, erected to prevent denudation, irrigation in this area being impossible. . . . Although I could find no positive evidence as to when they were erected, I should be inclined to place the period as the last three or four katuns of Cycle 9 and the first katuns of Cycle 10. Potsherds found on these terraces belong to this period; but this is, at the best, merely negative evidence, as only a superficial examination could be made. However, as the population was surely greater at this time than in the earlier period, the assumption might be made that the earlier and scantier population would have cultivated the lower level lands, and only pressure of population led to the terracing and cultivation of the steeper high slopes.

That the terraces were built to prevent erosion appears unquestionable. With the exception of recently denuded areas, the entire plateau is now heavily forested. At the time of

³ The writer has traveled through the hilly tableland of southern Campeche and northern Peten, and no agricultural terraces have been encountered in those areas, and none has been reported by others who have traversed the region.

the occupation by the terrace builders, all or the greater part of the land probably was cleared. As rainfall in the area probably exceeds 2500 mm. annually, loss of soil through erosion is great with removal of vegetation. This is very evident from conditions now existing in the northwestern part of the area.

When I visited Camp 6 in 1928, the hills nearby were covered with high luxuriant rain forest. Sapodilla trees and other hardwoods were abundant on slopes and tops of the highest hills. The same locality was visited again in July 1936.

Sometime between 1929 and 1932, this forest was devastated by a series of fires. Not only was the forest immediately around Camp 6 completely destroyed, but also a strip at least 3 km. wide, extending from Vaca on the north past Cohune Ridge in the south. Only dry burned trunks of trees and low rank secondary growth cover the area which in 1928 was heavily forested. In many places only the barren limestone remains; this is especially true of steep unterraced slopes.

Likewise, removal of the forest by the ancient Maya undoubtedly resulted in serious erosion which led to the building of soil-retaining terraces.

On the basis of the comparatively small flora, I judge that the plateau forest is considerably younger than the forest of northern Peten. That this area was abandoned several centuries later than northern Peten is possible. Settlements on the plateau may have been made during the Old Empire, but with terrace building having taken place at a later date with increase of population. This would account for the absence of terraces among contemporary Maya occupying adjacent areas to the west and northwest at the end of Cycle 9 and the beginning of Cycle 10. There is also the possibility that the terrace builders may have been emigrants from mountainous eastern Guatemala, entering the area after the disintegration of the Old Empire. If this did take place, the new settlers would have brought with them the type of agriculture practiced in the mountainous country, i.e. terracing. That the terraces antedate the Old Empire is improbable.

That a shifting type of agriculture, such as the milpa system, would be employed in a terraced area is unbelievable. The building of stone retaining walls and the filling-in with soil call for an investment in labor which would not be expended for a form of agriculture where the land would be abandoned for eight to twelve years after one or two crops. Terracing indicates continued occupation of land and at least a form of semipermanent agriculture.

In describing the terrace agriculture in Peru, Cook (1925, p. 108) states:

Terrace agriculture is not only a means of utilizing steep or broken land, otherwise not capable of cultivation, but is also of interest as representing a permanent system of agriculture. . . . By means of terracing, the soil is drained and kept in place so that fertility is not lost, but may continue to increase as it does in uncultivated lands. The terraced lands of the valleys of the eastern Andes undoubtedly have been cultivated continuously for many centuries and are still very productive. The great antiquity of the terrace system thus has a special significance as showing the possibility of a permanent agriculture, which is the necessary basis of a permanent civilization.

The question of whether the Maya had a permanent system of agriculture in any part of the Yucatan Peninsula has been discussed previously (Lundell, 1933*a*). The presence

of terraces in southern British Honduras may be interpreted to indicate that a system of agriculture more advanced than the milpa form was employed, at least locally, in the period possibly following the fall of the Old Empire.

ARCHAEOLOGICAL SITES

Although no ruins have been located on the plateau which compare in size with the large cities in Peten, there are a number of small archaeological sites. The building of the terraces may have consumed so much time that labor was not available for the construction of large ceremonial centers.

Thompson has studied several of the ruins, and the investigation of remaining ones should reveal additional information concerning the occupants of the region, the age of the terraces, and the approximate date of abandonment of the plateau. In 1928 and 1929, Thompson visited the ruin at Camp 6 and various sites in the vicinity of Mountain Cow. To the latter he applied the names Tzimin Kax, Cahal Pichik, Cahal Cunil, and Hatzcap Ceel. Mounds are reported as occurring near Cohune Ridge, and on his map Chapayal is designated as an archaeological site (Thompson, 1931).

As far as I have been able to determine, these represent all of the ruins known heretofore from the plateau area in British Honduras.⁴

During the 1936 trip, information was obtained from mahogany workers and former chicleros concerning several other sites within the region. Apparently the largest of these is located on the British Honduran-Guatemalan border near the abandoned mahogany camp called Esperanza about 12 km. south of Arenal. There are said to be a number of mounds in the site.

The second ruin is located about 3 km. from Retiro. From descriptions obtained locally, the ruin consists of one large standing structure which contains several chambers. We intended to visit the site, and went so far as to have a trail opened from Retiro to the ruin, but inclement weather, very muddy roads, and lack of time prevented our making the trip.

A third site lies south or southwest of Retiro near the Chiquibul River, and close to the British Honduran-Guatemalan border. The ruin is said to be similar to the one located near Retiro.

All three sites could be reached with ease during the dry season. In 1936 the mahogany roads were open as far south as Retiro.

CHICLE AND MAHOGANY EXPLOITATION

No agricultural settlements now exist south of Vaca and Arenal; hence disturbance of the forest by man is limited primarily to the exploiters of chicle and mahogany.

The chicle of the plateau is regarded as inferior to that of the sections of the peninsula to the north, although the unadulterated gum comes from the same species, *Achras Zapota* L. The stand of the *zapote* has been considerably depleted, but the tree still ranks as one of the dominants of the forest. The pure *zapote* latex from this region is very difficult to coagulate, a fact verified by the writer's tests at Camp 6 in 1928.

Adulteration of the latex from *Achras Zapota* with that of *Dipholis Stevensonii* Standl.

⁴H. Fowler, on his trip from El Cayo across the Maya Mountains in 1878-1879, is reported to have found two sites with mounds. The writer has not seen the Fowler report, and does not know which ruins he encountered.

is a common practice. *Dipholis Stevensonii*, which is abundant everywhere in advanced forest, has been bled extensively as evidenced by the tapping scars.

Logging operations have opened up the plateau. The center of exploitation extends south from Vaca through Camp 6 and Cohune Ridge to Valentin, Mountain Cow, and the upper reaches of the Macal River. Mahogany trees, some gigantic with a diameter of as much as 4 m., average about one per acre in the Valentin-Retiro section, a very rich stand of this species (pl. 1*b*). Spanish cedar, logged sparingly, is much rarer and usually smaller.

A logging railway formerly extended from Vaca south to within a few miles of Cohune Ridge. Tractors and trucks are now used exclusively, and roads for them penetrate almost every acre of the exploited area.

Forest destruction by fire usually follows the avenues of logging operations. In the area exploited longest, from Vaca to Cohune Ridge, complete denudation has resulted. As previously mentioned, around Camp 6 at the time of the writer's visit in 1928, high advanced forest covered the hills; in 1936 only a few scattered tree skeletons remained to tower above the rank second growth. Some hilltops and steep unterraced slopes were even washed clean of soil and completely barren, a result of fire devastation and subsequent erosion. Firing of the areas has been blamed on the railway, hunters, loggers, and chicleros. Doubtless all have been responsible. Chicleros, as well as hunters, make a practice of burning all camps no longer inhabitable, and hunters do not hesitate to burn out areas to facilitate hunting. Such fires, started during a dry season, sweep felled forest around camps or along roadsides, and eat along the ground through adjacent stands. Rank second growth, the older stages usually grassy, burn during subsequent seasons; each fire sweeps farther, and devastation results.

Regardless of the responsibility for setting the fires, whether deliberate, a result of carelessness, or accidental, large areas have been repeatedly swept by fire during the past decade to leave nothing but desolation in the wake. If the fire destruction continues—and it will continue with exploitation of the area—the hardwood forest of the entire plateau is doomed to early extinction.

CLASSIFICATION AND DESCRIPTION OF THE VEGETATION ADVANCED FOREST IN THE VICINITY OF VALENTIN

In its luxuriance and primeval appearance, the great forest in the vicinity of Valentin gives one the impression of being primary undisturbed growth. The presence everywhere of terraces, and the comparatively small flora, belie this outward aspect. Abandonment of the area by the Maya must have taken place at least five centuries ago, possibly eight. The forest appears more youthful than that of northern Peten, most of which is considered to have been completely abandoned for as much as ten centuries.

The forest represents an advanced stage in which hardwoods and palms predominate. Since there were no clearings, no recent secondary vegetation had become established. Not even a single weed was found, a blessing few collectors have the privilege to enjoy. Of especial interest is the presence of cohune palms on certain hills; these occur only in wet alluvial lowlands in northern British Honduras and northern Peten. The higher rainfall and shorter dry season make possible the occupation of the well-drained areas, such as hills, by certain moisture-loving plants.

In the vicinity of Valentin, the plateau topography is varied by low limestone hills and broad valleys with gently undulating terrain. In the matter of dominance and physiognomy, and to a certain extent floristically, the forest of the broad valleys differs considerably from that on the hills. Further, two related but distinct zones are recognizable on the hills. On topographic, physiognomic, ecological, and floristic bases, three definite zones may be distinguished: (1) forest of the valleys, (2) forest of the hillsides, and (3) forest of the hilltops.

Forest of the valleys. The valley zone is by far the most extensive. It comprises the highly luxuriant stage of the advanced forest in which trees tower to a height of 60 m. and form a closed canopy (pl. 1a). Three tree and two shrub layers are present. The uppermost tree tier contains the scattered towering giants, whereas the second story, generally 25-40 m. high, comprises the mass of the canopy. The first-story trees, 10-20 m. high, are less numerous than those of the second story. The treelets and tall shrubs, 3-6 m. high, are very abundant with coverage estimated to be as high as 50 per cent, while the low shrubs, 1-3 m. high, are less conspicuous with a cover of scarcely 10 per cent. Lianas and epiphytes are much in evidence. The floor herbs, although scattered and comparatively scarce, abound locally in favorable spots.

In order to present a quantitative analysis of the valley vegetation, a transect 18.3 m. wide and 100 m. long was cut through a stand of typical forest. Table 1 gives the total number of trees in the area of 1829 sq. m. Table 2 reveals the dominance as indicated by the mass values of the trees. Three species, *Drypetes Brownii*, *Sabal Morrisiana*, and *Ilex belizensis*, comprised 52.5 per cent of the total tree mass, a striking degree of dominance for old tropical forest.

In the transect, the treelets and tall shrubs, 3-6 m. high, had a cover of approximately 40 per cent. Of these the *give-and-take* palm, *Cryosophila argentea*, was outstanding, a total of 90 individuals being present in the area. The other shrubs, abundantly represented, were *Acalypha Mortoniana*, and several species of *Chamaedorea* and *Piper*. Present also were scattered individuals of a species of *Geonoma* and a bull-horn *Acacia*.

The cover of low shrubs was scarcely 10 per cent, species of *Geonoma*, *Psychotria*, and *Piper* being represented.

Four lianas, *Dioscorea Bartlettii*, *Cnestidium rufescens*, a species of *Desmoncus*, and a giant *Bauhinia* called *boxak* were noted.

Of the floor herbs, two coarse species of *Dryopteris* (*D. melanosticta* and another species [6281], related to *D. subtetragona*) and *Geophila herbacea* abounded, while only a few plants of *Spathiphyllum* (6195), *Costus* (6275), and *Olyra latifolia* occurred in the transect area.

TABLE I
TRANSECT THROUGH VALLEY FOREST

SPECIES	DIAMETER IN CENTIMETERS							TOTAL IN AREA OF 1820 Sq. M.
	7.5-15	15-30	30-60	60-90	90-120	120-150	150-180	
THIRD-STORY TREES:								
<i>Swietenia macrophylla</i>.....	...	...	...	...	I	...	...	I
<i>Terminalia obovata</i>.....	...	...	...	...	...	...	I	I
<i>Achras Zapota</i>.....	...	...	...	...	...	...	I	I
SECOND-STORY TREES:								
<i>Sabal Morrisiana</i>.....	...	18	...	...	...	...	...	18
<i>Ampelocera Hottlei</i>.....	...	2	1	...	...	...	...	3
<i>Brosimum Alicastrum</i>.....	...	...	...	2	...	...	...	2
<i>Cecropia mexicana</i> (?).....	I	2	...	...	...	...	...	3
<i>Cymbopetalum penduliflorum</i>.....	...	...	1	...	...	...	...	1
<i>Drypetes Brownii</i>.....	...	...	8	I	...	...	...	9
<i>Sebastiania Standleyana</i>.....	...	...	1	...	...	...	...	1
<i>Ilex belizensis</i>.....	...	...	7	...	...	...	...	7
<i>Calophyllum brasiliense</i> var. <i>Rekoi</i>.....	...	...	1	...	...	...	...	1
<i>Achras Zapota</i>.....	...	...	2	...	...	...	...	2
<i>Dipholis Stevensonii</i>.....	...	...	2	...	...	...	...	2
<i>Cufodontia Lundelliana</i>.....	...	...	1	...	...	...	...	1
FIRST-STORY TREES:								
<i>Pseudolmedia oxyphyllaria</i> ...	I	2	...	...	...	...	...	3
<i>Trophis racemosa</i> (?).....	I	...	...	...	...	...	...	1
<i>Trichilia minutiflora</i>.....	...	1	...	...	...	...	...	1
<i>Trichilia moschata</i>	I	2	3	...	...	...	...	6
<i>Drypetes Brownii</i>	2	5	...	...	...	...	...	7
<i>Ilex belizensis</i>	8	3	...	...	...	...	...	11
<i>Lucuma Durlandii</i>.....	...	3	2	...	...	...	...	5
<i>Sideroxylon amygdalinum</i>.....	...	1	...	...	...	...	...	1
Unidentified species (holol 642I).....	I	...	...	...	...	...	...	1
TOTAL	15	39	29	3	I	...	2	89

TABLE 2
RELATIVE MASS VALUES OF TREES IN TRANSECT THROUGH VALLEY FOREST

	Percentage of Mass
<i>Drypetes Brownii</i>	19.5
<i>Sabal Morrisiana</i>	16.7
<i>Ilex belizensis</i>	16.3
<i>Achras Zapota</i>	8.4
<i>Terminalia obovata</i>	4.7
<i>Brosimum Alicastrum</i>	4.6
<i>Swietenia macrophylla</i>	3.7
<i>Trichilia moschata</i>	3.7
<i>Pseudolmedia oxyphyllaria</i>	3.3
<i>Ampelocera Hottlei</i>	3.2
<i>Dipholis Stevensonii</i>	2.8
<i>Lucuma Durlandii</i>	2.8
<i>Cecropia mexicana</i> (?).....	2.3
<i>Sebastiania Standleyana</i>	1.9
<i>Cufodontia Lundelliana</i>	1.4
<i>Cymbopetalum penduliflorum</i>	1.4
<i>Calophyllum brasiliense</i> var. <i>Rekoi</i>	1.4
<i>Trichilia minutiflora</i>	0.5
<i>Trophis racemosa</i> (?).....	0.5
<i>Sideroxylon amygdalinum</i>	0.4
Unidentified species (<i>holol 6421</i>).....	0.5

The single transect gives a quantitative analysis of a typical stand. *Drypetes Brownii*, *Sabal Morrisiana*, and *Ilex belizensis* are the commonest trees in all the valley forest at Valentin; their position of dominance, as shown in Table 2, doubtless would be verified by additional transects. The distribution of a number of other species, some locally abundant, some rare and not represented at all in the single transect, would be better revealed by compilations from a series of transects. This is well illustrated by *Rinorea Hummelii*, an endemic species which dominates the tall shrub layer in much of the valley forest yet was absent in the area of the transect.

In the following list I include all species either collected or noted in the advanced, valley forest. Abundance and distribution are indicated thus:

- **** Dominant
- *** Abundant and uniformly distributed
- ** Locally abundant
- * Occasional to rare

Because of obvious difficulties for making records in high rain forest, it was not possible during the limited time to obtain data showing abundance and distribution of epiphytes.

TREES AND HEMI-EPIPHYTES:

- | | |
|----------|---|
| Palmae | ** <i>Orbignya Cohune</i> (Mart.) Dahlgren. <i>Cohune</i> , <i>Corozo</i> . |
| | **** <i>Sabal Morrisiana</i> Bartlett. <i>Botan</i> . |
| Ulmaceae | *** <i>Ampelocera Hottlei</i> Standl. <i>Luin</i> . 6423. |
| Moraceae | *** <i>Brosimum Alicastrum</i> Sw. <i>Macica</i> , <i>Ramon</i> . 6175. |
| | *** <i>Cecropia mexicana</i> Hemsl. (?). <i>Trumpet</i> . 6374. |
| | * <i>Coussapoa oligocephala</i> Donn. Sm. 6224. |
| | * <i>Ficus Colubrinae</i> Standl. 6191. |
| | ** <i>Ficus guajavoides</i> Lundell. 6295. |
| | * <i>Ficus panamensis</i> Standl. 6280. |
| | *** <i>Pseudolmedia oxyphyllaria</i> Donn. Sm. <i>Cherry</i> , <i>Manax</i> . |
| | * <i>Trophis racemosa</i> (L.) Urban. (?). <i>Ramon blanco</i> . 6422. |

- Anonaceae **Anona scleroderma* Safford. 6297.
 ****Cymbopetalum penduliflorum* (Dunal) Baill. *Poxte*. 6371.
- Lauraceae **Acrodictidium Peckii* (Johnston) Lundell. 6315.
 ****Acrodictidium capitatum* (Cham. & Schl.) Lundell. 6408.
- Leguminosae ****Acacia* sp. *Cockspur*.
 ****Pithecolobium arboreum* (L.) Urban. *Barba jolote*.
- Meliaceae **Cedrela mexicana* Roem. *Spanish cedar, Cedro*.
 ****Swietenia macrophylla* King. *Mahogany, Caoba*.
 ****Trichilia minutiflora* Standl. 6229.
 ****Trichilia moschata* Sw. *Cedrillo*. 6269, 6419, 6420.
- Burseraceae **Bursera Simaruba* (L.) Sarg. *Gumbolimbo*.
 ****Protium multiramiflorum* Lundell. 6212.
- Euphorbiaceae **Alchornea latifolia* Sw. 6375.
 **Alchornea oblongifolia* Standl. *Chinchin*. 6245.
 ****Drypetes Brownii* Standl. *Bullhoof*. 6189.
 ***Sebastiania Standleyana* Lundell. *Chechem blanco*.
- Aquifoliaceae ****Ilex belizensis* Lundell. 6205, 6247.
- Celastraceae **Wimmeria Bartlettii* Lundell. 6278.
- Actinidiaceae **Saurauia leucocarpa* Schl. 6185.
- Ochnaceae **Ouratea pyramidalis* Riley. 6296.
- Guttiferae ****Calophyllum brasiliense* Camb. var. *Rekoi* Standl. *Santa Maria*,
 Leche barillo.
 ****Clusia Chanekiana* Lundell. *Chunup*. 6366.
 **Clusia Lundellii* Standl. 6411.
 **Rheedia* (?). 6227.
- Flacourtiaceae **Hasseltia dioica* (Benth.) Sleumer. (?). 6291.
 **Laetia Thamnia* L. 6309.
- Turneraceae **Erblichia odorata* Seem. 7024.
- Rhizophoraceae **Cassipourea podantha* Standl. 6265.
- Combretaceae ****Terminalia obovata* (R. & P.) Steud. *Canxan*.
- Araliaceae **Gilibertia arborea* (L.) March. 6230.
 ****Oreopanax guatemalense* (Lem.) Dec. & Pl. 6306.
- Sapotaceae ****Achras Zapota* L. *Sapodilla, Zapote*.
 **Calocarpum mammosum* (L.) Pierre. *Mamee apple*.
 **Chrysophyllum oliviforme* L. *Siciya*.
 ****Dipholis Stevensonii* Standl. *Zapote faisán*. 6200, 6252.
 ****Lucuma Durlandii* Standl.
 ****Sideroxylon amygdalinum* Standl. 6246, 6264.
- Oleaceae **Linociera oblanceolata* Rob. 6310.
- Apocynaceae ****Cufodontia Lundelliana* Woods. 6220.
- Verbenaceae ****Vitex Gaumeri* Greenm. *Yaxnic*.
- Rubiaceae **Hamelia calycosa* Donn. Sm. 6180.
 ****Psychotria Lundellii* Standl. 6249.

ERECT TREELETS AND SHRUBS:

- Palmae **Bactris* sp. *Hone*. 6284.
 **Chamaedorea* sp. 6285.
 ****Chamaedorea* sp. 6241.
 *****Cryosophila argentea* Bartlett. *Give-and-take, Escoba*.
 ****Geonoma* sp. 6274.
 ****Geonoma* sp. 6207.
 ****Geonoma* sp. 6182.
 ***Hexopetion mexicanum* (Liebm.) Burret. (?). *Warree cohune*,
 Chapay. 6441.

- Piperaceae **Piper yucatanense* C. DC. 6289.
 ****Piper* spp.
 Euphorbiaceae ****Acalypha Mortoniana* Lundell. 6203.
 Celastraceae **Rhacoma eucymosa* (Loes. & Pitt.) Standl. 6206.
 Violaceae *****Rinorea Hummelii* Sprague. 6279, 6282.
 Myrsinaceae **Ardisia Donnell-Smithii* Mez. 6302.
 **Ardisia Schippii* Standl. 6204, 6277.
 Solanaceae **Saracha* (?). 6181.
 **Solanum erythrotrichum* Fern. 6179.
 Rubiaceae **Faramea occidentalis* (L.) Rich. 6178.
 **Psychotria chiapensis* Standl. 6412.
 **Psychotria limonensis* Krause. 6193, 6250.
 **Psychotria mombachensis* Standl. 6199.
 ****Psychotria Lundellii* Standl. 6194, 6234, 6260.

CLAMBERING SHRUBS, WOODY AND SUFFRUTESCENT VINES:

- Palmae **Desmoncus* sp. *Basket tie-tie*.
 Smilacaceae **Smilax mollis* H. & B. 6268.
 Dioscoreaceae ****Dioscorea Bartlettii* Morton.
 **Dioscorea convolvulacea* Cham. & Schl. 6169.
 Connaraceae **Cnestidium rufescens* Planch.
 Leguminosae **Bauhinia* sp. *Boxak*.
 Dilleniaceae **Tetracera mollis* Standl. 6270.
 Loganiaceae ****Strychnos brachistantha* Standl. *Snake seed*. 6266.
 Asclepiadaceae **Marsdenia mayana* Lundell. 6192.
 Solanaceae **Solanum cuspidatum* Morton. 6172, 6248.
 **Solanum Lundellii* Standl. 6171.
 Bignoniaceae **Macfadyena uncatata* (Andr.) Sprague & Sandw. (?). 6213.
 **Tynanthus guatemalensis* Donn. Sm. 6168.
 Cucurbitaceae **Anguria Warscewiczii* Hook. f. 6313.
 Compositae **Eupatorium Billbergianum* Beurl. 6254.
 **Liabum* sp. 6271.

EPIPHYTIC HERBS AND SHRUBS:

- Hymenophyllaceae *Trichomanes Godmani* Hook. 6187.
 Polypodiaceae *Ananthacorus angustifolius* (Sw.) Underw. & Maxon. 6236.
 Asplenium cristatum Lam. 6301.
 Asplenium salicifolium L. 6417.
 Asplenium serratum L. 6235.
 Elaphoglossum tovarense (Mett.) Moore. 6322.
 Nephrolepis pendula (Raddi) J. Sm. 6305.
 Paltonium lanceolatum (L.) Presl. 6259.
 Polybotrya villosula Christ. 6416.
 Polypodium fallax Schlecht. & Cham. 6216.
 Polypodium latum (Moore) Sod. 6231.
 Polypodium Lindenianum Kunze. 6174, 6217, 6293.
 Polypodium lycopodioides L. 6287.
 Polypodium percussum Cav. 6257, 6406.
 Polypodium plumula H. & B. 6276.
 Polypodium repens Aubl. 6262.
 Polytaenium Féei (Schaffn.) Maxon. 6223.
 Stenochlaena recurvata (Fée) Liebm. 6221, 6283.
 Vittaria filifolia Fée. 6196.
 Vittaria intramarginalis Baker. (?). 6261.

- Lycopodiaceae *Lycopodium taxifolium* Sw. 6258.
 Araceae *Anthurium aemulum* Schott. 6197.
 Anthurium scandens (Aubl.) Engl. 6255.
 Anthurium sp. 6336.
 Monstera tuberculata Lundell. 6238, 6337.
 Monstera belizensis Lundell. 6198.
 Bromeliaceae *Catopsis Lundelliana* L. B. Smith. 6256.
 Tillandsia festucoides Brongn. 6376.
 Tillandsia filifolia Ch. & Schdl. 6226.
 Tillandsia pruinosa Sw. 6272.
 Vriesia heliconioides (H. B. K.) Hook. 6303.
 Orchidaceae *Epidendrum difforme* Jacq. 6424.
 Epidendrum paleaceum (Lindl.) Rehb. f. 6413.
 Epidendrum polyanthum Lindl. (?). 6222.
 Lepanthes inaequiloba A. & S. 6214 (?), 6267.
 Pleurothallis longissima Lindl. 7031.
 Stanhopea oculata Lindl. 6190.
 Stelis microchila Schltr. (?). 6215.
 Piperaceae *Peperomia novae-hispaniae* Trel. 6288.
 Peperomia sp. 6311.
 Peperomia sp. 6286.
 Peperomia sp. 6233.
 Marcgraviaceae *Ruyschia enervia* Lundell. 6308.
 Cactaceae *Rhipsalis dissimilis* (G. A. Lindberg) Schumann. 6263.
 Rubiaceae *Hillia tetrandra* Sw. 6232.
- TERRESTRIAL HERBS:
- Polypodiaceae **Adiantum macrophyllum* Sw. 6409.
 ****Dryopteris melanosticta* (Kunze) Kuntze. 6335.
 ****Dryopteris subtetragona* (Link) Maxon. (?). 6281.
 **Tectaria heracleifolia* (Willd.) Underw. 6410.
 Gramineae **Ichnanthus pallens* (Sw.) Munro. 6292.
 **Leersia grandiflora* (Doell.) Prod. 6211.
 **Lithachne pauciflora* (Sw.) Beauv. 6294.
 **Olyra latifolia* L. 6210.
 ***Oplismenus hirtellus* (L.) Beauv. 6208, 6251, 6312.
 **Panicum frondescens* Meyer. 6314.
 **Pharus parvifolius* Nash. 6418.
 **Spathiphyllum* sp. 6195.
 Araceae **Campelia Zanonía* (L.) H. B. K. 6228.
 Commelinaceae **Marica gracilis* Herb. 6202.
 Iridaceae **Heliconia crassa* Griggs. (?). 6219.
 Musaceae **Costus* sp. 6275.
 Zingiberaceae **Renealmia* sp. 6323.
 Marantaceae ***Calathea micans* (Math.) Koern. 6304.
 Leguminosae ***Desmodium axillare* (Sw.) DC. 6201.
 Labiatae **Scutellaria orichalcea* Donn. Sm. 6218.
 Acanthaceae **Justicia breviflora* (Nees) Rusby. 6209, 6290.
 Rubiaceae ***Geophila herbacea* (Jacq.) Schum.
- PARASITES:
- Loranthaceae **Phoradendron* sp. 6253.
 **Phoradendron* sp. 6188.
 **Struthanthus belizensis* Lundell. 6273.
 Balanophoraceae ***Helosis mexicana* Liebm. 6414.

Forest of the hillsides. Although most of the hills are low, the slopes as a rule are quite steep, having an incline of 30° in many instances. The forest, which is not so luxuriant as that of the valleys, has a maximum height of about 35 m. at the base of hills and tapers down to 25 m. or less approaching the hilltops. The canopy is fairly open, and layering is not so evident as in the valleys. Epiphytes are noticeably less conspicuous.

Two transects were cut through hillside forest, both on a hill located about 0.5 km. northwest of Valentin. The advanced forest on this hill appeared typical with no evidences of recent disturbance.

The first transect, cut through forest on the northeast slope, was 9.14 m. wide and 52.4 m. long, a total area of 479 sq. m. The second transect, through forest on the southwest slope, was 9.14 m. wide and 38.1 m. long, a total area of 348 sq. m. The results of the two transects are given in Tables 3, 4, and 5.

In both, the outstanding dominant was *Pseudolmedia oxyphyllaria*, which represented 16.5 and 13 per cent of the total tree mass. *Ilex belizensis* came second with 15.8 and 9.7 per cent. Forest on the hills shows more variation in regard to dominance than forest in the valleys, as instanced by Transect II where *Guettarda Combsii* and *Lucuma Durlandii* were represented respectively by 13.0 and 11.3 per cent of the total mass as compared with

TABLE 3
TRANSECT I THROUGH FOREST ON HILLSIDE

SPECIES	DIAMETER IN CENTIMETERS						TOTAL IN AREA OF 479 Sq. M.
	7.5-15	15-30	30-45	45-60	60-75	75-90	
THIRD-STORY TREES:							
<i>Coussapoa oligocephala</i> . . . . .	...	...	...	I	...	...	I
<i>Swietenia macrophylla</i> . . . . .	...	...	...	...	...	I	I
<i>Bursera Simaruba</i> . . . . .	...	...	I	...	...	...	I
<i>Ilex belizensis</i> . . . . .	...	...	I	...	...	I	2
<i>Ceiba pentandra</i> . . . . .	...	...	...	...	...	I	I
SECOND-STORY TREES:							
<i>Brosimum Alicastrum</i> . . . . .	...	...	...	I	...	...	I
<i>Coussapoa oligocephala</i> . . . . .	...	...	I	...	...	...	I
<i>Pseudolmedia oxyphyllaria</i> . . . . .	...	I	I	...	...	...	2
<i>Drypetes Brownii</i> . . . . .	...	...	I	...	...	...	I
<i>Ilex belizensis</i> . . . . .	...	I	...	...	...	...	I
<i>Hauya Lundellii</i> . . . . .	...	...	I	...	...	...	I
FIRST-STORY TREES:							
<i>Cecropia mexicana</i> (?) 6373	2	...	...	...	...	...	2
<i>Pseudolmedia oxyphyllaria</i>	5	I	...	...	...	...	6
<i>Acacia</i> 6328	2	...	...	...	...	...	2
<i>Inga</i> 6325	I	...	...	...	...	...	I
<i>Trichilia erythrocarpa</i>	7	...	...	...	...	...	7
<i>Trichilia minutiflora</i>	4	...	...	...	...	...	4
<i>Calophyllum brasiliense</i> var. <i>Rekoi</i>	2	...	...	...	...	...	2
<i>Eugenia</i> 6333	I	...	...	...	...	...	I
<i>Eugenia</i> 6329 . . . . .	...	2	...	...	...	...	2
<i>Lucuma Durlandii</i>	2	...	...	...	...	...	2
<i>Linociera oblanceolata</i>	I	...	...	...	...	...	I
<i>Aspidosperma cruentum</i> . . . . .	...	I	...	...	...	...	I
TOTAL	27	6	6	2	...	3	44

TABLE 4
TRANSECT II THROUGH FOREST ON HILLSIDE

SPECIES	DIAMETER IN CENTIMETERS						TOTAL IN AREA OF 348 Sq. M.
	7.5-15	15-30	30-45	45-60	60-75	75-90	
THIRD-STORY TREES:							
<i>Alchornea latifolia</i>.....	...	...	...	I	...	...	I
<i>Drypetes Brownii</i>.....	...	...	I	...	...	...	I
SECOND-STORY TREES:							
<i>Brosimum Alicastrum</i>.....	...	...	I	...	...	...	I
<i>Pseudolmedia oxyphyllaria</i>.....	...	2	...	...	...	...	2
<i>Ilex belizensis</i>.....	...	...	I	...	...	...	I
<i>Lucuma Durlandii</i>.....	...	...	I	...	...	...	I
<i>Sideroxylon amygdalinum</i>.....	...	I	...	...	...	...	I
<i>Guettarda Combsii</i>.....	...	...	...	I	...	...	I
FIRST-STORY TREES:							
<i>Pseudolmedia oxyphyllaria</i>	2	...	...	...	...	...	2
<i>Zanthoxylum procerum</i>	I	...	...	...	...	...	I
<i>Trichilia minutiflora</i>	I	...	...	...	...	...	I
<i>Alchornea oblongifolia</i>	3	...	...	...	...	...	3
<i>Drypetes Brownii</i>	I	...	...	...	...	...	I
<i>Sebastiania Standleyana</i>	I	...	...	...	...	...	I
<i>Pimenta officinalis</i>.....	...	I	...	...	...	...	I
<i>Lucuma Durlandii</i>	I	I	...	...	...	...	2
<i>Guettarda Combsii</i>.....	...	I	...	...	...	...	I
Unidentified species.....	2	2	...	...	...	...	4
TOTAL.....	12	8	4	2	...	...	26

TABLE 5
RELATIVE MASS VALUES OF TREES IN TRANSECTS THROUGH FOREST ON HILLSIDES

	PERCENTAGE OF MASS	
	Transect I	Transect II
<i>Pseudolmedia oxyphyllaria</i>	16.5	13.0
<i>Ilex belizensis</i>	15.8	9.7
<i>Guettarda Combsii</i>.....	...	13.0
<i>Lucuma Durlandii</i>	1.8	11.3
<i>Alchornea latifolia</i>.....	...	11.2
<i>Ceiba pentandra</i>	9.0	...
<i>Drypetes Brownii</i>	5.4	8.5
<i>Brosimum Alicastrum</i>	5.3	8.5
<i>Coussapoa oligocephala</i>	8.1	...
<i>Swietenia macrophylla</i>	8.0	...
<i>Trichilia erythrocarpa</i>	6.0	...
<i>Alchornea oblongifolia</i>.....	...	4.9
<i>Pimenta officinalis</i>.....	...	4.9
<i>Bursera Simaruba</i>	4.5	...
<i>Trichilia minutiflora</i>	3.6	1.6
<i>Hauya Lundellii</i>	3.5	...
<i>Eugenia 6329</i>	3.4	...
<i>Sideroxylon amygdalinum</i>.....	...	3.2
<i>Aspidosperma cruentum</i>	1.8	...
<i>Calophyllum brasiliense</i> var. <i>Rekoi</i>	1.7	...
<i>Cecropia mexicana</i> (?) 6373.....	1.7	...
<i>Zanthoxylum procerum</i>.....	...	1.6
<i>Sebastiania Standleyana</i>.....	...	1.6
<i>Acacia 6328</i>	1.5	...
<i>Eugenia 6333</i>	0.8	...
<i>Inga 6325</i>	0.8	...
<i>Linociera oblanceolata</i>	0.8	...
Unidentified species.....	...	7.0

the absence of the former species in Transect I and the second species being represented by only 1.8 per cent of the mass. This variation in dominance was also observed on other hillsides. The distribution of the characteristic trees of the zone is quite uniform even though dominance varies to a certain degree.

The importance of *Ilex belizensis*, one of the three dominants in the valley forest, is to be noted. The outstanding floristic difference between the hillside and valley forest is the absence of *Sabal Morrisiana* on the hills; this is undoubtedly due to differences in soil moisture.

In the hillside forest the prominent treelets and shrubs are the *give-and-take* palm, *Cryosophila argentea*, and various species of *Piper*, *Geonoma*, and *Psychotria*. The *give-and-take* palm is here, as in the valleys, outstanding in the tall shrub layer. The commonest liana is *Dioscorea Bartlettii*. A *Bauhinia* and a species of the Malpighiaceae were recognized among the sterile woody vines. Throughout the zone, lianas and juveniles of trees and shrubs are abundant. No floor herbs were observed, and epiphytes were comparatively scarce.

Collections in hillside forest are listed below. As in the previous list, asterisks indicate distribution and abundance.

TREES AND HEMI-EPIPHYTES:

- Palmae **Orbignya Cohune* (Mart.) Dahlgren. *Cohune*.
 Moraceae ****Brosimum Alicastrum* Sw. *Macica*, *Ramon*. 6300.
 ****Cecropia mexicana* Hemsl. (?). 6373.
 **Coussapoa oligocephala* Donn. Sm. 6350.
 **Ficus involuta* (Liebm.) Miq. 6334
 *****Pseudolmedia oxyphyllaria* Donn. Sm. *Manax*. 6399.
 Nyctaginaceae **Neea psychotrioides* Donn. Sm. 6242.
 Lauraceae **Acrodiclidium caudatum* (Lundell) Lundell. 6183.
 **Phoebe longicaudata* Lundell. *Aguacatillo*. 6401.
 Leguminosae **Acacia* sp. *Cockspur*. 6328.
 ***Bauhinia gigas* Lundell. 6298.
 **Inga* sp. 6325.
 ****Pithecolobium arboreum* (L.) Urban. *Barba jolote*.
 Rutaceae **Zanthoxylum procerum* Donn. Sm.
 Meliaceae **Swietenia macrophylla* King. *Mahogany*, *Caoba*.
 ****Trichilia erythrocarpa* Lundell. 6319.
 ****Trichilia minutiflora* Standl. 6330.
 Burseraceae **Bursera Simaruba* (L.) Sarg. *Gumbolimbo*, *Chacah*.
 Euphorbiaceae **Alchornea latifolia* Sw.
 ****Alchornea oblongifolia* Standl. *Chinchin*.
 ****Drypetes Brownii* Standl. *Bullhoof*.
 **Sebastiania Standleyana* Lundell. *Chechem blanco*.
 **Mosquitoxylum jamaicense* Krug & Urban.
 Anacardiaceae ****Ilex belizensis* Lundell. 6331, 6332.
 Aquifoliaceae **Ceiba pentandra* (L.) Gaertn. *Coopte*. 6320.
 Bombacaceae **Calophyllum brasiliense* Camb. var. *Rekoi* Standl. *Santa Maria*, *Leche barillo*.
 Guttiferae **Clusia Chanekiana* Lundell. *Chunup*.
 Myrtaceae **Eugenia* sp. 6329.
 **Eugenia* sp. *Wild cinnamon*. 6333.
 ****Pimenta officinalis* Lindl. *Pimento*.
 Onagraceae **Hauya Lundellii* Standl. *Pimientillo de montaña*. 6318.

- Araliaceae **Gilibertia arborea* (L.) March. 6403.
 Sapotaceae **Achras Zapota* L. *Sapodilla*, *Zapote*.
 ****Dipholis Stevensonii* Standl. *Zapote faisán*.
 ****Lucuma Durlandii* Standl. *Zapotillo*. 6327, 6402.
 **Sideroxylon amygdalinum* Standl.
 **Sideroxylon Meyeri* Standl. *Zapotillo negro*.
 Oleaceae **Linociera oblanceolata* Robinson. 6321, 6324, 6404.
 Apocynaceae **Aspidosperma cruentum* Woods. 6326.
 ***Stemmadenia Donnell-Smithii* (Rose) Woods. *Cojon de caballo*. 6243.
 Verbenaceae **Vitex Gaumeri* Greenm. *Yaxnic*.
 Rubiaceae ****Guettarda Combsii* Urban. *Glossy wood*.

ERECT TREELETS AND SHRUBS:

- Palmae **Chamaedorea* sp.
 ****Cryosophila argentea* Bartlett. *Give-and-take*, *Escoba*.
 ****Geonoma* sp.
 Piperaceae ****Piper* spp.
 Melastomaceae **Heterotrichum octonum* (Bonpl.) DC.
 Rubiaceae **Psychotria* sp.

WOODY AND SUFFRUTESCENT VINES:

- Dioscoreaceae ****Dioscorea Bartlettii* Morton.
 Leguminosae ****Bauhinia* sp.
 Compositae **Eupatorium Billbergianum* Beurl. 6400.

EPIPHYTIC HERBS AND SHRUBS:

- Polypodiaceae *Polypodium fallax* Schlecht. & Cham. 6244.
 Polypodium fraternum Schlecht. & Cham. 6365.
 Polypodium Lindenianum Kunze.
 Araceae *Monstera tuberculata* Lundell.
 Bromeliaceae *Tillandsia festucoides* Brongn.
 Cactaceae *Rhipsalis coriacea* Polak. 6316.
 Rhipsalis dissimilis (G. A. Lindberg) Schumann.

Forest of the hilltops. Forest on the hilltops has an open canopy. Layering is not pronounced, and distinctions indicated in Table 6 are more or less arbitrary. Few of the trees reach a height of 30 m., and the average is much less. As on the hillsides, outcropping limestone is everywhere present. With scant soil and much greater exposure, conditions of soil moisture and evaporation on the hills are decidedly less favorable than in the valleys; hence it is not surprising that the zones differ considerably both in physiognomy and flora.

A transect 9.14 m. wide and 80.77 m. long, totaling 738 sq. m. in area, was cut across the top of the same hill through which the two hillside transects were made. The results are given in Tables 6 and 7. The dominant trees were *Sideroxylon Meyeri*, *Vitex Gaumeri*, and *Achras Zapota*, representing 18, 12, and 11.5 per cent respectively of the total mass. *Trichilia minutiflora* and *Cufodontia Lundelliana* ranked next in importance. As noted for the hillsides, *Sabal Morrisiana* was absent. *Ilex belizensis*, so prominent in the valleys and one of the dominants on hill slopes, was poorly represented.

Although the forest on this hill is typical in general of the stands on hilltops in the area, there are some variations in dominance and noteworthy differences in flora between hills. On many hill caps, *Pimenta officinalis* is more conspicuous. Another tree, *Bauhinia gigas*, not even represented in the transect, is a dominant on a nearby hill. Only the averages from a series of transects would give a complete picture of hilltop vegetation.

TABLE 6
TRANSECT THROUGH FOREST ON HILLTOP

SPECIES	DIAMETER IN CENTIMETERS						TOTAL IN AREA OF 738 Sq. M.
	7.5-15	15-30	30-45	45-60	60-75	75-90	
THIRD-STORY TREES:							
<i>Brosimum Alicastrum</i>.....	...	...	1	...	...	...	1
<i>Myroxylon balsamum</i>.....	...	...	1	...	...	...	1
<i>Swietenia macrophylla</i>.....	...	...	1	...	...	...	1
<i>Achras Zapota</i>.....	...	...	...	1	...	...	1
<i>Sideroxylon amygdalinum</i>.....	...	...	...	1	...	...	1
<i>Cufodontia Lundelliana</i>.....	...	1	2	...	...	...	3
<i>Vitex Gaumeri</i>.....	...	...	1	...	...	2	3
<i>Sickingia salvadorensis</i>.....	...	1	...	...	...	...	1
SECOND-STORY TREES:							
<i>Pseudolmedia oxyphyllaria</i>.....	...	1	...	...	...	...	1
<i>Acacia</i> (?) 6356.....	...	...	2	...	...	...	2
<i>Myroxylon balsamum</i>.....	...	1	...	...	...	...	1
<i>Swartzia cubensis</i>.....	...	1	...	...	...	...	1
<i>Zanthoxylum procerum</i>.....	...	...	1	...	...	...	1
<i>Trichilia minutiflora</i>.....	...	1	...	...	...	...	1
<i>Simaruba glauca</i>.....	...	1	...	...	...	...	1
<i>Protium multiramiflorum</i>.....	...	1	...	...	...	...	1
<i>Sebastiania Standleyana</i>.....	...	...	1	...	...	...	1
<i>Ilex belizensis</i>.....	...	1	...	...	...	...	1
<i>Thouinia paucidentata</i> (?) 6368.....	...	1	...	...	...	...	1
<i>Ouratea pyramidalis</i>.....	...	1	...	...	...	...	1
<i>Pimenta officinalis</i>.....	...	2	...	...	...	...	2
<i>Achras Zapota</i>.....	...	3	...	...	...	...	3
<i>Sideroxylon Meyeri</i>.....	...	6	1	1	...	...	8
<i>Exostema mexicanum</i> (?) 6340.....	...	...	1	...	...	...	1
FIRST-STORY TREES:							
<i>Ampelocera Hotteii</i>	1	...	...	...	...	...	1
<i>Pseudolmedia oxyphyllaria</i>	2	...	...	...	...	...	2
<i>Acacia</i> 6328.....	2	...	...	...	...	...	2
<i>Trichilia erythrocarpa</i>	7	...	...	...	...	...	7
<i>Trichilia minutiflora</i>	12	2	...	...	...	...	14
<i>Drypetes Brownii</i>	3	...	...	...	...	...	3
<i>Drypetes lateriflora</i>	1	...	...	...	...	...	1
<i>Astronium graveolens</i>.....	...	2	...	...	...	...	2
<i>Achras Zapota</i>	5	...	...	...	...	...	5
<i>Sideroxylon Meyeri</i>	8	...	...	...	...	...	8
<i>Cufodontia Lundelliana</i>	1	...	...	...	...	...	1
<i>Exostema mexicanum</i> (?) 6340.....	1	...	...	...	...	...	1
Unidentified species.....	...	1	...	...	...	...	1
TOTAL.....	43	27	12	3	...	2	87

TABLE 7

RELATIVE MASS VALUES OF TREES IN TRANSECT THROUGH FOREST ON HILLTOP

	Percentage of Mass
<i>Sideroxylon Meyeri</i>	18.0
<i>Vitex Gaumeri</i>	12.0
<i>Achras Zapota</i>	11.5
<i>Trichilia minutiflora</i>	9.5
<i>Cufodontia Lundelliana</i>	5.5
<i>Acacia</i> (?) 6356.....	4.0
<i>Pimenta officinalis</i>	3.0
<i>Sickingia salvadorensis</i>	3.0
<i>Myroxylon balsamum</i>	3.0
<i>Sideroxylon amygdalinum</i>	3.0
<i>Pseudolmedia oxyphyllaria</i>	2.5
<i>Brosimum Alicastrum</i>	2.5
<i>Swietenia macrophylla</i>	2.5
<i>Astronium graveolens</i>	2.5
<i>Sebastiania Standleyana</i>	2.0
<i>Exostema mexicanum</i> (?) 6340.....	2.0
<i>Trichilia erythrocarpa</i>	2.0
<i>Drypetes Brownii</i>	1.5
<i>Swartzia cubensis</i>	1.5
<i>Zanthoxylum procerum</i>	1.5
<i>Simaruba glauca</i>	1.5
<i>Protium multiramiflorum</i>	1.0
<i>Thouinia paucidentata</i> (?) 6368.....	1.0
<i>Ouratea pyramidalis</i>	1.0
<i>Drypetes lateriflora</i>	0.5
<i>Ilex belizensis</i>	0.5
<i>Ampelocera Hottlei</i>	0.5
<i>Acacia</i> 6328.....	0.5
Unidentified species.....	0.5

Palms appeared to dominate the treelet and shrub layers, the outstanding one being *Cryosophila argentea*, a species adapted to a wide range of edaphic conditions throughout its range. Juveniles of trees and shrubs were abundant.

Although lianas are not more abundant on the caps than on the slopes, more were found in determinable condition, as evidenced by the following list. *Dioscorea Bartlettii* was one of the most prominent.

All species noted or collected on hilltops are listed below. Asterisks indicate abundance and distribution.

TREES AND HEMI-EPIPHYTES:

Ulmaceae	* <i>Ampelocera Hottlei</i> Standl. 6346.
Moraceae	*** <i>Brosimum Alicastrum</i> Sw. <i>Macica</i> , <i>Ramon</i> . *** <i>Pseudolmedia oxyphyllaria</i> Donn. Sm. <i>Cherry</i> .
Leguminosae	* <i>Acacia</i> sp. <i>Cockspur</i> . *** <i>Acacia</i> (?). <i>Wild tamarind</i> , <i>Hesmo</i> . 6356. ** <i>Bauhinia gigas</i> Lundell. 6298. * <i>Myroxylon balsamum</i> (L.) Harms. <i>Balsamo</i> , <i>Naaba</i> . 6338. *** <i>Pithecolobium arboreum</i> (L.) Urban. <i>Barba jolote</i> . * <i>Swartzia cubensis</i> (Britt. & Wils.) Standl. <i>Catalox</i> . 6352.
Rutaceae	* <i>Zanthoxylum procerum</i> Donn. Sm. <i>Prickly yellow macho</i> , <i>Kiixche</i> . 6359.
Meliaceae	* <i>Guarea excelsa</i> H. B. K. 6351. * <i>Swietenia macrophylla</i> King. <i>Mahogany</i> , <i>Caoba</i> . *** <i>Trichilia erythrocarpa</i> Lundell. 6364. *** <i>Trichilia minutiflora</i> Standl. <i>Limonaria</i> . 6349, 6355.

- Simarubaceae **Simaruba glauca* DC. *Negrito, Pasaq*.
 Burseraceae **Protium multiramiflorum* Lundell.
 Euphorbiaceae **Drypetes Brownii* Standl. *Bullhoof*.
 **Drypetes lateriflora* (Sw.) Krug & Urb. 6348.
 **Sebastiania Standleyana* Lundell. *Iciche*.
 Anacardiaceae **Astronium graveolens* Jacq. 6339.
 Aquifoliaceae **Ilex belizensis* Lundell.
 Sapindaceae **Thouinia paucidentata* Radlk. (?). *Dzol*. 6368.
 Ochnaceae **Ouratea pyramidalis* Riley. *Chilillo-che*. 6369.
 Guttiferae **Clusia Chanekiana* Lundell. *Chunup*.
 Flacourtiaceae **Laetia Thamnia* L.
 Myrtaceae ****Pimenta officinalis* Lindl. *Pimento*.
 Sapotaceae *****Achras Zapota* L. *Sapodilla, Zapote*.
 **Sideroxylon amygdalinum* Standl. *Silly young, Paacecan*. 6362.
 *****Sideroxylon Meyeri* Standl. *Zapotillo negro*. 6184, 6343.
 Apocynaceae ****Cufodontia Lundelliana* Woods. *My lady blanco, Peechmaax*. 6360.
 Verbenaceae *****Vitex Gaumeri* Greenm. *Yaxnic*.
 Rubiaceae **Exostema mexicanum* Gray (?). 6340.
 ****Guettarda Combsii* Urban. *Glossy wood*. 6240.
 **Sickingia salvadorensis* Standl. *Chactemuch*. 6367.

ERECT TREELETS AND SHRUBS:

- Palmae **Chamaedorea* sp. 6361.
 ****Cryosophila argentea* Bartlett. *Give-and-take, Escoba*.
 **Geonoma* sp.
 Celastraceae **Myginda Gaumeri* Loes. 6299.

CLAMBERING SHRUBS, WOODY AND SUFFRUTESCENT VINES:

- Dioscoreaceae ****Dioscorea Bartlettii* Morton.
 Sapindaceae **Serjania scatens* Radlk. (?). 6357.
 Apocynaceae **Forsteronia peninsularis* Woods. 6358.
 Solanaceae **Solanum hypoleucum* (Standl.) Morton. 6237.
 Bignoniaceae **Stizophyllum perforatum* (Cham.) Miers. 6353.
 **Tynanthus guatemalensis* Donn. Sm. 6354.
 Rubiaceae **Chiococca alba* (L.) Hitchc. 6239.

EPIPHYTIC HERBS AND SHRUBS:

- Araceae *Monstera tuberculata* Lundell. 6238.
 Orchidaceae *Lycaste aromatica* Lindl. 6363.
Ornithocephalus Pottsiae S. Wats. 6345.
Pleurothallis Brighami S. Wats. 6186, 6342.
Stelis gracilis Ames. 6370.
 Rubiaceae *Hillia tetrandra* Sw. 6372.

TERRESTRIAL HERBS:

- Araceae **Anthurium* sp. 6341.
 Gentianaceae ***Leiphaimos* sp. 6347.

PARASITES:

- Loranthaceae **Phoradendron* sp. 6317.
 **Struthanthus cassythoides* Millsp. 6405.

IMPORTANCE OF ENDEMIC SPECIES IN THE ADVANCED FOREST AT VALENTIN

The twenty-four most abundant trees in the forest in the vicinity of Valentin are as follows:

<i>Sabal Morrisiana</i>	<i>Trichilia erythrocarpa</i>	<i>Achras Zapota</i>
<i>Brosimum Alicastrum</i>	<i>Trichilia minutiflora</i>	<i>Dipholis Stevensonii</i>
<i>Coussapoa oligocephala</i>	<i>Trichilia moschata</i>	<i>Lucuma Durlandii</i>
<i>Pseudolmedia oxyphyllaria</i>	<i>Drypetes Brownii</i>	<i>Sideroxylon amygdalinum</i>
<i>Cymbopetalum penduliflorum</i>	<i>Ilex belizensis</i>	<i>Sideroxylon Meyeri</i>
<i>Pithecolobium arboreum</i>	<i>Calophyllum brasiliense</i>	<i>Cufodontia Lundelliana</i>
<i>Protium multiramiflorum</i>	<i>Terminalia obovata</i>	<i>Vitex Gaumeri</i>
<i>Swietenia macrophylla</i>	<i>Pimenta officinalis</i>	<i>Guettarda Combsii</i>

Of these, ten are known only from the Yucatan Peninsula, including four which have been found only on the limestone plateau. Six other species do not range outside the Maya area. Five extend from the Maya area into the West Indies but do not reach South America, and three range from southern Mexico into South America but do not occur in the West Indies.

In mass, which is calculated on the basis of total size and number of individuals, three species, *Drypetes Brownii*, *Sabal Morrisiana*, and *Ilex belizensis*, all native in the peninsula with the latter known only from the plateau, comprised 52.5 per cent of the valley forest, as revealed in Table 2. In one transect on a hillside (Table 5), *Ilex belizensis*, which is endemic, and *Pseudolmedia oxyphyllaria*, which occurs in adjacent Guatemala also, totaled 32.3 of the mass. In the second hillside transect, these two, along with *Guettarda Combsii*, which ranges into Cuba, and *Lucuma Durlandii*, which is restricted to the Maya area, comprised 47 per cent of the total tree mass. In the hilltop transect (Table 7), two trees native in the peninsula, *Sideroxylon Meyeri* and *Trichilia minutiflora*, another, *Vitex Guameri*, which ranges south into Honduras, and *Achras Zapota* made up 51 per cent of the total. Among the rarer species, comprising the remainder of the tree mass, those known only from the peninsula were exceptionally conspicuous. The treelets, shrubs, and lianas, endemic in the peninsula, exhibited a comparable preponderance in individuals.

The dominance of the woody vegetation of the plateau by species, now considered locally endemic or restricted to the Yucatan Peninsula, is the striking feature of the forest.

COLLECTIONS IN ADVANCED FOREST AT COHUNE RIDGE AND CHALILLO CROSSING

The collections in advanced forest, outside of those listed previously for Valentin, were obtained within a radius of 3 km. from Cohune Ridge, along the trail leading from Cohune Ridge to Chalillo Crossing, and in the vicinity of Curassow Camp at Chalillo Crossing. No transects or systematic counts of abundance of individuals were made because of limitations in time and decidedly unfavorable weather. Most of the species obtained belong to the undergrowth layers.

The flora of the advanced forest differs little from that at Valentin as evidenced by the relic trees in the second growth at Cohune Ridge and the miscellaneous collections. Significant is the fact that nearly half of the trees and shrubs collected are native to the Yucatan Peninsula.

In the valleys at Cohune Ridge, *Dipholis Stevensonii*, *Bourreria oxyphylla*, *Swietenia macrophylla*, and *Pithecolobium arboreum* were among the abundantly represented trees.

In a low area to the south, a patch of cohune ridge survives, whence the name of the mahogany camp. This cohune lowland is the type locality for *Zanthoxylum nigripunctatum*. On a hill about 1 km. east of Cohune Ridge, the type of *Trichilia erythrocarpa* was collected and nearby I noted *Bauhinia gigas*. At Chalillo crossing groves of the cohune palm abound in the valley of the Macal River; on the hills the Sapotaceae predominate, with *Achras Zapota* much in evidence.

The following list contains all the collections in advanced forest from the aforementioned localities:

TREES AND HEMI-EPIPHYTES:

- | | |
|---------------|--|
| Moraceae | <i>Ficus Oerstediana</i> Miq. 6486. |
| Lauraceae | <i>Acrodiclidium capitatum</i> (Cham. & Schl.) Lundell. 6551. |
| Leguminosae | <i>Bauhinia gigas</i> Lundell.
<i>Lonchocarpus Castilloi</i> Standl. <i>Cabbage bark</i> , <i>Manchich</i> .
<i>Pithecolobium arboreum</i> (L.) Urban. <i>Barba jolote</i> . 6482. |
| Rutaceae | <i>Zanthoxylum nigripunctatum</i> Lundell. <i>Prickly yellow</i> . 6487. |
| Meliaceae | <i>Guarea excelsa</i> H. B. K. 6484.
<i>Trichilia erythrocarpa</i> Lundell. 6495. |
| Euphorbiaceae | <i>Bernardia interrupta</i> (Schl.) Muell. Arg. 6509. |
| Bombacaceae | <i>Quararibea Fieldii</i> Millsp. 6507. |
| Guttiferaceae | <i>Clusia rosea</i> Jacq. 6491. |

ERECT TREELETS AND SHRUBS:

- | | |
|---------------|---|
| Piperaceae | <i>Piper psilorhache</i> C. DC. 6483.
<i>Piper Schippianum</i> Trel. (?). 6505.
<i>Piper sempervirens</i> (Trel.) Lundell. 6510.
<i>Piper yucatanense</i> C. DC. 6499. |
| Nyctaginaceae | <i>Neea psychotrioides</i> Donn. Sm. 6521. |
| Malpighiaceae | <i>Bunchosia lanceolata</i> Turcz. 6503. |
| Melastomaceae | <i>Heterotrichum octonum</i> (Bonpl.) DC. 6529.
<i>Miconia hyperprasina</i> Naud. 6496. |
| Myrsinaceae | <i>Ardisia paschalis</i> Donn. Sm. 6514. |
| Solanaceae | <i>Solanum hondurense</i> Morton. 6512. |
| Rubiaceae | <i>Psychotria chiapensis</i> Standl. 6550.
<i>Psychotria Oerstediana</i> Standl. 6524. |

CLAMBERING SHRUBS AND WOODY VINES:

- | | |
|---------------|--|
| Malpighiaceae | <i>Tetrapteris Schiedeana</i> Cham. & Schl. 6485. |
| Solanaceae | <i>Solanum cuspidatum</i> Morton. 6508. |
| Gesneriaceae | <i>Drymonia spectabilis</i> (H. B. K.) Mart. 6549. |

EPIPHYTIC HERBS AND SHRUBS:

- | | |
|----------------|--|
| Polypodiaceae | <i>Polypodium triseriale</i> Sw. 6488.
<i>Vittaria lineata</i> (L.) Sm. 6493. |
| Bromeliaceae | <i>Catopsis Wauranea</i> Mez. 6531.
<i>Vriesia heliconioides</i> (H. B. K.) Hook. 6515. |
| Orchidaceae | <i>Dichaea neglecta</i> Schltr. (?). 6552. |
| Marcgraviaceae | <i>Souroubea triandra</i> Lundell. 6492. |

TERRESTRIAL HERBS:

- | | |
|---------------|--|
| Polypodiaceae | <i>Adiantum macrophyllum</i> Sw. 6504.
<i>Polypodium plumula</i> H. & B. (?). 6494. |
| Schizaeaceae | <i>Anemia hirta</i> (L.) Sw. 6526. |

Gramineae	<i>Ichnanthus tenuis</i> (Presl) Hitchc. & Chase. 6528. <i>Oplismenus hirtellus</i> (L.) Beauv. 6523. <i>Panicum pulchellum</i> Raddi. 6513. <i>Paspalum nutans</i> Lam. 6525.
Cyperaceae	<i>Scleria melaleuca</i> Schlecht. & Cham. 6506.
Commelinaceae	<i>Tradescantia geniculata</i> Jacq. 6511.
Urticaceae	<i>Pilea pubescens</i> Liebm. 6520.
Lythraceae	<i>Cuphea calophylla</i> Cham. & Schl. 6497.
Labiatae	<i>Salvia Lundellii</i> Epling. 6527.
Acanthaceae	<i>Ruellia Harveyana</i> Stapf. 6518.

COLLECTIONS IN YOUNG SECOND GROWTH AND RELIC FOREST AT COHUNE RIDGE

Mahogany operations on the plateau were temporarily suspended in 1928; for several years prior to that time, Cohune Ridge had been one of the principal mahogany camps. The site was abandoned until the summer of 1936, when another camp was established. Between 1928 and 1936, the destructive fires, previously described, swept the vicinity.

When collections were made at Cohune Ridge in July 1936, the young second growth was thicket-like, ranging in height from 3 to 10 m., but averaging about 5 m. Some rapidly growing trees, such as the *moho*, towered as much as 20 m. Scattered through this thicket stood tall relics of the former forest, these showing many scars from the fires.

In the young second growth at Cohune Ridge, solanaceous shrubs predominated both in number of species and individuals. Endemic species of the family were especially prominent.

Among the numerous species of vines and subscandent plants, the clambering grasses, species of *Lasiacis*, abounded. Few epiphytes were found on the second growth trees; the majority here listed grew on the relic trees, high in the crowns where the fires could not reach them. Among the coarse herbs, the Compositae predominated; practically all were sterile at the time of our visit so that few could be collected. On the thicket floor, the low *Lasiacis Grisebachii* formed almost a continuous covering.

All the species collected or noted in the young second-growth thickets at Cohune Ridge are listed below:

RELIC TREES AND HEMI-EPIPHYTES:

Leguminosae	<i>Lonchocarpus Castilloi</i> Standl. <i>Cabbage bark, Manchich.</i> 6490.
Araliaceae	<i>Oreopanax guatemalense</i> (Lem.) Dec. & Pl. 6471.
Sapotaceae	<i>Lucuma Durlandii</i> Standl. 6442. <i>Dipholis Stevensonii</i> Standl.
Boraginaceae	<i>Bourreria oxyphylla</i> Standl. 6439.

SECOND-GROWTH TREES, TREELETS, AND ERECT SHRUBS:

Piperaceae	<i>Piper Stevensonii</i> Trel. (?). 6474.
Ulmaceae	<i>Trema micrantha</i> (L.) Blume. 6465.
Urticaceae	<i>Urera caracasana</i> (Jacq.) Griseb. var. <i>tomentosa</i> Wedd. <i>Cow-it.</i> 6475.
Nyctaginaceae	<i>Neea psychotrioides</i> Donn. Sm. 6458, 6464.
Leguminosae	<i>Bauhinia divaricata</i> L. 6476.
Meliaceae	<i>Trichilia montana</i> H. B. K. 6500.
Malpighiaceae	<i>Bunchosia lanceolata</i> Turcz. 6457.
Tiliaceae	<i>Heliocarpus</i> sp. <i>Moho, White moho, High ridge moho.</i>
Bombacaceae	<i>Hampea tomentosa</i> (Presl) Standl. 6478.
Myrtaceae	<i>Calypttranthes Millspaughii</i> Urban. 6431.
Araliaceae	<i>Gilibertia arborea</i> (L.) March. 6461.

- Myrsinaceae *Ardisia compressa* H. B. K. 7027.
 Apocynaceae *Stemmadenia Donnell-Smithii* (Rose) Woods. *Cojoton*. 6480.
 Solanaceae *Athenaea affinis* Morton. 6452.
Capsicum Lundellii Morton. 6453.
Solanum erythrotrichum Fern. 6501.
Solanum heteroclitum Sendtn. 6438.
Solanum umbellatum Mill. 6467.
- CLAMBERING SHRUBS AND WOODY VINES:
- Gramineae *Lasiacis divaricata* (L.) Hitchc. 6430.
Lasiacis Sloanei (Griseb.) Hitchc. 6433.
Lasiacis sorghoidea (Desv.) Hitchc. & Chase. 6434.
Olyra latifolia L. 6428.
- Smilacaceae *Smilax mollis* H. & B. 6440.
- Hippocrateaceae *Hippocratea yucatanensis* Standl. (?). 6489.
- Apocynaceae *Prestonia amanuensis* Woods. 6462.
- Boraginaceae *Tournefortia hirsutissima* L. 6468.
Tournefortia syringaefolia Vahl. 6473.
Tournefortia volubilis L. 6470.
- Solanaceae *Solanum hypoleucum* (Standl.) Morton. 6454.
Solanum Lundellii Standl. 6479.
- Bignoniaceae *Martinella obovata* (H. B. K.) Bur. & Schum. 6437.
Paragonia pyramidata (Rich.) Bur. 6463.
- Compositae *Baccharis trinervis* (Lam.) Pers. var. *rhexioides* (H. B. K.) Baker. 6459.
Eupatorium Bartlettii Rob. 6481.
Notoptera scabridula Blake. 6469.
- HERBACEOUS VINES:
- Dioscoreaceae *Dioscorea convolvulacea* C. & S. 6477.
- Asclepiadaceae *Fischeria Briquetiana* Standl. 6534.
Vincetoxicum macranthum (Kunze) Standl. 6435.
- EPIPHYTES:
- Polypodiaceae *Asplenium serratum* L. 6533.
Paltonium lanceolatum (L.) Presl. 6448.
Polypodium astrolepis Liebm. 6450.
Polypodium crassifolium L. 6532.
Polypodium plumula H. & B. 6460.
- Bromeliaceae *Tillandsia Schiedeana* Steud. 6449.
- Orchidaceae *Epidendrum raniferum* Lindl. 6447.
Notylia trisepala Lindl. & Paxt. 6445.
Ornithocephalus Pottsiae S. Wats. 6444.
Pleurothallis Carioi Schltr. 6443.
- Cactaceae *Rhipsalis Cassytha* Gaertn. 6446.
- TERRESTRIAL HERBS:
- Polypodiaceae *Adiantum trapeziforme* L. 6498.
Dryopteris subtetragona (Link) Maxon. 6456.
Pteris grandifolia L. 6429.
- Gramineae *Lasiacis Grisebachii* (Nash) Hitchc. 6451.
Oplismenus hirtellus (L.) Beauv. 6502.
- Marantaceae *Myrosma guapilensis* Donn. Sm. 6436.
- Compositae *Schistocarpha oppositifolia* (Kuntze) Rydb. 6466.

LIST OF THE SPECIES COLLECTED OR OBSERVED ON THE LIMESTONE PLATEAU

HYMENOPHYLLACEAE: *Trichomanes Godmani* Hook. (Valentin, 6187). POLY-
 PODIACEAE: *Adiantum macrophyllum* Sw. (Valentin, 6409; Chalillo Crossing, 6504);
A. trapeziforme L. (Cohune Ridge, 6498); *Ananthacorus angustifolius* (Sw.) Underw. &
 Maxon (Valentin, 6236); *Asplenium cristatum* Lam. (Retiro, 6301; Chalillo Crossing,
 6522); *A. salicifolium* L. (Valentin, 6417); *A. serratum* L. (Valentin, 6235; Cohune Ridge,
 6533); *Cheilanthes notholaenoides* (Desv.) Maxon (Camp 6-Vaca road, 6542); *Dryopteris*
melanosticta (Kunze) Kuntze (Valentin, 6335); *D. patens* (Sw.) Kuntze (Camp 6,
 6543); *D. subtetragona* (Link) Maxon (Cohune Ridge, 6456); *Dryopteris* sp. (Valentin,
 6281); *Elaphoglossum tovarensis* (Mett.) Moore (Valentin, 6322); *Nephrolepis pendula*
 (Raddi) J. Sm. (Valentin-Retiro road, 6305); *Paltonium lanceolatum* (L.) Presl (Valentin,
 6259; Cohune Ridge, 6448); *Polybotrya villosula* Christ (Valentin, 6416); *Polypodium*
astrolepis Liebm. (Cohune Ridge, 6450); *P. crassifolium* L. (Cohune Ridge, 6532); *P. fallax*
 Schl. & Cham. (Valentin, 6216; 6244); *P. fraternum* Schl. & Cham. (Valentin, 6365);
P. latum (Moore) Sod. (Valentin, 6231); *P. Lindenianum* Kunze (Arenal-Valentin road,
 6174; Valentin, 6217, 6293); *P. lycopodioides* L. (Valentin, 6287); *P. percussum* Cav.
 (Valentin, 6257, 6406); *P. plumula* H. & B. (Valentin, 6276; Cohune Ridge, 6460, 6494);
P. repens Aubl. (Valentin, 6262); *P. triseriale* Sw. (Cohune Ridge, 6488); *Polypodium* sp.
 (Camp 6-Vaca road, 6545); *Polytaenium Féei* (Schaffn.) Maxon (Valentin, 6223); *Pteris*
grandifolia L. (Cohune Ridge, 6429); *P. Kunzeana* Ag. (Chalillo Crossing, 6517); *P. longi-*
folia L. (Camp 6-Vaca road, 6546); *Stenochlaena recurvata* (Fée) Liebm. (Valentin, 6221,
 6283); *Tectaria heracleifolia* (Willd.) Underw. (Valentin, 6410); *Vittaria filifolia* Fée
 (Valentin, 6196); *V. intramarginalis* Baker (?) (Valentin, 6261); *V. lineata* (L.) J. E. Sm.
 (Cohune Ridge, 6493).

SCHIZAEACEAE: *Anemia hirta* (L.) Sw. (Cohune Ridge-Chalillo Crossing trail,
 6526). LYCOPODIACEAE: *Lycopodium taxifolium* Sw. (Valentin, 6258). GRAMI-
 NEAE: *Homolepis aturensis* (H. B. K.) Chase (Cohune Ridge, 6425); *Ichnanthus pallens*
 (Sw.) Munro (Valentin, 6292); *I. tenuis* (Presl) Hitchc. & Chase (Cohune Ridge-Chalillo
 Crossing trail, 6528); *Lasiacis divaricata* (L.) Hitchc. (Cohune Ridge, 6430); *L. Grisebachii*
 (Nash) Hitchc. (Cohune Ridge, 6451); *L. Sloanei* (Griseb.) Hitchc. (Cohune Ridge, 6433);
L. sorghoidea (Desv.) Hitchc. & Chase (Cohune Ridge, 6434); *Leersia grandiflora* (Doell.)
 Prod. (Valentin, 6211); *Lithachne pauciflora* (Sw.) Beauv. (Valentin, 6294); *Olyra latifolia*
 L. (Valentin, 6210, 6932; Cohune Ridge, 6428); *Oplismenus hirtellus* (L.) Beauv.
 (Valentin, 6208, 6251, 6312; Cohune Ridge, 6502; Chalillo Crossing, 6523); *Panicum*
fasciculatum Sw. (Cohune Ridge, 6472); *P. frondescens* Meyer (Valentin, 6314); *P. pul-*
chellum Raddi (Chalillo Crossing, 6513); *Paspalum caespitosum* Fl. (Cohune Ridge, 6426);
P. Langei (Fourn.) Nash (Cohune Ridge, 6427); *P. nutans* Lam. (Cohune Ridge-Chalillo
 Crossing trail, 6525); *Pharus parvifolius* Nash (Valentin, 6418).

CYPERACEAE: *Scleria melaleuca* Schl. & Cham. (Chalillo Crossing, 6506). PALMAE:
Bactris sp. (Valentin, 6284); *Chamaedorea* sp. (Valentin, 6241); *Chamaedorea* sp.
 (Valentin, 6285); *Chamaedorea* sp. (Valentin, 6361); *Cryosophila argentea* Bartlett;
Desmoncus sp.; *Geonoma* spp. (Valentin, 6182, 6207, 6274); *Hexopetion mexicanum*
 (Liebm.) Burret (?) (Chapayal, 6441); *Orbignya Cohune* (Mart.) Dahlgren; *Sabal Mor-*
risiana Bartlett.

ARACEAE: *Anthurium aemulum* Schott (Valentin, 6197); *A. scandens* (Aubl.) Engl.
 (Valentin, 6255); *Anthurium* spp. (Valentin, 6336, 6341); *Dieffenbachia* sp. (Chalillo
 Crossing, 6530); *Monstera belizensis* Lundell (Valentin, 6198, type coll.); *M. tuberculata*

Lundell (Valentin, 6238, type coll.; 6337); *Philodendron guttiferum* Kunth (?) (Camp 6, 6541); *Spathiphyllum* sp. (Valentin, 6195).

BROMELIACEAE: *Catopsis Lundelliana* L. B. Smith (Valentin, 6256, type coll.); *C. Wawraea* Mez. (Chalillo Crossing, 6531); *Tillandsia festucoides* Brongn. (Valentin, 6376); *T. filifolia* Ch. & Schdl. (Valentin, 6226); *T. pruinosa* Sw. (Valentin, 6272); *T. Schiedeana* Steud. (Cohune Ridge, 6449); *Vriesia heliconioides* (H. B. K.) Hook. (Valentin, 6303; Chalillo Crossing, 6515).

COMMELINACEAE: *Campelia Zanonia* (L.) H. B. K. (Valentin, 6228); *Tradescantia geniculata* Jacq. (Chalillo Crossing, 6511). SMILACACEAE: *Smilax mollis* H. & B. (Valentin, 6268; Cohune Ridge, 6440). DIOSCOREACEAE: *Dioscorea Bartlettii* Morton; *D. convolvulacea* Cham. & Schl. (Arenal-Valentin road, 6169; Cohune Ridge, 6477). IRIDACEAE: *Marica gracilis* Herb. (Valentin, 6202). MUSACEAE: *Heliconia crassa* Griggs (?) (Valentin, 6219); *Heliconia* sp. (Camp 6, 6535). ZINGIBERACEAE: *Costus* sp. (Valentin, 6275); *Renealmia* sp. (Valentin, 6323). MARANTACEAE: *Calathea micans* (Math.) Koern. (Retiro, 6304); *Maranta arundinacea* L. (Arenal, 6162); *Myrosma guapilensis* Donn. Sm. (Cohune Ridge, 6436).

ORCHIDACEAE: *Dichaea neglecta* Schltr. (?) (Chalillo Crossing-Cohune Ridge trail, 6552); *Epidendrum difforme* Jacq. (Valentin, 6424); *E. paleaceum* (Lindl.) Rchb. f. (Valentin, 6413); *E. polyanthum* Lindl. (?) (Valentin, 6222); *E. raniferum* Lindl. (Cohune Ridge, 6447); *Lepanthes inaequiloba* A. & S. (Valentin, 6214 (?); 6267); *Lycaste aromatica* Lindl. (Valentin, 6363); *Notylia trispala* Lindl. & Paxt. (Cohune Ridge, 6445); *Ornithocephalus Pottsiae* S. Wats. (Valentin, 6345; Cohune Ridge, 6444); *Pleurothallis Brighamii* S. Wats. (Valentin, 6186, 6342); *P. Carioi* Schltr. (Cohune Ridge, 6443); *P. longissima* Lindl. (Valentin, 7031); *Stanhopea oculata* Lindl. (Arenal-Valentin road, 6190); *Stelis gracilis* Ames (Valentin, 6370); *S. microchila* Schltr. (?) (Valentin, 6215).

PIPERACEAE: *Peperomia novae-hispaniae* Trel. (Valentin, 6288); *Peperomia* sp. (Valentin, 6233); *Peperomia* sp. (Valentin, 6286); *Peperomia* sp. (Valentin, 6311); *Piper psilorhache* C. DC. (Cohune Ridge, 6483); *P. Schippianum* Trel. (?) (Chalillo Crossing, 6505); *P. sempervirens* (Trel.) Lundell (Chalillo Crossing, 6510); *P. Stevensonii* Trel. (?) (Cohune Ridge, 6474); *P. yucatanense* C. DC. (Valentin, 6289; Cohune Ridge, 6499). ULMACEAE: *Ampelocera Hottlei* Standl. (Valentin, 6225, 6346, 6423); *Trema micrantha* (L.) Blume (Cohune Ridge, 6465). MORACEAE: *Brosimum Alicastrum* Sw. (Arenal-Valentin road, 6175; Valentin, 6300); *Cecropia mexicana* Hemsl. (?) (Valentin, 6373, 6374); *Coussapoa oligocephala* Donn. Sm. (Valentin, 6224, 6350); *Ficus Colubrinae* Standl. (Valentin, 6191); *F. guajavoides* Lundell (Valentin, 6295, type coll.); *F. involuta* (Liebm.) Miq. (Valentin, 6334); *F. Oerstediana* Miq. (Cohune Ridge, 6486); *F. panamensis* Standl. (Valentin, 6280); *Pseudolmedia oxyphyllaria* Donn. Sm. (Valentin, 6399); *Trophis racemosa* (L.) Urban (?) (Valentin, 6422).

URTICACEAE: *Pilea pubescens* Liebm. (Chalillo Crossing, 6520); *Urera caracasana* (Jacq.) Griseb. var. *tomentosa* Wedd. (Cohune Ridge, 6475). LORANTHACEAE: *Phoradendron* sp. (Valentin, 6188); *Phoradendron* sp. (Valentin, 6253); *Phoradendron* sp. (Valentin, 6317); *Struthanthus belizensis* Lundell (Valentin, 6273, type coll.); *S. cassythoides* Millsp. (Valentin, 6405). BALANOPHORACEAE: *Helosis mexicana* Liebm. (Valentin, 6414). NYCTAGINACEAE: *Neea psychotrioides* Donn. Sm. (Valentin, 6242; Cohune Ridge, 6458, 6464; Chalillo Crossing, 6521).

ANONACEAE: *Anona scleroderma* Safford (Valentin, 6297); *Cymbopetalum penduliflorum* (Dunal) Baill. (Arenal-Valentin road, 6173; Valentin, 6371). LAURACEAE: *Acrodiclidium capitatum* (Cham. & Schl.) Lundell (Valentin, 6408; Camp 6, 6539);

Chalillo Crossing-Cohune Ridge trail, 6551); *A. caudatum* (Lundell) Lundell (Arenal-Valentin road, 6183, type coll.); *A. Peckii* (Johnston) Lundell (Retiro, 6315); *Phoebe longicaudata* Lundell (Valentin, 6401). CONNARACEAE: *Cnestidium rufescens* Planch. LEGUMINOSAE: *Acacia* sp. (Valentin, 6328); *Acacia* (?) (Valentin, 6356); *Bauhinia divaricata* L. (Cohune Ridge, 6476); *B. gigas* Lundell (Valentin, 6298, type coll.); *Bauhinia* sp. (Boxak); *Desmodium axillare* (Sw.) DC. (Valentin, 6201); *Inga Rodrigueziana* Pittier (Camp 6-Vaca road, 6544); *Inga* sp. (Valentin, 6325); *Lonchocarpus Castilloi* Standl. (Cohune Ridge, 6490); *Myroxylon balsamum* (L.) Harms (Valentin, 6338); *Pithecolobium arboreum* (L.) Urban. (Cohune Ridge, 6482); *P. macrandrium* Donn. Sm. (Camp 6, 6536); *Swartzia cubensis* (Britt. & Wils.) Standl. (Valentin, 6352).

RUTACEAE: *Zanthoxylum nigripunctatum* Lundell (Cohune Ridge, 6487, type coll.); *Z. procerum* Donn. Sm. (Valentin, 6359). MELIACEAE: *Cedrela mexicana* Roem.; *Guarea excelsa* H. B. K. (Valentin, 6351; Cohune Ridge, 6484); *Swietenia macrophylla* King; *Trichilia erythrocarpa* Lundell (Valentin, 6319, 6364; Cohune Ridge, 6495, type coll.); *T. minutiflora* Standl. (Valentin, 6229, 6330, 6349, 6355); *T. montana* H. B. K. (Cohune Ridge, 6500); *T. moschata* Swartz (Valentin, 6269, 6419, 6420). SIMARUBACEAE: *Simaruba gluaca* DC. BURSERACEAE: *Bursera Simaruba* (L.) Sarg.; *Protium multiramiflorum* Lundell (Valentin, 6212, type coll.).

MALPIGHIACEAE: *Bunchosia lanceolata* Turcz. (Cohune Ridge, 6457, 6503); *Malpighia* (?) (Arenal-Valentin road, 6170); *Tetrapteris Schiedeana* Cham. & Schl. (Cohune Ridge, 6485). POLYGALACEAE: *Polygala paniculata* L. (Arenal, 6164). DICHAPETALACEAE: *Dichapetalum Donnell-Smithii* Engler (Arenal, 6163). EUPHORBIACEAE: *Acalypha Mortoniana* Lundell (Valentin, 6203); *Alchornea latifolia* Sw. (Valentin, 6375); *A. oblongifolia* Standl. (Valentin, 6245); *Bernardia interrupta* (Schl.) Muell. Arg. (Chalillo Crossing, 6509); *Drypetes Brownii* Standl. (Valentin, 6189); *D. lateriflora* (Sw.) Krug & Urb. (Valentin, 6348); *Euphorbia hirta* L. (Camp 6, 6538); *Phyllanthus ferax* Standl. (Cohune Ridge, 6432); *Sebastiania Standleyana* Lundell; *Tragia* sp. (Camp 6, 6537).

ANACARDIACEAE: *Astronium graveolens* Jacq. (Valentin, 6339); *Mosquitoxylum jamaicense* Krug & Urban. AQUIFOLIACEAE: *Ilex belizensis* Lundell (Valentin, 6205; 6247, type coll.; 6331, 6332). HIPPOCRATEACEAE: *Hippocratea yucatanensis* Standl. (?) (Cohune Ridge, 6489). CELASTRACEAE: *Celastrus Mainsianus* Lundell (Valentin-Retiro road, 6307, type coll.); *Myginda Gaumeri* Loes. (Valentin, 6299); *Rhacoma eucymosa* (Loes. & Pitt.) Standl. (Valentin, 6206); *Wimmeria Bartlettii* Lundell (Valentin, 6278).

SAPINDACEAE: *Serjania scatens* Radlk. (?) (Valentin, 6357); *Thouinia paucidentata* Radlk. (?) (Valentin, 6368). TILIACEAE: *Heliocarpus* sp. (Chalillo Crossing, 6516). BOMBACACEAE: *Ceiba pentandra* (L.) Gaertn. (Valentin, 6320); *Hampea tomentosa* (Presl) Standl. (Cohune Ridge, 6478); *Quararibea Fieldii* Millsp. (Chalillo Crossing, 6507). DILLENIACEAE: *Tetracera mollis* Standl. (Valentin, 6270). ACTINIDIACEAE: *Saurauia leucocarpa* Schl. (Valentin, 6185; Chalillo Crossing, 6519). OCHNACEAE: *Ouratea pyramidalis* Riley (Valentin, 6296, 6369). MARCGRAVIACEAE: *Souroubea triandra* Lundell (Cohune Ridge, 6492, type coll.); *Ruyschia enervia* Lundell (Valentin-Retiro road, 6308, type coll.).

GUTTIFERAE: *Calophyllum brasiliense* Camb. var. *Rekoi* Standl.; *Rhedia* (?) (Valentin, 6227); *Clusia Chanekiana* Lundell (Valentin, 6366, type coll.); *C. Lundellii* Standl. (Valentin, 6411); *C. rosea* Jacq. (Cohune Ridge, 6491). VIOLACEAE: *Rinorea Hummelii* Sprague (Valentin, 6279, 6282).

FLACOURTIACEAE: *Hasseltia dioica* (Benth.) Sleumer (?) (Valentin, 6291);

Laetia Thamnia L. (Valentin-Retiro road, 6309). TURNERACEAE: *Erblichia odorata* Seem. (Valentin, 7024). CACTACEAE: *Rhipsalis Cassytha* Gaertn. (Cohune Ridge, 6446); *R. coriacea* Polak (Valentin, 6316); *R. dissimilis* (G. A. Lindberg) Schumann (Valentin, 6263). LYTHRACEAE: *Cuphea calophylla* Cham. & Schl. (Cohune Ridge, 6497). COMBRETACEAE: *Terminalia obovata* (R. & P.) Steud. RHIZOPHORACEAE: *Cassipourea podantha* Standl. (Valentin, 6265). MYRTACEAE: *Calyptanthus Millspaughii* Urban (Cohune Ridge, 6431); *Eugenia* sp. (Valentin, 6333); *Eugenia* sp. (Valentin, 6329); *Pimenta officinalis* Lindl.

MELASTOMACEAE: *Heterotrichum octonum* (Bonpl.) DC. (Arenal-Valentin road, 6177; Chalillo Crossing, 6529); *Miconia hyperprasina* Naud. (Cohune Ridge, 6496). ONAGRACEAE: *Hauya Lundellii* Standl. (Valentin, 6318, type coll.). ARALIACEAE: *Gilbertia arborea* (L.) March. (Valentin, 6230, 6403, 6461); *G. Smithiana* I. M. Johnston (Camp 6, 6540); *Oreopanax guatemalense* (Lem.) Dec. & Pl. (Valentin-Retiro road, 6306; Cohune Ridge, 6471). MYRSINACEAE: *Ardisia compressa* H. B. K. (Cohune Ridge, 7027); *A. Donnell-Smithii* Mez. (Retiro, 6302); *A. paschalis* Donn. Sm. (Chalillo Crossing, 6514); *A. Schippii* Standl. (Valentin, 6204, 6277).

SAPOTACEAE: *Achras Zapota* L.; *Calocarpum mammosum* (L.) Pierre; *Chryso-phyllum oliviforme* L. (Valentin, 6415); *Dipholis Stevensonii* Standl. (Valentin, 6200, 6252); *Lucuma Durlandii* Standl. (Valentin, 6327, 6402; Cohune Ridge, 6442); *Sideroxylon amygdalinum* Standl. (Valentin, 6246, 6264, 6362); *S. Meyeri* Standl. (Valentin, 6184, 6343). OLEACEAE: *Linociera oblanceolata* Rob. (Valentin-Retiro road, 6310; Valentin, 6321, 6324, 6404). LOGANIACEAE: *Strychnos brachistantha* Standl. (Valentin, 6266). GENTIANACEAE: *Leiphaimos* sp. (Valentin, 6347).

APOCYNACEAE: *Aspidosperma cruentum* Woods. (Valentin, 6326); *Cufodontia Lundelliana* Woods. (Valentin, 6220, 6360); *Forsteronia peninsularis* Woods. (Valentin, 6358); *Prestonia amanuensis* Woods. (Cohune Ridge, 6462); *Stemmadenia Donnell-Smithii* (Rose) Woods. (Valentin, 6243, 6480). ASCLEPIADACEAE: *Fischeria Briquetiana* Standl. (Cohune Ridge, 6534); *Marsdenia mayana* Lundell (Valentin, 6192, type coll.); *Vincetoxicum edule* (Hemsl.) Standl. (Arenal, 6166); *V. macranthum* (Kunze) Standl. (Cohune Ridge, 6435); *V. stenanthum* Standl. (Camp 6, 6548). CONVULVACEAE: *Ipomoea tuxtlenensis* House (Camp 6-Vaca road, 6547).

BORAGINACEAE: *Bourreria oxyphylla* Standl. (Cohune Ridge, 6439); *Rochefortia* sp. (Arenal-Valentin road, 6167); *Tournefortia hirsutissima* L. (Cohune Ridge, 6468); *T. syringaeifolia* Vahl (Cohune Ridge, 6473); *T. volubilis* L. (Cohune Ridge, 6470). VERBENACEAE: *Vitex Gaumeri* Greenm. LABIATAE: *Salvia Lundellii* Epling (Arenal, 6165, type coll.; Cohune Ridge-Chalillo Crossing trail, 6527); *Scutellaria orichalcea* Donn. Sm. (Valentin, 6218); *Teucrium vesicarium* Willd. (Cohune Ridge, 6455).

SOLANACEAE: *Athenaea affinis* Morton (Cohune Ridge, 6452, type coll.); *Capsicum Lundellii* Morton (Cohune Ridge, 6453, type coll.); *Saracha* (?) (Arenal-Valentin road, 6181); *Solanum cuspidatum* Morton (Arenal-Valentin road, 6172, type coll.; Valentin, 6248; Chalillo Crossing, 6508); *S. erythrotrichum* Fern. (Arenal-Valentin road, 6179; Cohune Ridge, 6501); *S. heteroclitum* Sendtn. (Cohune Ridge, 6438); *S. hondurensis* Morton (Chalillo Crossing, 6512, type coll.); *S. hypoleucum* (Standl.) Morton (Valentin, 6237; Cohune Ridge, 6454); *S. lanceaeifolium* Jacq. (Arenal, 6161); *S. Lundellii* Standl. (Arenal-Valentin road, 6171; Cohune Ridge, 6479); *S. umbellatum* Mill. (Cohune Ridge, 6467).

BIGNONIACEAE: *Macfadyena uncatata* (Andr.) Sprague & Sandw. (?) (Valentin, 6213); *Martinella obovata* (H. B. K.) Bur. & Schum. (Cohune Ridge, 6437); *Paragonia pyramidata* (Rich.) Bur. (Cohune Ridge, 6463); *Stizophyllum perforatum* (Cham.) Miers.

(Valentin, 6353); *Tynanthus guatemalensis* Donn. Sm. (Arenal-Valentin road, 6168; Valentin, 6354). GESNERIACEAE: *Drymonia spectabilis* (H. B. K.) Mart. (Chalillo Crossing-Cohune Ridge trail, 6549).

ACANTHACEAE: *Justicia breviflora* (Nees) Rusby (Valentin, 6209; 6290); *Louteri-dium Donnell-Smithii* Wats.; *Ruellia Harveyana* Stapf (Chalillo Crossing, 6518).

RUBIACEAE: *Chiococca alba* (L.) Hitchc. (Valentin, 6239); *Exostema mexicanum* Gray (?) (Valentin, 6340); *Faramea occidentalis* (L.) Rich. (Arenal-Valentin road, 6178); *Geophila herbacea* (Jacq.) Schum. (Valentin, 7025); *Guettarda Combsii* Urban (Valentin, 6240); *Hamelia calycosa* Donn. Sm. (Arenal-Valentin road, 6180); *Hillia tetrandra* Sw. (Valentin, 6232, 6372); *Psychotria chiapensis* Standl. (Valentin, 6412; Chalillo Crossing-Cohune Ridge trail, 6550); *P. limonensis* Krause (Valentin, 6193, 6250); *P. Lundellii* Standl. (Valentin, 6194, 6234, 6249, 6260); *P. mombachensis* Standl. (Valentin, 6199); *P. Oerstediana* Standl. (Chalillo Crossing, 6524); *Sickingia salvadorensis* Standl. (Valentin, 6367). CUCURBITACEAE: *Anguria Warscewiczii* Hook. f. (Valentin, 6313).

COMPOSITAE: *Baccharis trinervis* (Lam.) Pers. var. *rhexioides* (H. B. K.) Baker (Cohune Ridge, 6459); *Eupatorium Bartlettii* Rob. (Cohune Ridge, 6481); *E. Billbergianum* Beurl. (Valentin, 6254, 6400); *Liabum* sp. (Valentin, 6271); *Notoptera scabridula* Blake (Cohune Ridge, 6469); *Schistocarpha oppositifolia* (Kuntze) Rydb. (Cohune Ridge, 6466).

THE MOUNTAIN PINE RIDGE

DESCRIPTION OF THE REGION

The Mountain Pine Ridge and adjacent Bald Hill country to the east were carefully mapped by Ower (1927, 1929) during his geological survey of the colony. Regarding the southern mountainous region, and particularly the area under discussion, he makes the following statement (1927, p. 374):

The whole of the mountain area is really a peneplain at an elevation of 2500 to 3000 feet. The north-western portion is capped by limestone, which never exceeds 2500 feet. On the north-eastern edge of this limestone is the Mountain Pine Ridge, which extends into the Bald Hills. The cause of this isolated open pine area is not at first apparent. Except for the Bald Hills the area is almost entirely granite, but the other granitic areas in the colony are heavily vegetated. The eastern end of the Bald Hills is siliceous, and large veins of quartz and quartzite are prominent features south-westward to the Belize River. At the extreme north-west of the Mountain Pine Ridge young grit beds mask the junction of the slate and limestone. The veins just mentioned evidently were the channels through which warm siliceous water rose and on cooling deposited a sand capping attractive to pines. . . .

Concerning the age of the rock mass he says (1927, p. 379):

The rocks of British Honduras may be considered to consist of a central massif of Upper Carboniferous sedimentary and acid igneous rocks surrounded by thick foraminiferal limestone of about Oligocene age. . . .

Studies of the 1936 expedition were confined to the granite section and the narrow north-western borderland of Oligocene limestone (fig. 1).

Soils of the granite uplands are coarse acid sands, which Ower believed were deposited by siliceous springs. A soil pit, dug at San Agustin in the pine uplands, revealed a top layer of black sandy loam (pH 5) about 5 cm. deep below which, extending to a depth of approximately 30 cm., the soil was brownish yellow sand (pH 6) streaked black. Under this a layer of brownish yellow, coarse sand (pH 5 and 6) extended to a depth of 85 cm. At the 85-cm. depth began a red and gray layer, predominantly red, of coarse sand (pH 5) with hard concretions forming hardpan. This continued to below 135 cm., the depth of the test pit.

The lower layers had every appearance of being disintegrated granite, which indicates that the soils were locally derived from underlying rock, not deposited by siliceous springs as described by Ower. This view agrees with that expressed by Bartlett (1935*b*, p. 10) in his discussion of the British Honduran pinelands.

Along the larger streams in strips of flood plain there are accumulations of rich black alluvium which supports luxuriant rain forest. The soil of the bordering limestone is a calcareous clay, thin on the hills, of varying depth in the valleys.

No rainfall statistics for the Mountain Pine Ridge are available. At Middlesex to the east of the Bald Hills, the annual precipitation is about 3600 mm.; at El Cayo on the west it is 2050 mm. The area is very well watered, and its average rainfall must exceed 3000 mm. Because of the porous sands, little or no water stands in the uplands, except in small marshy

meadows. Streams ranging from small spring-fed brooks to large creeks cross almost every kilometer. Since most of the drainage of the watershed is subsurface through the sand, the streams are clear even in flood time.

HUMAN OCCUPANCY AND FIRE DESTRUCTION

The sterile sandy upland soils are valueless for agriculture. However, the alluvial lowlands along the creeks and the bordering limestone area have rich soils, and here are mounds and other evidences of Maya occupation. Near San Agustin there are two limestone caves in which potsherds of Maya origin abound.

The pinelands now have no settlements, but previously a cattle ranch was maintained at Vaquero (whence the name). Small ranches once existed at San Agustin and on Rio Privacion. Since grasses predominate in the herbaceous cover over much of the uplands, this industry might well thrive in the area.

Indians, chiefly from the village of San Antonio, hunt deer through the uplands, and burn the countryside each season. Sections escaping fire rapidly become overgrown with such thick herbaceous vegetation and pine seedlings that passage through them is difficult.

It is possible that the pine became established as a result of repeated fire destruction, possibly in prehistoric times. However, the considerable endemism among the herbs argues against this thesis. As Ower points out (1927, p. 374), other granitic areas in the colony are heavily forested. The burning now apparently prevents establishment of mesophytic calcifuge forest, and also destroys much of the pine.

CLASSIFICATION AND DESCRIPTION OF THE VEGETATION

The beautiful rolling uplands of the Mountain Pine Ridge are everywhere park-like (pl. 2a). The burning of the land by the Indians keeps down the shrubby growth and pine seedlings and leaves broad sweeps of grassland, some sections bearing fine stands of pine, others practically deforested, and some barren. Oak groves shadow the heads of ravines and form marginal forest along streams and limestone borderlands. Here and there occur small palm-fringed upland marshes.

No less attractive than the pineland itself are the numerous small streams of crystal water everywhere flowing fast or rushing down the innumerable cascades into clear pools with sandy bottoms. So well watered is the country that brooks and creeks occur in the San Agustin and Vaquero sections at intervals of less than a kilometer. Bordering brooks, small clumps of trees or shrubs alternate with stretches of marsh and grassy rocky sections. Along these a few renowned orchids grow in wanton profusion. The cattleyas cover huge boulders with a mantle of purple, and tall sobralias form colonies half an acre in extent, their lavender and purple flowers as large as those of a giant *Iris*.

Along the larger streams tall riparian forest covers the alluvial flood plains, but open rocky stretches usually with cascades have vegetation like that bordering brooks.

The vegetation of these pine ridge habitats, and the bordering limestone country, will be discussed under: (1) vegetation of the pine uplands, (2) vegetation along brooks and in upland marshes, (3) vegetation along creeks, (4) marginal forest, and (5) forest of the bordering limestone region.

VEGETATION OF THE PINE UPLANDS

The pine uplands in the vicinity of San Agustín contain representative stands of pine and associated hardwoods as well as typical herbaceous cover (pl. 2*b*). Here a transect was made through the best phase of the pine forest (Table 8). In the area of 11,163 sq. m. there were 189 pines, 11 oaks of two species, 1 *nanze* tree, 10 clethras, and 5 leucothoes. Of the 189 pines, 152 ranged in diameter at breast height from 15 to 45 cm. Their boles to the crotch had a length of 15 to 25 m., and the total height for all sizes ranged from 20 to 38 m. Most of the trunks were fire-scarred and enlarged at base. Because of the fires, no pine seedlings were present. Of the secondary trees, the oaks and clethras were largest, but neither exceeded 20 m. in height. The *nanze* and the leucothoes both were small, scarcely more than arborescent shrubs.

TABLE 8
TRANSECT THROUGH PINE FOREST

SPECIES	DIAMETER IN CENTIMETERS (BREAST HIGH)						TOTAL IN AREA OF 11,163 Sq. M.
	7.5-15	15-30	30-45	45-60	60-75	75-90	
<i>Pinus caribaea</i>	5	74	78	23	9	...	189
<i>Quercus Barbeyana</i>	1	6	...	...	...	...	7
<i>Quercus hondurensis</i>	2	2	...	...	...	...	4
<i>Byrsonima crassifolia</i>	1	...	...	...	...	...	1
<i>Clethra hondurensis</i>	5	5	...	...	...	...	10
<i>Leucothoe mexicana</i>	4	1	...	...	...	...	5
TOTAL	18	88	78	23	9	...	216

In the transect area, about 85 per cent of the floor cover consisted of grasses, 4 per cent of sedges, and 11 per cent of perennial herbs, shrubs, and juveniles of the *nanze*.

Possibly as much as 20 per cent of the Mountain Pine Ridge has a pine stand comparable to that through which the transect was made. This estimate may be high for the entire region, but it will hold for the western section traversed by the 1936 expedition. There are a few giant pines; one over 100 cm. in diameter was measured in a lowland bordering Mahogany Creek. However, the great majority are less than 45 cm. in diameter. The fire damage has been great; hence the percentage of trees sound enough for lumber must be small. The stand of pine over most of the uplands is very thin, and much of the country is open treeless grassland.

Scattered through the uplands with the pines are *silver pimentas* (*Schippia concolor*), various oaks, the *nanze* or *craboo*, and *Ternstroemia Tepezapote*, *Clethra hondurensis*, and *Leucothoe mexicana*. The last attains a height of as much as 10 m. All are fire-resistant. The thick cork on the boles of the *silver pimenta* palms and the leucothoes is noteworthy. Except for the oaks, all the secondary species occur as scattered individuals in the uplands. Oak groves are common along heads of ravines and in marginal forest, areas where the soil is somewhat richer than in the rolling uplands (pl. 3*a*).

Shrubs are rare in the open pineland, but abundant along brooks and in marginal forest. Epiphytes, usually orchids, grow on the boulders and on secondary trees, chiefly the oaks and *craboos*.

The herbaceous flora, consisting primarily of perennials, is not rich to judge from collecting during our brief visit. Of the 79 species of herbs obtained, the grasses total 30, the sedges 7, the legumes 11. The herbaceous vegetation of the western section of the Mountain Pine Ridge is predominantly grassy; this is true for the number of species and total percentage of cover. *Paspalum pectinatum* was the most conspicuous species during July and August 1936. Sedges rank next to grasses in importance with legumes third.

The species collected in the pine uplands, chiefly at San Agustin and Vaquero, are listed below.

- TREES:
- Pinaceae *Pinus caribaea* Mor.
- Palmae *Schippia concolor* Burret. *Silver pimenta*. 6558.
- Fagaceae *Quercus Barbeyana* Trel. 6626, 6729.
Quercus hondurensis Trel. 6758.
Quercus oleoides Cham. & Schl. var. *australis* Trel. 6627, 6837.
- Malpighiaceae *Byrsonima crassifolia* (L.) H. B. K. *Nanze, Craboo*.
- Theaceae *Ternstroemia Tepezapote* Schl. & Cham. 6838.
- Ericaceae *Clethra hondurensis* Britton. 6924.
Leucothoe mexicana (Hemsl.) Small. 6792.
- SHRUBS:
- Leguminosae *Inga pinetorum* Pittier. 6747.
- Melastomaceae *Heterocentron subtripplinervium* (Link & Otto) A. Br. & Bouché. 6875.
Miconia albicans (Sw.) Triana. 6917.
- EPIPHYTES:
- Orchidaceae *Catasetum integerrimum* Hook. 6624.
Galeandra Batemanii Rolfe. 6691.
Polystachya clavata Lindl. 6913.
- TERRESTRIAL HERBS:
- Gramineae *Andropogon bicornis* L. 6889.
Andropogon Elliottii Chapm. 6727.
Andropogon Selloanus (Hack.) Hack. 6629.
Aristida implexa Trin. 6904.
Aristida tenuispica Hitchc. 6815.
Axonopus compressus (Swartz) Beauv. 6713.
Digitaria horizontalis Willd. 6716.
Digitaria multiflora Swallen. 6730.
Eragrostis maypurensis (H. B. K.) Steud. 6722.
Eragrostis spectabilis (Pursh.) Steud. 6738.
Hackelochloa granularis (L.) Kuntze. 6733.
Mesosetum filifolium Hubb. 6564.
Panicum albomarginatum Nash. 6563.
Panicum fusiforme Hitchc. 6561.
Panicum laxum Swartz. 6717.
Panicum olivaceum Hitchc. & Chase. 6595, 6725.
Panicum Sellowii Nees. 6734.
Panicum strigosum Muhl. 6559.
Panicum viscidellum Scribn. 6732, 6735.
Paspalum Blodgettii Chapm. 6714.
Paspalum paniculatum L. 6715.
Paspalum pectinatum Nees. 6565.
Paspalum pilosum Lam. 6659, 6877.

- Paspalum plicatulum* Michx. 6876, 6878.
Setaria geniculata (Lam.) Beauv. 6736.
Setaria tenax (Rich.) Beauv. 6731.
Sorghastrum setosum (Griseb.) Hitchc. 6865.
Sporobolus indicus (L.) R. Br. 6724.
Thrasya campylostachya (Hack.) Chase. 6737.
Trachypogon angustifolius (H. B. K.) Nees. 6621.
- Cyperaceae
Bulbostylis capillaris (L.) Clarke. 6679.
Bulbostylis spadicea (H. B. K.) Kükenthal. 6919.
Bulbostylis vestita Kunth. 6698.
Cyperus flavus (Vahl) Nees. 6819.
Cyperus ischnos Schlechtend. 6818.
Cyperus Mutisii (H. B. K.) Griseb. 6710, 6817.
Scleria ciliata Michx. 6711.
- Commelinaceae
Commelina elegans H. B. K. 6744.
- Liliaceae
Echeandia sp. 6622.
- Orchidaceae
Habenaria mesodactyla Griseb. 6712.
- Droseraceae
Drosera brevifolia Pursh. 6927.
- Leguminosae
Cassia flexuosa L. 6695.
Cassia hispidula Vahl. 6911.
Cassia Tagera L. 6915.
Desmodium axillare (Sw.) DC. 6749.
Desmodium frutescens (Jacq.) Schindl. 6723.
Desmodium obtusum (Muhl.) DC. 6726.
Eriosema pulchellum (H. B. K.) Don. 6929.
Eriosema sp. 6930.
Phaseolus gracilis Poepp. (?). 6931.
Stylosanthes guyanensis (Aubl.) Sw. 6922.
Zornia diphylla (L.) Pers. 6745.
- Polygalaceae
Polygala bryzoides St. Hil. 6750.
Polygala incarnata L. 6822.
Polygala variabilis H. B. K. 6873.
Polygala variabilis H. B. K. f. *leucanthema* Blake. 6708.
- Euphorbiaceae
Croton repens Schlecht. 6721.
Dalechampia Schippii Standl. 6764.
Euphorbia heterophylla L. 6895.
Waltheria americana L. 6898.
- Sterculiaceae
Lechea tripetala (Moc. & Sesse) Britton (?). 6636, 6916.
- Cistaceae
Hybanthus calceolaria (L.) G. K. Schulze. 6793, 6894.
- Violaceae
Psidium Oerstedianum Berg. 6560.
- Myrtaceae
Evolvulus alsinoides L. (?). 6835.
- Convolvulaceae
Evolvulus sericeus Sw. 6821.
Ipomoea aphylla Standl. 6720.
- Verbenaceae
Ghinia spicata (Aubl.) Moldenke. E. B. Mains 4118.
- Labiatae
Scutellaria Lundellii Epling. 6867.
- Solanaceae
Schwenkia americana L. 6709.
- Scrophulariaceae
Buchnera sp. 6783.
Lamourouxia viscosa H. B. K. 6879.
Russelia sp. 6706, 6728, 6868, 6869, 6923, 6925, 6928.
Ruellia geminiflora H. B. K. 6602.
- Acanthaceae
Borreria suaveolens Mey. 6850.
- Rubiaceae
Declieuxia fruticosa (Willd.) Kuntze var. *mexicana* (DC.) Standl. 6849.
Diodia sarmentosa Sw. 6926.

Compositae	<i>Calea longipedicellata</i> Rob. & Greenm. 6765.
	<i>Chrysopsis graminifolia</i> (Michx.) Nutt. 6630.
	<i>Hieracium hondurensis</i> Blake. 6660.
	<i>Orthopappus angustifolius</i> (Sw.) Gleason. 6666.

VEGETATION ALONG BROOKS AND IN UPLAND MARSHES

Along the brooks, bordering stands of trees or shrubs, stretches of marsh, steep grassy banks with scattered shrubs, and dense groves of *pimenta* palms, as well as clumps of tall coarse herbs, give this habitat unending variety.

The most characteristic tree fringing brooks is *Clusia Massoniana* (pl. 3b). It is especially prominent in the Vaquero section, where it forms a continuous narrow belt on both sides of the nearby streams. Other trees, which occur as scattered individuals, are *Pinus caribaea*, *Sweetia panamensis*, *Cassipourea podantha*, *Photinia microcarpa*, and *Clethra hondurensis*.

Typical of the brooksides are dense, almost pure stands of the low *pimenta* palm, *Acoelorrhapha pinetorum*. Usually such clumps, called *pimentales*, grow in marshy sections where the bed is wide. In a *pimental* which had burned the previous dry season, *Digitaria pedicellaris*, *Hackelochloa granularis*, and *Panicum cayennense* covered the floor. Bordering *pimentales* at San Agustin there are large colonies of *Heliconia latispatha* and *Renealmia aromatica*, both coarse vigorous perennial herbs.

Fringing the small streams, clumps of *Myrica cerifera*, or solitary individuals of various other shrubs, including the very attractive orange-yellow flowered *Hypericum terrae-firmae*, are not uncommon.

Along stretches of open rocky banks, some strewn with boulders, others with outcropping igneous rock, grow low shrubs, mostly melastomes, and numerous herbaceous perennials, chiefly grasses, but including also such species as *Escobedia laevis*, *Marsypianthes Cham-aedrys*, *Aeschynomene laevis*, *Stylosanthes viscosa*, and *Calea trichotoma*. In these places grow the masses of the very attractive orchid, *Cattleya Skinneri*, as well as clumps of *Sobralia macrantha*.

Probably most interesting of the brookside habitats are the small patches of seepy marshland in which utricularias, polygalas, *Xyris*, and small sedges abound. So numerous are the utricularias in favorable spots that their fine yellow, orange-yellow, and blue flowers form masses of color. In other marshy areas may be found such monocotyledons as *Echeandia*, *Xiphidium*, and *Hypoxis*.

Marshy areas in the uplands, usually with *pimenta* palm clumps, have much the same association, although better defined than that along brooks. Along with the *pimenta* palm, the upland marshlands are characterized by various sedges and grasses, two species of *Xyris*, and *Gerardia Harperi*.

All of the collections along brooks and in upland marshes, a total of 74 species, are listed below:

TREES:

Pinaceae	<i>Pinus caribaea</i> Mor.
Rosaceae	<i>Photinia microcarpa</i> Standl. 6854.
Leguminosae	<i>Sweetia panamensis</i> Benth. <i>Billy Webb</i> . 6831.
Guttiferae	<i>Clusia Massoniana</i> Lundell. 6887.
Rhizophoraceae	<i>Cassipourea podantha</i> Standl. 6858.
Ericaceae	<i>Clethra hondurensis</i> Britton. 6562.

SHRUBS:

- Palmae *Acoelorrhaphe pinetorum* Bartlett. *Pimenta*.
 Myricaceae *Myrica cerifera* L.
 Leguminosae *Pithecolobium Donnell-Smithii* (Britt. & Rose) Standl. 6572.
 Euphorbiaceae *Stillingia zelayensis* Muell.-Arg. 6740.
 Cyrillaceae *Cyrilla racemiflora* L. 6883.
 Hypericaceae *Hypericum fasciculatum* Lam. (?). 6573.
Hypericum terrae-firmae Sprague & Riley. 6617.
 Myrtaceae *Calyptranthes Calderonii* Standl. 6857.
Myrcia rufidula Schlecht. (?). 6882.
 Melastomaceae *Clidemia dependens* D. Don. 6574, 6684.
Clidemia neglecta D. Don. 6741, 6870.
Clidemia strigillosa (Sw.) DC. 6872.
Conostegia Lundellii Gleason. 6587, 6587A.
Heterotrichum octonum (Bonpl.) DC. 6635.
Miconia ibaguensis (Bonpl.) Triana. 6586, 6892.
Miconia oinochrophylla Donn. Sm. 6888.
Tococa guianensis Aubl. 6856, 6880.
 Araliaceae *Gilbertia Smithiana* I. M. Johnston. 6918, 6921.
 Verbenaceae *Citharexylum caudatum* L. 6690.
 Rubiaceae *Appunia guatemalensis* Donn. Sm. 6871.

EPIPHYTES:

- Bromeliaceae *Catopsis Berteroniana* (Schult. f.) Mez. 6881.

TERRESTRIAL HERBS:

- Gramineae *Andropogon leucostachyus* H. B. K. 6657.
Andropogon tener (Nees) Kunth. 6905.
Digitaria pedicellaris (Trin.) Prain. 6694.
Eriochrysis cayennensis Beauv. 6628.
Hackelochloa granularis (L.) Kuntze. 6693.
Ichnanthus villosus Swallen. 6852.
Panicum cayennense Lam. 6585.
Panicum cyanescens Nees. 6568.
Panicum parvifolium Lam. 6631.
Panicum Sellowii Nees. 6557.
Paspalum plicatulum Michx. 6829.
Thrasya campylostachya (Hack.) Chase. 6855.
 Cyperaceae *Bulbostylis junciformis* (H. B. K.) Kunth. 6696.
Cyperus unioides R. Br. 6719.
Scleria hirtella Sw. 6681.
Scleria mitis Berg. 6718.
 Xyridaceae *Xyris* sp. 6658.
Xyris sp. 6866.
 Liliaceae *Echeandia* sp. 6742.
 Haemodoraceae *Xiphidium caeruleum* Aubl. 6634.
 Amaryllidaceae *Hypoxis decumbens* L. 6616.
 Musaceae *Heliconia latispatha* Benth. 6655.
 Zingiberaceae *Renealmia aromatica* (Aubl.) Griseb. 6743.
 Burmanniaceae *Apteria aphylla* (Nutt.) Barnh. 6899.
 Orchidaceae *Cattleya Skinneri* Batem.
Habenaria setifera Lindl. 6968.
 Leguminosae *Aeschynomene laevis* Mart. & Gal. 6886.
Stylosanthes viscosa Sw. 6885.

Polygalaceae	<i>Polygala adenophora</i> L. 6860, 6861. <i>Polygala asperuloides</i> H. B. K. 6897. <i>Polygala hygrophila</i> H. B. K. 6862.
Euphorbiaceae	<i>Euphorbia heterophylla</i> L. 6830. <i>Euphorbia hyssopifolia</i> L. 6896. <i>Euphorbia</i> sp. 7023.
Passifloraceae	<i>Passiflora foetida</i> L. var. <i>lanuginosa</i> Killip. 6874, 6900.
Apocynaceae	<i>Mandevilla subsagittata</i> (R. & P.) Woods. 6884.
Asclepiadaceae	<i>Blepharodon mucronatum</i> (Schlecht.) Dcne. 6832. <i>Metastelma pedunculare</i> Dcne. 6656.
Labiatae	<i>Marsypianthes Chamaedrys</i> (Vahl) Kuntze. 6893.
Scrophulariaceae	<i>Escobedia laevis</i> Cham. & Schl. 6692. <i>Gerardia Harperi</i> (Penn.) Penn. 6643.
Lentibulariaceae	<i>Utricularia</i> spp. 6859, 6863, 6864.
Rubiaceae	<i>Crusea calocephala</i> DC. 6625.
Compositae	<i>Calea trichotoma</i> Donn. Sm. 6820. <i>Melampodium gracile</i> Less. 6759. <i>Wedelia parviceps</i> Blake. 6763.

VEGETATION ALONG CREEKS

The larger streams at the western edge of the Mountain Pine Ridge between Rio Privacion and Vaquero are, in the order named, Rio Privacion, Rio Pinol, Rio On, Rio Frio, and Mahogany Creek. In spite of their Spanish designation as rivers, all are in reality creeks which dwindle almost to brooks during dry spells. After hard rains they become tremendous torrents, but rapidly subside. The small streams at Vaquero, apparently unnamed, might be rated as creeks; the collections along them have been included under brooks.

Although much of the vegetation bordering the creeks is identical with that of the brooks, especially along upper reaches, these streams differ in having areas of alluvial flood plain which supports tall rain forest in which mahogany occurs in sufficient quantity to justify logging operations.

Since most of the collecting was done along Rio Frio at San Agustin and at the great cascades of Rio On, the discussion of the vegetation will be restricted to a brief description of the habitats visited along these streams.

RIO FRIO⁵

Forest of the alluvial flood plain. In the luxuriant flood plain forest, a belt usually less than 100 meters wide, the tallest trees, some up to 40 meters, are the mahogany, *Swietenia macrophylla*, *Quercus acutifolia*, and *Symphonia globulifera*. The smaller trees, ranging in height from 5 to 15 meters, include *Inga belizensis*, *Ilex guianensis*, *Cassipourea podantha*, *Eugenia* sp., *Henriettea strigosa*, *Miconia dodecandra*, *Mouriria exilis*, and *Enallagma latifolia*. Of these, the *Mouriria* was commonest. Of the treelets and shrubs, the following were collected: *Myrcia rufidula* (?), *Miconia hyperprasina*, *M. obovalis*, and *M. oligocephala*. The melastomes characterize the lower layer, and are most numerous

⁵ This stream has been incorrectly labeled "Rio Trio" on the Map of British Honduras issued by the Surveyor General's Department of British Honduras in 1933 (Stevenson, 1935). Also, Rio Privacion is incorrectly spelled "Privassion Creek."

in species and individuals. Fringing the stream, in the dense shade, grow scattered individuals of the tree fern *Alsophila myosuroides*.

Two tall woody lianas, *Forsteronia* sp. (6912) and *Arrabidaea candicans*, and a slender climbing fern, *Lygodium volubile*, were found in the same association. On the floor I collected *Panicum pilosum*, *Paspalum conjugatum*, *Campelia* (?), *Ruellia Harveyana*, and the minute saprophyte *Apteria aphylla*.

Vegetation of the open rocky banks and cascades. In the stream, usually at cascades, grow large colonies of *Lindenia rivalis*. Here also a reddish aquatic, *Marathrum* (?), may be found in mats, tenaciously anchored to the bedrock.

On open banks, small trees, either in clumps or as scattered individuals, fringe the stream. Of these, *Licania hypoleuca*, *Sweetia panamensis*, *Clusia Massoniana*, *Clusia* sp. (6600), and *Oreopanax guatemalense* were collected. As along brooks, *Clusia Massoniana* is abundant. Growing with these are the shrubby *Calliandra rivalis* and *Calypttranthes Bartlettii*, the latter most conspicuous. The herbaceous assemblage, growing on huge boulders or outcropping rock, is unusually interesting. Often the plants are anchored in a few inches of soil in a pocket or crevice. Usually such areas are partially shaded by trees of the stream edge or the marginal forest. Here as terrestrials grow *Polypodium* sp. (6639), *Selaginella cuspidata*, *Andropogon lateralis* var. *incanus*, *Digitaria cayoensis*, *Lasiacis procerrima*, *Paspalum corcovadense*, *Thrasya campylostachya*, *Pitcairnia petiolata*, *Cattleya Skinneri*, *Maxillaria uncatata*, *Pleurothallis marginata*, *Sobralia decora*, *S. macrantha*, *Desmodium adscendens*, *Oxalis* sp. (6642), *Polygala paniculata*, and *Mandevilla hirsuta*. Such banks, with the abundance of the showy cattleyas, sobralias, and pitcairnia, are delightful spots, each with an individuality. In contrast to brooksides, sedgy marshy areas are rare along the main streams of the creeks.

RIO ON

The trail from San Antonio to San Agustin crosses Rio On at the western edge of the pineland just above the great cascades where the stream descends into the gorge of the Macal River. The granite banks of the upper cascades are open stretches of eroded rock with crevices, pockets, small sheltered nooks, and ledges. The stream bed, a rather narrow course, consists of exposed bedrock with some boulders, and short stretches of sand and gravel.

Along the rocky banks grow *Cassia Deamii*, *Erythroxyton areolatum*, *Eugenia O'Neillii*, *Miconia pteropoda*, *Appunia guatemalensis*, *Hillia tetrandra*, *Calea fluviatilis*, and other noteworthy shrubs. With these are patches of *Epidendrum alatum* and *Cattleya Skinneri*. Grass thrives in the alluvium of rock crevices; here I collected *Andropogon lateralis* var. *incanus*, *A. virgatus*, *Aristida hamulosa*, *A. orizabensis*, *Ichnanthus villosus*, *Panicum cyanescens*, *P. laxum*, *Paspalum coryphaeum*, and *P. plicatulum*.

Down in the creek bed the water is too swift for aquatics, but one grass, *Andropogon tener*, was locally abundant. Fringing the stream I found *Zinowiewia pallida*, a small tree.

All collections along the creeks, a total of 78 species, are listed below:

TREES 15-40 M. HIGH:

Fagaceae
Rosaceae

Quercus acutifolia Nee. 6615.
Licania hypoleuca Benth. 6601.

- Leguminosae *Sweetia panamensis* Benth. *Billy Webb*. 6620.
 Meliaceae *Swietenia macrophylla* King. *Mahogany*.
 Guttiferae *Symphonia globulifera* L.f. *Chilillo*. 6773.

TREES 5-15 M. HIGH:

- Lauraceae *Phoebe longicaudata* Lundell. 6833.
 Leguminosae *Inga belizensis* Standl. 6599.
 Aquifoliaceae *Ilex guianensis* (Aubl.) Kuntze. 6607.
 Cyrillaceae *Cyrilla racemiflora* L. 6967.
 Celastraceae *Zinowiewia pallida* Lundell. 6794.
 Guttiferae *Clusia Massoniana* Lundell. 6598, 6605.
Clusia sp. 6600.
 Rhizophoraceae *Cassipourea podantha* Standl. 6612.
 Myrtaceae *Eugenia* sp. 6606.
 Melastomaceae *Henriettea strigosa* Gleason. 6623.
Miconia dodecandra (Desr.) Cogn. 6609, 6685.
Mouriria exilis Gleason. 6772.
 Araliaceae *Oreopanax guatemalense* (Lem.) Dec. & Pl. 6704.
 Bignoniaceae *Enallagma latifolia* (Mill.) Standl. 6618.

TREELETS AND SHRUBS:

- Cyatheaceae *Alsophila myosuroides* Liebm. 6592.
 Leguminosae *Calliandra rivalis* Lundell. 6610.
Cassia Deamii (Britt. & Rose) Lundell. 6782.
 Erythroxylaceae *Erythroxylon areolatum* L. 6779.
 Myrtaceae *Calyptranthes Bartlettii* Standl. 6686.
Eugenia O'Neillii Lundell. 6803.
Myrcia rufidula Schlecht. (?). 6611.
Psidium molle Bertol. 6902.
 Melastomaceae *Miconia hyperprasina* Naud. 6663.
Miconia obovalis Naud. 6604.
Miconia oligocephala Donn. Sm. 6608.
Miconia pteropoda Benth. 6790.
 Rubiaceae *Appunia guatemalensis* Donn. Sm. 6796.
Hillia tetrandra Sw. 6799.
Lindenia rivalis Benth. 6687.
Psychotria fruticetorum Standl. 6702.
 Compositae *Calea fluviatilis* Blake. 6787.

WOODY VINES:

- Apocynaceae *Forsteronia* sp. 6912.
 Bignoniaceae *Arrabidaea candicans* (L. C. Rich.) DC. 6771.

EPIPHYTES:

- Bromeliaceae *Tillandsia Balbisiana* Schult. f. 6795.
Tillandsia fasciculata Sw. var. *convexispica* Mez. 6707.
 Orchidaceae *Epidendrum nocturnum* Jacq. 6806.

TERRESTRIAL HERBS:

- Gleicheniaceae *Dicranopteris pectinata* (Willd.) Underw. 6603.
 Polypodiaceae *Polypodium plumula* H. & B. 6798.
Polypodium sp. 6639.
 Schizaeaceae *Lygodium volubile* Sw. 6613.
 Selaginellaceae *Selaginella cuspidata* Link. 6700.

Gramineae	<i>Andropogon lateralis</i> Nees var. <i>incanus</i> (Hack.) Henr. 6705, 6791. <i>Andropogon tener</i> (Nees) Kunth. 6797. <i>Andropogon virgatus</i> Desv. 6800. <i>Aristida hamulosa</i> Henr. 6801. <i>Aristida orizabensis</i> Fourn. 6804. <i>Digitaria cayoensis</i> Swallen. 6670. <i>Ichnanthus villosus</i> Swallen. 6785. <i>Lasiacis procerrima</i> (Hack.) Hitchc. 6571. <i>Panicum cyanescens</i> Nees. 6789. <i>Panicum laxum</i> Swartz. 6788. <i>Panicum Lundellii</i> Swallen. 6903. <i>Panicum pilosum</i> Swartz. 6668. <i>Paspalum conjugatum</i> Berg. 6669. <i>Paspalum corcovadense</i> Raddi. 6640. <i>Paspalum coryphaeum</i> Trin. 6784. <i>Paspalum plicatulum</i> Michx. 6802. <i>Thrasya campylostachya</i> (Hack.) Chase. 6641.
Bromeliaceae	<i>Pitcairnia petiolata</i> (Koch & Bouché) Baker. 6566.
Commelinaceae	<i>Campelia</i> (?). 6664.
Burmanniaceae	<i>Apteria aphylla</i> (Nutt.) Barnh. 6614.
Orchidaceae	<i>Cattleya Skinneri</i> Batem. 6701. <i>Epidendrum alatum</i> Batem. 6786. <i>Maxillaria uncata</i> Lindl. 6591. <i>Pleurothallis marginata</i> Lindl. 6590. <i>Sobralia decora</i> Batem. 6597. <i>Sobralia macrantha</i> Lindl. 6689.
Podostemonaceae	<i>Marathrum</i> (?). <i>Onoyha</i> . 6703.
Leguminosae	<i>Desmodium adscendens</i> (Sw.) DC. 6569, 6688.
Oxalidaceae	<i>Oxalis</i> sp. 6642.
Polygalaceae	<i>Polygala paniculata</i> L. 6914.
Apocynaceae	<i>Mandevilla hirsuta</i> (A. Rich.) K. Sch. 6619.
Acanthaceae	<i>Ruellia Harveyana</i> Stapf. 6667.

MARGINAL FOREST

Between the pineland and the mesophytic forest along the flood plains of creeks there is a narrow belt of transition vegetation (pl. 4). Where the creek banks are rocky and open, the belt often fringes the streams. This marginal forest consists of open stands of oaks, pine, and the *silver pimenta* (*Schippia concolor*), usually with lower layers of treelets, shrubs, and herbs. Where fire has been severe, the stand of pine, oaks, and *silver pimenta* alone remains, with grasses overrunning the floor. In the undergrowth, the typical treelets and shrubs are *Erythroxyton areolatum*, *Solanum jamaicense*, *Anisomeris protracta*, *Pali-courea triphylla*, *Psychotria* spp., and various melastomes. The herbs include *Pteridium caudatum*, *Ichnanthus pallens*, *I. Standleyi*, *Oplismenus hirtellus*, *Coccocypselum hirsutum*, and *Richardia scabra*.

The marginal forest which fringes the limestone borderland differs somewhat floristically; this is undoubtedly due to soil conditions. The oak and pine species are the same, and edge the pineland. In the undergrowth and taller transition stages, which give way imperceptibly to the limestone forest, calciphile species predominate. The common lime-loving *palmetto*, *Sabal Morrisiana*, is here abundant. Among the treelets and shrubs found in

this marginal belt were *Phoebe longicaudata*, *Heterotrichum octonum*, *Miconia oligocephala*, *Xylosma sylvicola* (?), *Tabernaemontana chrysocarpa*, *Cordia polycephala*, *Solanum erythrotrichum*, *S. sideroxyloides*, and *Appunia guatemalensis*. *Lasiacis Grisebachii*, *L. papillosa*, and *L. sorghoidea* are the three most prominent herbs, although two other grasses, *Olyra latifolia* and *Ichnanthus tenuis*, abound also.

At the head of a wet ravine bordering the pineland, a stand of luxuriant forest was encountered in which I collected three very interesting trees, *Tapirira macrophylla*, *Sloanea eriostemon*, and *Henriettea succosa*; two shrubs, *Siparuna nicaraguensis* and *Psychotria patens*; and one large woody vine, *Piptocarpha chontalensis*. Whether this forest represents a phase of an invading mesophytic stage must await further investigation. The assemblage differed from any other marginal forest encountered.

All species collected or noted in the marginal forest are listed below:

TREES 10-25 M. HIGH:

- Pinaceae *Pinus caribaea* Mor.
 Palmae *Sabal Morrisiana* Bartlett. 6676, 6683.
 Fagaceae *Quercus* spp.
 Anacardiaceae *Tapirira macrophylla* Lundell. 6841.
 Tiliaceae *Sloanea eriostemon* Sprague & Riley. 6824.
 Araliaceae *Gilibertia Smithiana* I. M. Johnston. 6588

TREES 5-10 M. HIGH:

- Palmae *Schippia concolor* Burret. *Silver pimenta*. 6673.
 Lauraceae *Phoebe longicaudata* Lundell. 6757.
 Erythroxylaceae *Erythroxylon areolatum* L. 6671.
 Myrtaceae *Eugenia* sp. 6677.
 Melastomaceae *Henriettea succosa* (Aubl.) DC. 6826.
Miconia oligocephala Donn. Sm. 6770.
 Apocynaceae *Tabernaemontana chrysocarpa* Blake. 6665.

SHRUBS:

- Monimiaceae *Siparuna nicaraguensis* Hemsl. 6825.
 Flacourtiaceae *Xylosma sylvicola* Standl. (?). 6754.
 Melastomaceae *Clidemia Deppeana* Steud. 6674.
Clidemia rubra (Aubl.) Mart. 6975.
Heterotrichum octonum (Bonpl.) DC. 6678.
 Myrsinaceae *Parathesis cubana* (A. DC.) Molinet & G. Maza. 6739.
 Boraginaceae *Cordia polycephala* (Lam.) Johnston. 6756.
 Solanaceae *Solanum erythrotrichum* Fern. 6753.
Solanum jamaicense Dunal. 6672.
 Rubiaceae *Anisomeris protracta* (Bartl.) Standl. 6589.
Appunia guatemalensis Donn. Sm. 6675, 6813.
Palicourea triphylla DC. 6567.
Psychotria patens Sw. 6637, 6769, 6843.

WOODY VINES:

- Solanaceae *Solanum sideroxyloides* Schl. 6814.
 Compositae *Piptocarpha chontalensis* Baker. 6842.

EPIPHYTES:

- Polypodiaceae *Elaphoglossum* sp. 6570.
 Bromeliaceae *Catopsis apicroides* (Ch. & Schdl.) Bak. 6834.

Orchidaceae	<i>Maxillaria crassifolia</i> (Lindl.) Rchb. f. 6848.
Cactaceae	<i>Rhipsalis coriacea</i> Polak. 6839, 6910.
TERRESTRIAL HERBS:	
Polypodiaceae	<i>Pteridium caudatum</i> (L.) Maxon. 6653.
Gramineae	<i>Ichnanthus pallens</i> (Swartz) Munro. 6844.
	<i>Ichnanthus Standleyi</i> Hitchc. 6593.
	<i>Ichnanthus tenuis</i> (Presl) Hitchc. & Chase. 6762.
	<i>Lasiacis Grisebachii</i> (Nash) Hitchc. 6751.
	<i>Lasiacis papillosa</i> Swallen. 6840.
	<i>Lasiacis sorghoidea</i> (Desv.) Hitchc. & Chase. 6752.
	<i>Olyra latifolia</i> L. 6638, 6755.
	<i>Oplismenus hirtellus</i> (L.) Beauv. 6827.
	<i>Pharus latifolius</i> L. 6845.
Haemodoraceae	<i>Xiphidium caeruleum</i> Aubl. 6828.
Dioscoreaceae	<i>Dioscorea Bernoulliana</i> Prain & Burk. 6891.
Leguminosae	<i>Centrosema virginianum</i> Benth. 6768.
	<i>Tephrosia belizensis</i> Lundell. 6662.
Euphorbiaceae	<i>Euphorbia</i> sp. 6767.
	<i>Phyllanthus</i> sp. 6594.
Violaceae	<i>Hybanthus oppositifolius</i> (L.) Taub. 6661.
Apocynaceae	<i>Mandevilla hirsuta</i> (A. Rich.) K. Sch. 6632.
	<i>Mandevilla subsagittata</i> (R. & P.) Woods. 6633.
Solanaceae	<i>Physalis Lagascae</i> R. & S. 6836.
Rubiaceae	<i>Coccocypselum hirsutum</i> Bartl. 6851.
	<i>Diodia rigida</i> (Willd.) Cham. & Schl. 6654.
	<i>Richardia scabra</i> L. 6596.
Compositae	<i>Calea trichotoma</i> Donn. Sm. 6890.

FOREST OF THE BORDERING LIMESTONE REGION

Fires, sweeping from the pinelands, have devastated much of the adjacent limestone area. All of the forest encountered was either secondary or culled so much by fire that only fire-resistant relics remained.

The *palmetto*, *Sabal Morrisiana*, and *Achras Zapota* still characterized least damaged sectors of the forest. Of the other trees and treelets, I obtained determinable material of *Beaucarnea Ameliae*, *Coccoloba belizensis*, *Clusia suborbicularis*, *Gilibertia concinna*, *Diospyros* sp. (6807), *Plumeria rubra*, and *Bourreria oxyphylla*. Among the arborescent shrubs were *Chamaedorea* sp. (6853), *Cryosophila argentea*, *Coccoloba cozumelensis*, *Neomillspaughia emarginata*, *Neea psychotrioides*, *Anona reticulata*, *Erythroxyton Bequaertii*, *Guettarda Gaumeri*, *Machaonia Lindeniana*, and *Psychotria undata*. All except *Bourreria oxyphylla* grew on the hills. In open places, denuded by fire, *Ichnanthus lanceolatus* and *Panicum parviglume* covered the ground. In the forest shade, here as elsewhere on dry limestone hills, *Scleria lithosperma* was common.

A majority of the species in this limestone area are typical of the dry deciduous forest of Yucatan and northern Quintana Roo.

Collections from the limestone borderlands of the Mountain Pine Ridge are listed below:

TREES:

Palmae	<i>Sabal Morrisiana</i> Bartlett. <i>Botan, Palmetto</i> .
Liliaceae	<i>Beaucarnea Ameliae</i> Lundell. 6650.

Polygonaceae	<i>Coccoloba belizensis</i> Standl. 6812.
Guttiferae	<i>Clusia suborbicularis</i> Lundell. 6805.
Araliaceae	<i>Gilibertia concinna</i> Standl. <i>Mano de leon</i> . 6811, 6966.
Sapotaceae	<i>Achras Zapota</i> L. 6746.
Ebenaceae	<i>Diospyros</i> sp. 6807.
Apocynaceae	<i>Plumeria rubra</i> L. <i>Palo de zopilote</i> , <i>Utopachuom</i> . 6846.
Boraginaceae	<i>Bouyeria oxyphylla</i> Standl. 6761.

TREELETS AND SHRUBS:

Palmae	<i>Chamaedorea</i> sp. 6853. <i>Cryosophila argentea</i> Bartlett. 6909.
Polygonaceae	<i>Coccoloba cozumelensis</i> Hemsl. 6648. <i>Neomillspaughia emarginata</i> (Gross) Blake. 6645.
Nyctaginaceae	<i>Neea psychotrioides</i> Donn. Sm. 6652.
Anonaceae	<i>Anona reticulata</i> L. 6651.
Erythroxylaceae	<i>Erythroxylon Bequaertii</i> Standl. 6810.
Rubiaceae	<i>Guettarda Gaumeri</i> Standl. 6649. <i>Machaonia Lindeniana</i> Baill. 6647. <i>Psychotria undata</i> Jacq. 6766.

EPIPHYTES:

Polypodiaceae	<i>Polypodium plumula</i> H. & B. 6748.
Orchidaceae	<i>Epidendrum paniculatum</i> Ruiz & Pav. 6760.

TERRESTRIAL HERBS:

Schizaeaceae	<i>Anemia phyllitidis</i> (L.) Sw. 6908. <i>Anemia speciosa</i> Presl. 6906.
Gramineae	<i>Ichnanthus lanceolatus</i> Scribn. & Smith. 6646, 6808. <i>Panicum parviglume</i> Hack. 6809.
Cyperaceae	<i>Scleria lithosperma</i> (L.) Sw.
Papaveraceae	<i>Bocconia frutescens</i> L. 6907.

SIGNIFICANCE OF THE DISTRIBUTION OF CERTAIN SPECIES

The presence on the limestone hills bordering the Mountain Pine Ridge of *Beaucarnea Ameliae*, *Coccoloba cozumelensis*, *Neomillspaughia emarginata*, *Erythroxylon Bequaertii*, *Guettarda Gaumeri*, *Machaonia Lindeniana*, and the presence of such plants as *Gymnopodium*, *Mimosa hemiendyta*, *Caesalpinia yucatanensis*, *Pithecolobium albicans*, *Erythroxylon brevipes*, *Hybanthus yucatanensis*, as well as *Coccoloba cozumelensis* and *Guettarda Gaumeri*, in the wooded swamps (*bajos*) of southern Campeche and Peten are significant to a historical interpretation of the distribution of the vegetation of the peninsula. These species are among those which dominate the cactus thicket and advanced deciduous forest of the state of Yucatan and northern Quintana Roo, xerophytic and subxerophytic zones (Lundell, 1938d). Their presence as relics on dry hill crests and in swamps in the southern areas of much higher rainfall may be interpreted to indicate either that the climate at the base of the peninsula has been considerably drier in the past, or that the clearing of the land by the ancient Maya resulted in conditions which favored the growth of xerophytes.

Relic colonies still persist in those habitats which are least suited to the invaders from the quasi rain forest, not necessarily best adapted to the relic vegetation. Their presence suggests that the cactus thicket and deciduous forest zones were at one time much more extensive than now, and possibly covered most of the peninsula at least as far south as central British Honduras.

LIST OF THE SPECIES COLLECTED OR OBSERVED IN THE MOUNTAIN PINE RIDGE
AND BORDERLAND

- GLEICHENIACEAE: *Dicranopteris pectinata* (Willd.) Underw. (San Agustín, 6603).
 CYATHEACEAE: *Alsophila myosuroides* Liebm. (San Agustín, 6592). POLYPODIA-
 CEAE: *Elaphoglossum* sp. (San Agustín, 6570); *Polypodium plumula* H. & B. (San
 Agustín, 6748; Río On, 6798); *Polypodium* sp. (San Agustín, 6639); *Pteridium caudatum*
 (L.) Maxon (San Agustín, 6653). SCHIZAEACEAE: *Anemia phyllitidis* (L.) Sw. (San
 Agustín, 6908); *A. speciosa* Presl (San Agustín, 6906); *Lygodium volubile* Sw. (San Agus-
 tín, 6613). SELAGINELLACEAE: *Selaginella cuspidata* Link (San Agustín, 6700).
 PINACEAE: *Pinus caribaea* Mor. GRAMINEAE: *Andropogon bicornis* L. (Vaquero,
 6889); *A. Elliottii* Chapm. (San Agustín, 6727); *A. lateralis* Nees var. *incanus* (Hack.)
 Henr. (San Agustín, 6705; Río On, 6791); *A. leucostachyus* H. B. K. (San Agustín, 6657);
A. Selloanus (Hack.) Hack. (San Agustín, 6629); *A. tener* (Nees) Kunth. (Río On, 6797;
 San Agustín, 6905); *A. virgatus* Desv. (Río On, 6800); *Aristida hamulosa* Henr. (Río On,
 6801); *A. implexa* Trin. (San Agustín, 6904); *A. orizabensis* Fourn. (Río On, 6804);
A. tenuispica Hitchc. (San Agustín, 6815); *Axonopus compressus* (Swartz) Beauv. (San
 Agustín, 6713); *Digitaria cayoensis* Swallen (San Agustín, 6670, type coll.); *D. horizontalis*
 Willd. (San Agustín, 6716); *D. multiflora* Swallen (San Agustín, 6740, type coll.); *D.*
pedicellaris (Trin.) Prain (San Agustín, 6694); *Eragrostis maypurensis* (H. B. K.) Steud.
 (San Agustín, 6722); *E. spectabilis* (Pursh) Steud. (San Agustín, 6738); *Eriochrysis cayen-*
nensis Beauv. (San Agustín, 6628); *Hackelochloa granularis* (L.) Kuntze (San Agustín,
 6693, 6733); *Ichnanthus lanceolatus* Scribn. & Smith (San Agustín, 6646, 6808); *I. pallens*
 (Swartz) Munro (San Agustín, 6844); *I. Standleyi* Hitchc. (San Agustín, 6593); *I. tenuis*
 (Presl) Hitchc. & Chase (San Agustín, 6762); *I. villosus* Swallen (Río On, 6785; Vaquero,
 6852, type coll.); *Lasiacis Grisebachii* (Nash) Hitchc. (San Agustín, 6751); *L. papillosa*
 Swallen (San Agustín, 6840); *L. procerrima* (Hack.) Hitchc. (San Agustín, 6571); *L.*
sorghoidea (Desv.) Hitchc. & Chase (San Agustín, 6752); *Mesosetum filifolium* Hubb.
 (San Agustín, 6564); *Olyra latifolia* L. (San Agustín, 6638; 6735); *Oplismenus hirtellus*
 (L.) Beauv. (San Agustín, 6827); *Panicum albomarginatum* Nash (San Agustín, 6563);
P. cayennense Lam. (San Agustín, 6585); *P. cyanescens* Nees (San Agustín, 6568; Río On,
 6789); *P. fusiforme* Hitchc. (San Agustín, 6561); *P. laxum* Swartz (San Agustín, 6717;
 Río On, 6788); *P. Lundellii* Swallen (Mahogany Creek, 6903, type coll.); *P. olivaceum*
 Hitchc. & Chase (San Agustín, 6595, 6725); *P. parvifolium* Lam. (San Agustín, 6631);
P. parviglume Hack. (San Agustín, 6809); *P. pilosum* Swartz (San Agustín, 6668); *P.*
Sellowii Nees (San Agustín, 6557, 6734); *P. strigosum* Muhl. (San Agustín, 6559); *P.*
viscidellum Scribn. (San Agustín, 6732; 6735); *Paspalum Blodgettii* Chapm. (San Agustín,
 6714); *P. conjugatum* Berg. (San Agustín, 6669); *P. corcovadense* Raddi (San Agustín,
 6640); *P. coryphaeum* Trin. (Río On, 6784); *P. paniculatum* L. (San Agustín, 6715); *P.*
pectinatum Nees (San Agustín, 6565); *P. pilosum* Lam. (San Agustín, 6659; Vaquero,
 6877); *P. plicatulum* Michx. (Río On, 6802; San Agustín, 6829; Vaquero, 6876, 6878);
Pharus latifolius L. (San Agustín, 6845); *Setaria geniculata* (Lam.) Beauv. (San Agustín,
 6736); *S. tenax* (Rich.) Beauv. (San Agustín, 6731); *Sorghastrum setosum* (Griseb.)
 Hitchc. (San Agustín, 6865); *Sporobolus indicus* (L.) R. Br. (San Agustín, 6724); *Thrasya*
campylostachya (Hack.) Chase (San Agustín, 6641, 6737; Vaquero, 6855); *Trachypogon*
angustifolius (H. B. K.) Nees (San Agustín, 6621).
 CYPERACEAE: *Bulbostylis capillaris* (L.) Clarke (San Agustín, 6679); *B. junciformis*
 (H. B. K.) Kunth (San Agustín, 6696); *B. spadicea* (H. B. K.) Kükenthal (San Agustín,
 6919); *B. vestita* Kunth (San Agustín, 6698); *Cyperus flavus* (Vahl) Nees (San Agustín,

6819); *C. ischnos* Schlechtend. (San Agustin, 6818); *C. Mutisii* (H. B. K.) Griseb. (San Agustin, 6710; 6817); *C. uniolooides* R. Br. (San Agustin, 6719); *Scleria ciliata* Michx. (San Agustin, 6711); *S. hirtella* Sw. (San Agustin, 6681); *S. lithosperma* (L.) Sw. (San Agustin, 6816); *S. mitis* Berg. (San Agustin, 6718).

PALMAE: *Acoelorrhapha pinetorum* Bartlett; *Chamaedorea* sp. (Vaquero, 6853); *Cryosophila argentea* Bartlett (San Agustin, 6909); *Sabal Morrisiana* Bartlett (San Agustin, 6676, 6683); *Schippia concolor* Burret (San Agustin, 6558, 6673). XYRIDACEAE: *Xyris* sp. (San Agustin, 6658); *Xyris* sp. (San Agustin, 6866). BROMELIACEAE: *Catopsis apicroides* (Ch. & Schdl.) Bak. (San Agustin, 6834); *C. Berteroniana* (Schult. f.) Mez. (Vaquero, 6881); *Pitcairnia petiolata* (Koch & Bouché) Bak. (San Agustin, 6566); *Tillandsia Balbisiana* Schult. f. (Rio On, 6795); *T. fasciculata* Sw. var. *convexispica* Mez. (San Agustin, 6707). COMMELINACEAE: *Campelia* (?) (San Agustin, 6664); *Comelina elegans* H. B. K. (San Agustin, 6744).

LILIACEAE: *Beaucarnea Ameliae* Lundell (San Agustin, 6650); *Echeandia* sp. (San Agustin, 6622, 6742). HAEMODORACEAE: *Xiphidium caeruleum* Aubl. (San Agustin, 6634, 6828). AMARYLLIDACEAE: *Hypoxis decumbens* L. (San Agustin, 6616). DIOSCOREACEAE: *Dioscorea Bernoulliana* Prain & Burk. (Vaquero, 6891). MUSACEAE: *Heliconia latispatha* Benth. (San Agustin, 6655). ZINGIBERACEAE: *Renealmia aromatica* (Aubl.) Griseb. (San Agustin, 6743). BURMANNIACEAE: *Apteria aphylla* (Nutt.) Barnh. (San Agustin, 6614; Vaquero, 6899).

ORCHIDACEAE: *Catasetum integerrimum* Hook. (San Agustin, 6624); *Cattleya Skinneri* Batem. (San Agustin, 6701); *Epidendrum alatum* Batem. (Rio On, 6786); *E. nocturnum* Jacq. (San Agustin, 6806); *E. paniculatum* Ruiz & Pav. (San Agustin, 6760); *Galeandra Batemanii* Rolfe (San Agustin, 6691); *Habenaria mesodactyla* Griseb. (San Agustin, 6712); *H. setifera* Lindl. (Rio Privacion, 6968); *Maxillaria crassifolia* (Lindl.) Rchb. f. (San Agustin, 6848); *M. uncatata* Lindl. (San Agustin, 6591); *Pleurothallis marginata* Lindl. (San Agustin, 6590); *Polystachya clavata* Lindl. (San Agustin, 6913); *Sobralia decora* Batem. (San Agustin, 6597); *S. macrantha* Lindl. (San Agustin, 6689).

MYRICACEAE: *Myrica cerifera* L. FAGACEAE: *Quercus acutifolia* Née (San Agustin, 6615); *Q. Barbeyana* Trel. (San Agustin, 6626, 6729); *Q. hondurensis* Trel. (San Agustin, 6758); *Q. oleoides* Cham. & Schl. var. *australis* Trel. (San Agustin, 6627, 6837). POLYGONACEAE: *Coccoloba belizensis* Standl. (San Agustin, 6812); *C. cozumelensis* Hemsl. (San Agustin, 6648); *Neomillspaughia emarginata* (Gross) Blake (San Agustin, 6645). NYCTAGINACEAE: *Neea psychotrioides* Donn. Sm. (San Agustin, 6652). ANONACEAE: *Anona reticulata* L. (San Agustin, 6651). MONIMIACEAE: *Siparuna nicaraguensis* Hemsl. (San Agustin, 6825). LAURACEAE: *Phoebe longicaudata* Lundell (San Agustin, 6757; 6833, type coll.). PAPAVERACEAE: *Bocconia frutescens* L. (San Agustin, 6907). DROSERACEAE: *Drosera brevifolia* Pursh (San Agustin, 6927). PODOSTEMONACEAE: *Marathrum* (?) (San Agustin, 6703). ROSACEAE: *Licania hypoleuca* Benth. (San Agustin, 6601); *Photinia microcarpa* Standl. (Rio Privacion, 6582; Vaquero, 6854).

LEGUMINOSAE: *Aeschynomene laevis* Mart. & Gal. (Vaquero, 6886); *Calliandra rivalis* Lundell (San Agustin, 6610, type coll.); *Cassia Deamii* (Britt. & Rose) Lundell (Rio On, 6782); *C. flexuosa* L. (San Agustin, 6695); *C. hispidula* Vahl (San Agustin, 6911); *C. Tagera* L. (San Agustin, 6915); *Centrosema virginianum* Benth. (San Agustin, 6768); *Desmodium adscendens* (Sw.) DC. (San Agustin, 6569, 6688); *D. axillare* (Sw.) DC. (San Agustin, 6749); *D. frutescens* (Jacq.) Schindl. (San Agustin, 6723); *D. obtusum* (Muhl.) DC. (San Agustin, 6726); *Eriosema pulchellum* (H. B. K.) Don (San Agustin,

6929); *Eriosema* sp. (San Agustin, 6930); *Inga belizensis* Standl. (San Agustin, 6599); *I. pinetorum* Pittier (San Agustin, 6747); *Phaseolus gracilis* Poepp. (?) (San Agustin, 6931); *Pithecolobium Donnell-Smithii* (Britt. & Rose) Standl. (San Agustin, 6572); *Stylosanthes guyanensis* (Aubl.) Sw. (San Agustin, 6922); *S. viscosa* Sw. (Vaquero, 6885); *Sweetia panamensis* Benth. (San Agustin, 6620, 6831); *Tephrosia belizensis* Lundell (San Agustin, 6662, type coll.); *Zornia diphylla* (L.) Pers. (San Agustin, 6745).

OXALIDACEAE: *Oxalis* sp. (San Agustin, 6642). ERYTHROXYLACEAE: *Erythroxylon areolatum* L. (San Agustin, 6671; Rio On, 6779); *E. Bequaertii* Standl. (San Agustin, 6810, type coll.; *E. belizense* Lundell, syn.). MELIACEAE: *Swietenia macrophylla* King. MALPIGHIACEAE: *Byrsonima crassifolia* (L.) H. B. K. POLYGALACEAE: *Polygala adenophora* L. (Vaquero, 6860; Mahogany Creek, 6861); *P. asperuloides* H. B. K. (Vaquero, 6897); *P. bryzoides* St. Hil. (San Agustin, 6750); *P. hygrophila* H. B. K. (Mahogany Creek, 6862); *P. incarnata* L. (San Agustin, 6822); *P. paniculata* L. (San Agustin, 6914); *P. variabilis* H. B. K. (Vaquero, 6873); *P. variabilis* H. B. K. f. *leucanthema* Blake (San Agustin, 6708).

EUPHORBACEAE: *Croton repens* Schlecht. (San Agustin, 6721); *Dalechampia Schippii* Standl. (San Agustin, 6764); *Euphorbia heterophylla* L. (San Agustin, 6830; Vaquero, 6895); *E. hysopifolia* L. (Vaquero, 6896); *Euphorbia* sp. (San Agustin, 6767); *Euphorbia* sp. (Vaquero, 7023); *Phyllanthus* sp. (San Agustin, 6594); *Stillingia zelayensis* Muell. Arg. (San Agustin, 6740). ANACARDIACEAE: *Tapirira macrophylla* Lundell (San Agustin, 6841, type coll.). AQUIFOLIACEAE: *Ilex guianensis* (Aubl.) Kuntze (San Agustin, 6607). CYRILLACEAE: *Cyrilla racemiflora* L. (Vaquero, 6883; Rio Pinol, 6967). CELASTRACEAE: *Zinowiewia pallida* Lundell (Rio On, 6794, type coll.).

TILIACEAE: *Sloanea eriostemon* Sprague (San Agustin, 6824). STERCULIACEAE: *Waltheria americana* L. (Vaquero, 6898). THEACEAE: *Ternstroemia Tepezapote* Schl. & Cham. (San Agustin, 6838). GUTTIFERAE: *Clusia Massoniana* Lundell (San Agustin, 6598, 6605; Vaquero, 6887); *C. suborbicularis* Lundell (San Agustin, 6805, type coll.); *Clusia* sp. (San Agustin, 6600); *Symphonia globulifera* L.f. (San Agustin, 6773). HYPERICACEAE: *Hypericum fasciculatum* Lam. (?) (San Agustin, 6573); *H. terrae-firmae* Sprague & Riley (San Agustin, 6617). CISTACEAE: *Lechea tripetala* (Moc. & Sesse) Britton (?) (San Agustin, 6636, 6916). VIOLACEAE: *Hybanthus calceolaria* (L.) G. K. Schulze (San Agustin, 6793; Vaquero, 6894); *H. oppositifolius* (L.) Taub. (San Agustin, 6661).

FLACOURTIACEAE: *Xylosma sylvicola* Standl. (?) (San Agustin, 6754). PASSIFLORACEAE: *Passiflora foetida* L. var. *lanuginosa* Killip (Vaquero, 6874, 6900). CACTACEAE: *Rhipsalis coriacea* Polak (San Agustin, 6839, 6910). RHIZOPHORACEAE: *Cassipourea podantha* Standl. (San Agustin, 6612; Vaquero, 6858). MYRTACEAE: *Calyptanthes Bartlettii* Standl. (San Agustin, 6686); *C. Calderonii* Standl. (Vaquero, 6857); *Eugenia O'Neillii* Lundell (Rio On, 6803); *Eugenia* sp. (San Agustin, 6606); *Eugenia* sp. (San Agustin, 6677); *Myrcia rufidula* Schlecht. (?) (San Agustin, 6611; Vaquero, 6882); *Psidium molle* Bertol. (Mahogany Creek, 6902); *P. Oerstedianum* Berg. (San Agustin, 6560).

MELASTOMACEAE: *Clidemia dependens* D. Don (San Agustin, 6574, 6684); *C. Deppeana* Steud. (San Agustin, 6674); *C. neglecta* D. Don (San Agustin, 6741; Vaquero, 6870); *C. rubra* (Aubl.) Mart. (San Agustin, 6975); *C. strigillosa* (Sw.) DC. (Vaquero, 6872); *Conostegia Lundellii* Gleason (San Agustin, 6587, type coll.; 6587A); *Henriettea strigosa* Gleason (San Agustin, 6623); *H. succosa* (Aubl.) DC. (San Agustin, 6826); *Heterotrichum octonum* (Bonpl.) DC. (San Agustin, 6635, 6678); *Heterocentron sub-*

triplinervium (Link & Otto) A. Br. & Bouché (Vaquero, 6875); *Miconia albicans* (Sw.) Triana (San Agustín, 6917); *M. dodecandra* (Desr.) Cogn. (San Agustín, 6609, 6685); *M. hyperprasina* Naud. (San Agustín, 6663); *M. ibaguensis* (Bonpl.) Triana (San Agustín, 6586; Vaquero, 6892); *M. obovalis* Naud. (San Agustín, 6604); *M. oinochrophylla* Donn. Sm. (Vaquero, 6888); *M. oligocephala* Donn. Sm. (San Agustín, 6608, 6770); *M. pteropoda* Benth. (Rio On, 6790); *Mouriria exilis* Gleason (San Agustín, 6772); *Tococa guianensis* Aubl. (Vaquero, 6856, 6880).

ARALIACEAE: *G'libertia Smithiana* I. M. Johnston (San Agustín, 6588, 6918, 6921); *G. concinna* Standl. (San Agustín, 6811; Rio Privación, 6966); *Oreopanax guatemalense* (Lem.) Dec. & Pl. (San Agustín, 6704). ERICACEAE: *Clethra hondurensis* Britton (San Agustín, 6562, 6924); *Leucothoe mexicana* (Hemsl.) Small (San Agustín, 6792). MYRSINACEAE: *Parathesis cubana* (A. DC.) Molinet & G. Maza (San Agustín, 6739). SAPOTACEAE: *Achras Zapota* L. (San Agustín, 6746). EBENACEAE: *Diospyros* sp. (San Agustín, 6807). APOCYNACEAE: *Forsteronia* sp. (San Agustín, 6912); *Mandevilla hirsuta* (A. Rich.) K. Sch. (San Agustín, 6619, 6632); *M. subsagittata* (R. & P.) Woods. (San Agustín, 6633; Vaquero, 6884); *Plumeria rubra* L. (San Agustín, 6846); *Tabernaemontana chrysocarpa* Blake (San Agustín, 6665).

ASCLEPIADACEAE: *Blepharodon mucronatum* (Schlecht.) Dcne. (San Agustín, 6832); *Metastelma pedunculare* Dcne. (San Agustín, 6656). CONVULVULACEAE: *Evolvulus alsinoides* L. (?) (San Agustín, 6835); *E. sericeus* Sw. (San Agustín, 6821); *Ipomoea aphylla* Standl. (San Agustín, 6720). BORAGINACEAE: *Bourreria oxyphylla* Standl. (San Agustín, 6761); *Cordia polycephala* (Lam.) Johnston (San Agustín, 6756). VERBENACEAE: *Citharexylum caudatum* L. (San Agustín, 6690); *Ghinia spicata* (Aubl.) Moldenke (Vaquero, E. B. Mains 4118). LABIATAE: *Marsypianthes Chamaedrys* (Vahl) Kuntze (Vaquero, 6893); *Scutellaria Lundellii* Epling (Vaquero, 6867, type coll.).

SOLANACEAE: *Physalis Lagascae* R. & S. (San Agustín, 6836); *Schwenkia americana* L. (San Agustín, 6709); *Solanum erythrotrichum* Fern. (San Agustín, 6753); *S. jamaicense* Dunal (San Agustín, 6672); *S. sideroxyloides* Schl. (San Agustín, 6814). SCROPHULARIACEAE: *Buchnera* sp. (San Agustín, 6783); *Escobedia laevis* C. & S. (San Agustín, 6692); *Gerardia Harperi* (Penn.) Penn. (San Agustín, 6643); *Lamourouxia viscosa* H. B. K. (Vaquero, 6879); *Russelia* sp. (San Agustín, 6706, 6728, 6923, 6925, 6928; Vaquero, 6868, 6869). BIGNONIACEAE: *Arrabidaea candicans* (L. C. Rich.) DC. (San Agustín, 6771); *Enallagma latifolia* (Mill.) Standl. (San Agustín, 6618). LENTIBULARIACEAE: *Utricularia* sp. (Vaquero, 6859); *Utricularia* sp. (Mahogany Creek, 6863); *Utricularia* sp. (Mahogany Creek, 6864).

ACANTHACEAE: *Ruellia geminiflora* H. B. K. (San Agustín, 6602); *R. Harveyana* Stapf (San Agustín, 6667). RUBIACEAE: *Anisomeris protracta* (Bartl.) Standl. (San Agustín, 6589); *Appunia guatemalensis* Donn. Sm. (San Agustín, 6675, 6813; Rio On, 6796; Vaquero, 6871); *Borreria suaveolens* Mey. (San Agustín, 6850); *Coccocypselum hirsutum* Bartl. (San Agustín, 6851); *Crusea calocephala* DC. (San Agustín, 6625); *Declieuxia fruticosa* (Willd.) Kuntze var. *mexicana* (DC.) Standl. (San Agustín, 6849); *Diodia rigida* (Willd.) Cham. & Schl. (San Agustín, 6654); *D. sarmentosa* Sw. (San Agustín, 6926); *Guettarda Gaumeri* Standl. (San Agustín, 6649); *Hillia tetrandra* Sw. (Rio On, 6799); *Lindenia rivalis* Benth. (San Agustín, 6687); *Machaonia Lindeniana* Baill. (San Agustín, 6647); *Palicourea triphylla* DC. (San Agustín, 6567); *Psychotria fruticeorum* Standl. (San Agustín, 6702); *P. patens* Sw. (San Agustín, 6637, 6769, 6843); *P. undata* Jacq. (San Agustín, 6766); *Richardia scabra* L. (San Agustín, 6596).

COMPOSITAE: *Calea fluviatilis* Blake (Rio On, 6787); *C. longipedicellata* Rob. &

Greenm. (San Agustin, 6765); *C. trichotoma* Donn. Sm. (San Agustin, 6820; Vaquero, 6890); *Chrysopsis graminifolia* (Michx.) Nutt. (San Agustin, 6630); *Hieracium hondurensis* Blake (San Agustin, 6660); *Melampodium gracile* Less. (San Agustin, 6759); *Orthopappus angustifolius* (Sw.) Gleason (San Agustin, 6666); *Piptocarpha chontalensis* Baker (San Agustin, 6842); *Wedelia parviceps* Blake (San Agustin, 6763).

SUMMARY

1. Taxonomy is again emphasized as the foundation of any botanical survey; before the distribution or the economic and ethnobotanical importance of a species or genus can be investigated, the unit itself must be defined and named.

2. The expedition carried out a reconnaissance survey of the vegetation of the limestone plateau and Mountain Pine Ridge of El Cayo District, British Honduras, in the period from June 15–August 17, 1936. This involved studies of distribution and dominance and extensive floristic work, as well as investigations of the controlling biotic and physiographic factors.

3. The presence of erosion terraces on the limestone plateau is interpreted as indicating that the Maya did develop, at least locally, possibly following the decadence of the Old Empire, a system of agriculture in the peninsula more advanced than the milpa type, for labor involved in terracing suggests continued occupation of land and at least a form of semipermanent agriculture.

4. Fire destruction along the avenues of logging operations have devastated large sections of the limestone plateau forest. If fire destruction continues—and it will continue with exploitation of the area—the hardwood forest is doomed to early extinction.

5. Three forest zones were distinguished in the survey of the advanced forest at Valentin, i.e. valley, hillside, and hilltop, and transects were cut through each. As revealed by these transects, the woody vegetation of the advanced forest is dominated by species now considered locally endemic or restricted to the Yucatan Peninsula. This overwhelming dominance by native species is the most striking feature of the forest.

6. The Mountain Pine Ridge, a beautiful sandy rolling granitic highland, is swept by seasonal fires set by hunters. These maintain a park-like appearance by destroying pine seedlings and undergrowth. The pinelands, usually with scattered pines but sometimes with fair stands of timber, have a herbaceous cover predominantly grassy.

7. No evidences of Maya occupancy were found in the Mountain Pine Ridge except in the alluvial lowlands along streams and in the limestone borderlands.

8. The presence on the limestone hills bordering the pinelands of relic colonies of species which are among the dominants in the cactus thicket and advanced deciduous forest of the state of Yucatan and northern Quintana Roo may be interpreted to indicate that the deciduous forest zone, now confined to the northern part of the peninsula, was at one time widespread and extended at least as far south as central British Honduras.

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a



b

a: Valentin. A view through the valley forest in which the camp was located. Although many of the trees had been removed, very little sunshine penetrated the canopy.

b: A giant mahogany tree, *Swietenia macrophylla*, at Retiro.



a



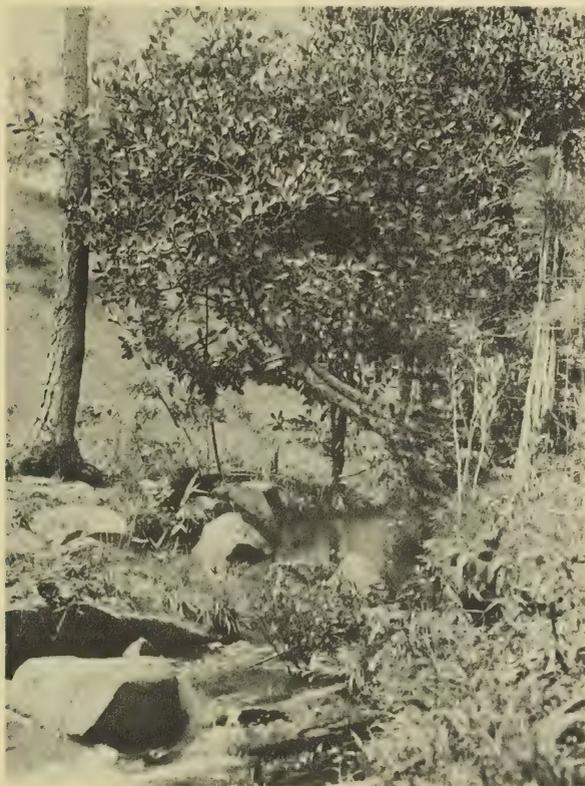
b

a: Rolling uplands of the Mountain Pine Ridge above Rio On. Note the granite boulders.

b: Pine forest at San Agustin with brook in foreground. The palm, *Acoelorrhaphe pinetorum*, always grows in marshy areas. Note the grassy herbaceous cover of the pineland.



a



b

a: Pine-oak forest in uplands near San Agustin.

b: *Clusia Massoniana* bordering brook at Vaquero.



a



b

a: Pine-oak forest of the borderlands near San Agustin.

b: Marginal forest along the granitic banks of Rio Frio. The palm, *Schippia concolor*, is the characteristic plant of the habitat.

XV

The Apocynaceous Flora of the
Yucatan Peninsula

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With six text figures
[Issued June 20, 1940]

THE APOCYNACEOUS FLORA OF THE YUCATAN PENINSULA

INTRODUCTION

It is an astonishing fact that among the Flowering Plants of the Yucatan Peninsula alone, in the region which includes Yucatan, Campeche, Quintana Roo, British Honduras, and the Guatemalan department of Peten, comprising an area of roughly 186,480 sq. km., are found somewhat more than one-half the American genera of Apocynaceae. Although the number of genera of the family found in this region certainly exceeds that of any similar area in the Western Hemisphere, nearly equaling, as a matter of fact, that of the indigenous apocynaceous genera of Brazil, the representation of species is quite low in proportion, and averages somewhat less than two for each of the 25 genera.

Combined with the large number of apocynaceous genera of the Yucatan Peninsula, one is surprised to find that the representatives of the family in this region are rather sharply divided as to natural affinity with those of the floras of other areas of tropical America: the Greater Antilles, South America, and Central America generally (including southern Mexico). By "natural affinity" is meant in this instance close relationship as evidenced by common species, or by distinct species referable to a single genus indigenous to the respective land masses concerned.

Visualized in this manner, for example, the apocynaceous floras of the Yucatan Peninsula and the Greater Antilles are found to have an affinity in the liana *Echites umbellata* Jacq., commonly found throughout the islands, and also present at low altitudes along the coast of the region under our attention. An affinity of the apocynaceous flora of South America and that of our region is manifest in the genus *Couma*, the famous "Cow-tree" of South America, which possesses its one known Central American species in *C. guatemalensis* Standl. of northern Guatemala and highland British Honduras. On the other hand, *Cufodontia* is a genus of trees apparently limited in distribution to Central America, at present being known to occur from the state of Oaxaca, Mexico, to southern Costa Rica. A single species of *Cufodontia* has been collected in the Yucatan Peninsula: *C. Lundelliana* Woods.

A third factor of interest in the Apocynaceae of the Yucatan Peninsula lies in the number of circumscribed, endemic species isolated hundreds or even thousands of kilometers outside the characteristic range of their genus. Such isolated endemics are in most cases species of genera otherwise wholly South American, in some instances with natural ranges extending as far south as Argentina. Other such endemics are of genera characteristically Antillean. Or the range of the genus may include both South America and the Antilles as well as Central America. An exceptionally interesting illustration of such isolated endemism is found in the genus *Aspidosperma*, the famous "Ax-breaker" trees, with many species of South America ranging from Colombia to Patagonia, three endemic species of the Yucatan Peninsula (*A. megalocarpon* Muell.-Arg., *A. cruentum* Woods., *A. Lundellianum* Woods.), and a single species endemic to Hispaniola (*A. domingense* Urb.).

In addition to the indigenous apocynaceous flora, several exotics occur throughout the Yucatan Peninsula, as one would expect, either in cultivation or as obvious escapes from

cultivation. This group includes the ubiquitous tropical ornamentals *Allamanda cathartica* L., *Nerium Oleander* L., *Tabernaemontana (Ervatamia) Coronaria* (Jacq.) Willd., and *Lochnera rosea* (L.) Reichb. To this list should possibly be added *Plumeria rubra* L. and its various color forms, which, although apparently indigenous to Central America at least in part, are now so widely cultivated and naturalize so exuberantly that it is difficult to distinguish between escaped trees and those which are spontaneous.

Continued discussion concerning the historical aspects of the distribution of Apocynaceae in the Yucatan Peninsula may be facilitated by the following tabulation of the flora according to the three directions of affinity which have been defined previously, together with the relatively few cultivated or escaped exotics. The genera and species enumerated are those of the Yucatan region only, save for the species preceded by an asterisk indicating a distribution involving both the Yucatan Peninsula and South America or the Greater Antilles.

I. AFFINITIES WITH BOTH SOUTH AMERICA AND THE ANTILLES

Aspidosperma

- A. cruentum* Woods.
- A. Lundellianum* Woods.
- A. megalocarpon* Muell.-Arg.

Forsteronia

- F. myriantha* Donn. Sm.
- F. peninsularis* Woods.
- F. viridescens* Blake

Mandevilla

- **M. hirsuta* (A. Rich.) K. Sch. (South America)
- **M. subsagittata* (R. & P.) Woods. (South America)
- **M. torosa* (Jacq.) Woods. (Jamaica)

Mesechites

- **M. trifida* (Jacq.) Muell.-Arg. (South America)

Odontadenia

- O. caudigera* Woods.
- O. Schippii* Woods.

Plumeria

- **P. obtusa* L. (Greater Antilles)
- **P. rubra* L. (? South America)

Rauwolfia

- **R. hirsuta* Jacq. (both South America and the Antilles)

Tabernaemontana

- **T. amygdalifolia* Jacq.
- T. arborea* Rose
- T. chrysocarpa* Blake

II. AFFINITIES WITH SOUTH AMERICA

Couma

- C. guatemalensis* Standl.

Lacmellea

- **L. edulis* Karst.

*Laubertia**L. peninsularis* Woods.*Malouetia**M. guatemalensis* (Muell.-Arg.) Standl.*Prestonia**P. amanuensis* Woods.*P. concolor* (Blake) Woods.*P. Schippii* Woods.*Stemmadenia**S. Donnell-Smithii* (Rose) Woods.*S. Galeottiana* (A. Rich.) Miers*Thevetia**Th. Gaumeri* Hemsl.*? *Th. peruviana* (Pers.) K. Sch.

III. AFFINITIES WITH THE GREATER ANTILLES

*Cameraria** *C. latifolia* L. (*C. belizensis* Standl.)*Echites**E. elegantula* Woods.*E. tuxtlenensis* Standl.* *E. umbellata* Jacq.*E. yucatanensis* Millsp.*Rhabdadenia** *Rh. biflora* (Jacq.) Muell.-Arg.*Urechites**U. Andrieuxii* Muell.-Arg.

IV. AFFINITIES WITH SOUTHERN MEXICO AND CENTRAL AMERICA

*Cufodontia**C. Lundelliana* Woods.*Fernaldia** *F. pandurata* (A. DC.) Woods.*Plumeriopsis** *P. Ahouai* (L.) Rusby & Woods.

V. CULTIVATED OR ESCAPED EXOTICS

*Allamanda**A. cathartica* L.*Lochnera**L. rosea* (L.) Reichb.*Nerium**N. Oleander* L.*Plumeria* (see also affinities of both South America and Antilles)? *P. rubra* L.*Tabernaemontana* (*Ervatamia*)*T. Coronaria* (Jacq.) Willd.*Thevetia* (see also affinities of South America)? *Th. peruviana* (Pers.) K. Sch.

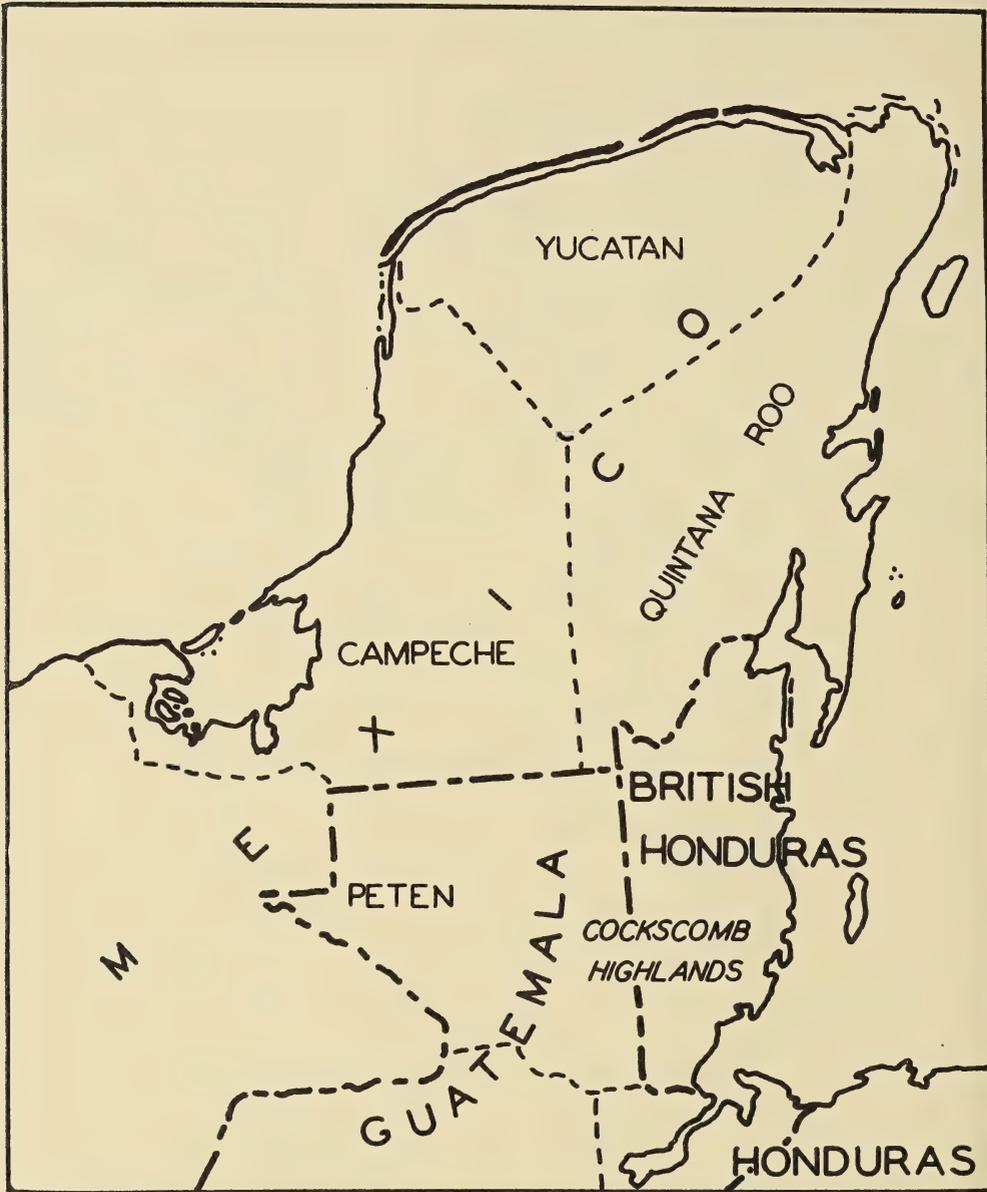


FIG. 1.—The Yucatan Peninsula, Showing Political Boundaries and the Location of the Cockscomb Highlands

From the foregoing tabulation it will be seen that the affinities of the Yucatan Apocynaceae may be summarized as follows: *Affinities with both South America and the Antilles*—8 genera, 18 species, 8 of which are found in either South America or the Antilles in addition to Yucatan. *Affinities with the Greater Antilles alone*—4 genera, 7 species, of which 3 are common to both land masses. *Affinities with South America alone*—7 genera, 11 species, 1 of which is common to both land masses. *Affinities with Central America generally (including southern Mexico)*—3 genera, 3 species. From the standpoint of genera, therefore, the affinities of the apocynaceous flora of Yucatan with that of both South America and the Greater Antilles, with that of the Greater Antilles alone, and with that of South America alone may be expressed by the ratio 8 : 4 : 7. The ratio with respect to species common to the respective land masses is 1 : 5 : 4.

This summary of the Yucatan Apocynaceae is at variance with the earlier conclusions of Hemsley,¹ who demonstrated among the Spermatophytes of Central America as a whole affinities to the flora of both South America and the Antilles, to that of the Antilles alone, and to South America alone proportions approximately as 3 : 1 : 5, respectively. Obvious explanations for this failure of coincidence present themselves in the enormous increase of botanical collecting in Central America during the past half century, the broad scope of Hemsley's work, lack of correlation of the Yucatan flora as a unit, and a somewhat different statistical approach.

Both Hemsley's data and ours dispute Grisebach's² opinion that Yucatan should be considered as part of the West Indian vegetational province. Nevertheless, it is of great interest to find that as early as 1865 Grisebach hypothesized the existence of an Antillean connection, or "continent," to explain the affinity of the floras of the Greater Antilles, northern South America, and Central America. Both Hemsley and Grisebach tabulated upon the basis of "common species" only, as have other writers on this subject, who have derived their data almost entirely from Hemsley.³ A more complete and significant picture of the vegetational relationships for any region is obtained if regard is paid not only to the number of species, but to their relationships within the respective genera as well. Consequently the genus has been made the unit of comparison in the present study, rather than the species. This method of correlation naturally is dependent upon a detailed systematic knowledge of the floral elements under consideration.

As a student of the Apocynaceae of some years' standing, the present writer has had the opportunity to examine the tropical American representation of the family included within nearly all the important herbaria of America and Europe, including the recent and rich collections made on the various joint expeditions of the University of Michigan and the Carnegie Institution of Washington to the Maya region. In addition, I have been aided greatly, in the present study particularly, by the interest and special collections of Apocynaceae of the Yucatan Peninsula by Dr. C. L. Lundell, of the University of Michigan, and Mr. W. A. Schipp, of Stann Creek, British Honduras.

¹ W. B. Hemsley, *Botany*, 4: 227, in S. D. Godman and O. Salvin, *Biologia Centrali-Americana* (London, 1887).

² A. Grisebach, *Geographische Verbreitung der Pflanzen Westindiens* (Göttingen, 1865).

³ Cf. J. H. Harshberger, *Phytogeographic Survey of North America* (Leipzig, 1911).

INFERENCE CONCERNING THE ASSOCIATIONS OF GEOLOGIC HISTORY
AND THE DISTRIBUTION OF APOCYNACEAE

Reference to the geologic history of the Antillean-Caribbean region is of interest and indubitable significance to a study of the distribution of Apocynaceae in the Yucatan Peninsula. According to Schuchert,⁴ who must be regarded as our most convenient and trustworthy authority on this subject, the "core" of Central America consists of the highlands of Guatemala, Honduras, and northeastern Nicaragua, which are underlaid with crystalline limestones referable to pre-Permian or possibly to pre-Cambrian. This region would appear to be that of longest continued exposure in the Antillean-Caribbean province of North America, although its geologic history is yet incomplete in detail. It has evidently suffered no major submergence at least since Middle Carboniferous.

Vying in duration of exposure with the "core" of Guatemala, Honduras, and Nicaragua are the highlands of interior British Honduras, centering about the Cockscomb Mountains and extending into the adjacent Guatemalan province of Peten, the strata of which are largely Upper Carboniferous intrusives together with sedimentary rocks of undetermined age. The immediately surrounding deposits to the north, west, and south are Oligocene limestones, and to the east is the post-Pliocene coastal plain. These highlands have had a long history of continued exposure extending at least from the Late Upper Carboniferous, at which time the Angiosperms, probably including ancient representatives of the Apocynaceae,⁵ were in a flourishing condition. At this time also a broad land bridge connected the interior highlands of British Honduras not only with the remainder of Central America and northern South America, but with Cuba, Jamaica, Hispaniola, Puerto Rico, and adjacent islands to the east. This condition was maintained essentially until Upper Eocene, when southern Nicaragua and northeastern Costa Rica were submerged, and the trans-Caribbean land bridge became limited to southeastern Oriente, Cuba, to the east.

The Cockscomb highlands of British Honduras were surrounded by intrusive seas as an island during Lower and Middle Oligocene, reunited to the mainland in Upper Oligocene, again isolated in Lower and Middle Miocene, and again reunited to the continent in Upper Miocene and Lower Pliocene.

To summarize the records which may have important bearings upon the history of the distribution of Apocynaceae in the Yucatan Peninsula, we may limit ourselves to the following considerations: (1) The continued exposure of the Cockscomb highlands at least since Late Upper Cretaceous; (2) the rupturing of the land bridge to northern South America in Upper Eocene, Lower and Middle Oligocene, and again in Lower and Middle Miocene; and (3) the persistent land bridge eastward to the Greater Antilles, with various fluctuations, from before Carboniferous, evidently, until Upper Pliocene.

AFFINITIES WITH BOTH SOUTH AMERICA AND THE GREATER ANTILLES

As may be seen from the previous tabulation (pp. 62, 63), nearly half the species of Apocynaceae indigenous to Yucatan show a strong affinity for the apocynaceous floras of both South America and the Greater Antilles, being included within genera occupying at least portions of both areas in addition to their distribution in Central America. Although

⁴ C. Schuchert, *Historical Geology of the Antillean-Caribbean Region* (New York, 1935).

⁵ Cf. R. E. Woodson, Jr., *Ann. Missouri Bot. Gard.* **15**: 387-395. 1928.

certain of these genera produce seeds capable of transportation long distances by air currents, as is common in the family, it will be found that remarkably few of the species enumerated possess large ranges of distribution, only eight, as a matter of fact, being found in either South America or the Antilles as well as in Yucatan.

The natural inference to be drawn from these observations is that the Yucatecan-Antillean-South American distribution of these genera is a relict of a distribution once continuous in past geologic times. It should be remembered that within the period of ascendancy of the Angiosperms, Yucatan, the Greater Antilles, and South America have repeatedly been connected by broad land bridges notably in Late Upper Cretaceous and Lower Eocene. During these times, we find that the junction of the land bridges to the Antilles, eastward, and to South America, southward, was at the Honduran-Nicaraguan "core," closely adjacent to the Cockscomb highlands of our region. Does it appear strange, in view of these records, that the Apocynaceae of the Yucatan Peninsula are composed of characteristic Antillean and South American genera in almost equal proportions? Discussion of a few genera illustrating this affinity may support these observations.

The genus *Odontadenia* includes 26 species, according to recent studies.⁶ Of these, 23 are entirely South American, save *O. cognata* (Stadelm.) Woods. and *O. grandiflora* (Meyer) Miq., which are rarely found in Panama (the latter also with one record in southern Costa Rica), where they may be considered as recently adventive upon the low coastal plain. Two species, *O. caudigera* Woods. and *O. Schippii* Woods., are endemic in British Honduras, where they are found at moderately high altitudes. One species, *O. polyneura* (Urb.) Woods., is found at moderately high altitudes in Hispaniola. It should be noted, incidentally, that the species of both British Honduras and Hispaniola are referable strictly to the sections of the genus as found in South America and, moreover, each of the three species to a different section, which further argues the inference of a distribution once continuous.

Quite similar to *Odontadenia* in distribution is the genus *Aspidosperma*, with approximately 45 species wholly South American; three species of the Yucatan Peninsula, *A. cruentum* Woods., *A. Lundellianum* Woods., *A. megalocarpon* Muell.-Arg.; and one species of Hispaniola, *A. domingense* Urb.

The genus *Mesechites* is divided into two subgenera in recent studies:⁷ subgenus *Eumesechites*, entirely South and Central American, including *M. trifida* (Jacq.) Muell.-Arg., which occurs from Yucatan to Ecuador and Brazil; and subgenus *Antillechites*, including two endemic species each of Hispaniola and Cuba.

Mandevilla is a large genus of some 110 species ranging from central Mexico to Argentina.⁸ It is interesting and doubtless significant that although only four species are known in the Yucatan Peninsula, two—*M. hirsuta* (A. Rich.) K. Sch. and *M. subsagittata* (R. & P.) Woods.—are referable to the large, typically South American subgenus *Exothostemon*; one—*M. tubiflora* (Mart. & Gal.) Woods.—to the wholly Central American § *Tubiflorae*; and one—*M. torosa* (Jacq.) Woods., which also occurs commonly in Jamaica—to the characteristically Mexican § *Torosae*.

⁶ R. E. Woodson, Jr., Ann. Missouri Bot. Gard. **22**: 270-306. 1935.

⁷ R. E. Woodson, Jr., Ann. Missouri Bot. Gard. **20**: 629-645. 1933.

⁸ Cf. R. E. Woodson, Jr., Ann. Missouri Bot. Gard. **20**: 645-777. 1933.

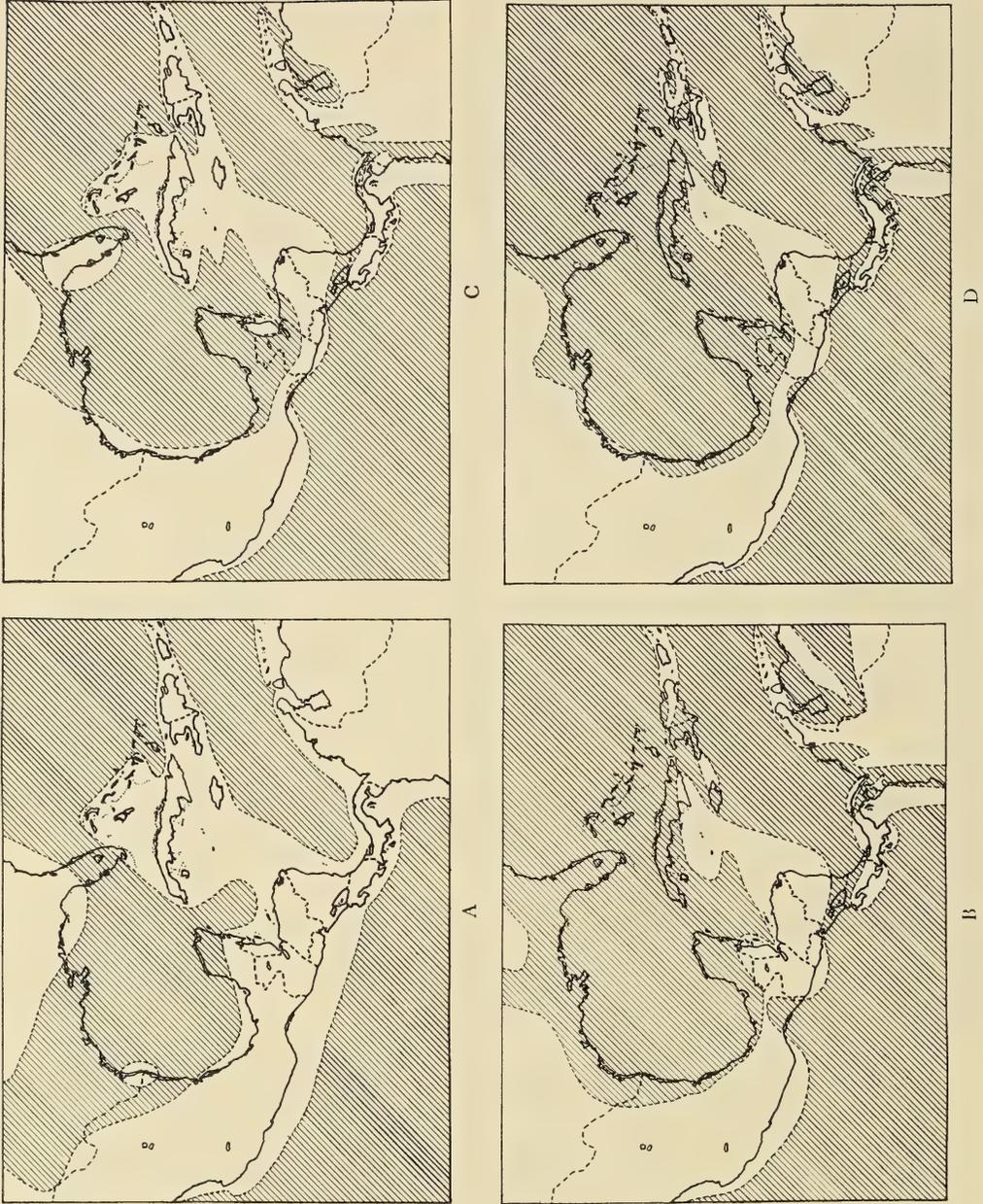


FIG. 2

A, Late Upper Cretaceous (after Schuchert).
 B, Upper Eocene (after Schuchert).

C, Lower Oligocene (after Schuchert).
 D, Middle Oligocene (after Schuchert).

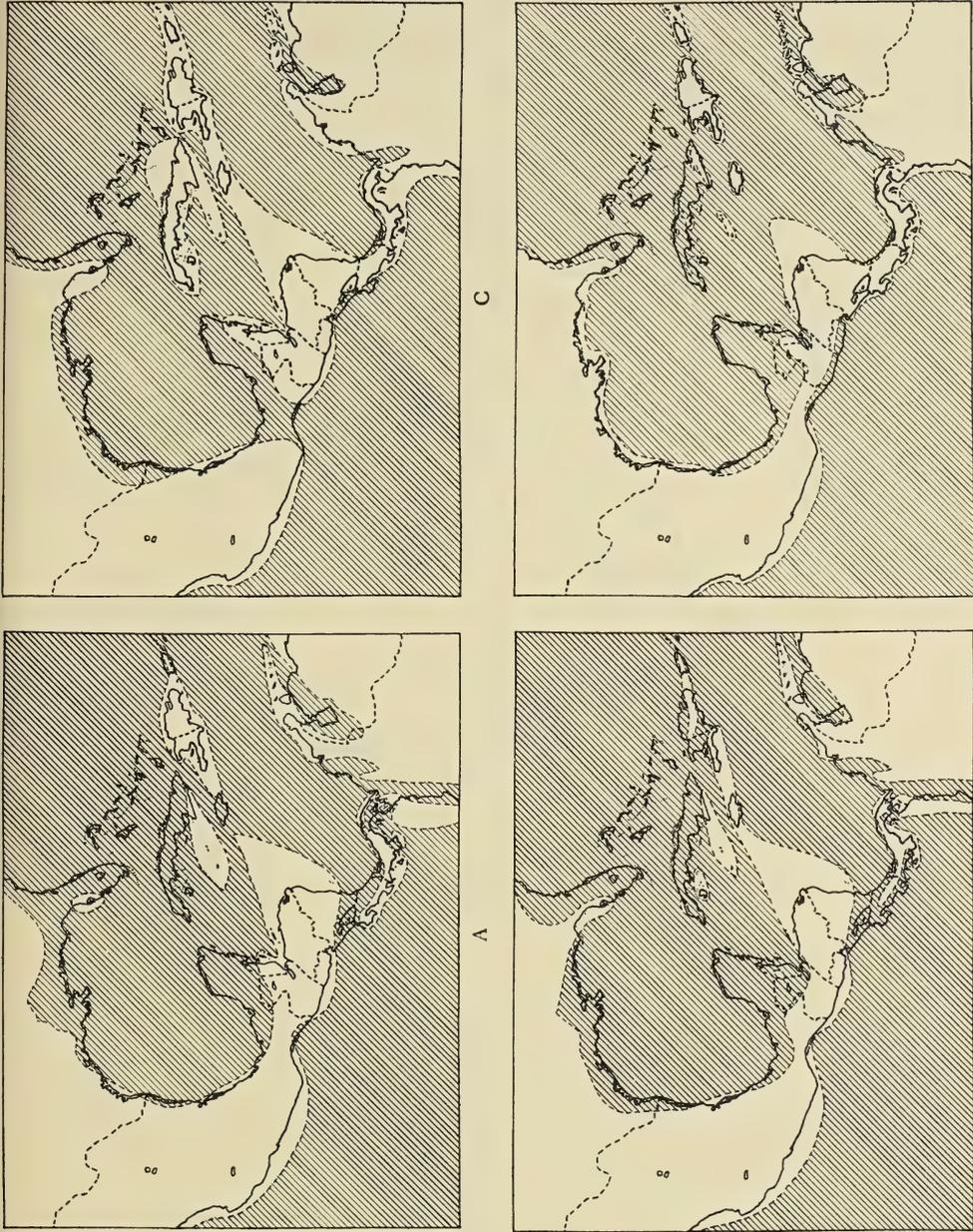


FIG. 3
 C, Upper Miocene-Lower Pliocene (after Schuchert).
 D, Upper Pliocene-Pleistocene (after Schuchert).

A, Upper Oligocene (after Schuchert).
 B, Lower Middle Miocene (after Schuchert).

But perhaps the best illustrations of the affinity of the floras of both South America and the Greater Antilles for that of Central America, including the Yucatan Peninsula, are found in such genera as *Forsteronia*, *Plumeria*, *Rauwolfia*, and *Tabernaemontana*, each of which includes Jamaica, Cuba, Hispaniola, and Puerto Rico in its Antillean representation. Of these, the first will probably serve best for illustration, as it has been revised recently.⁹

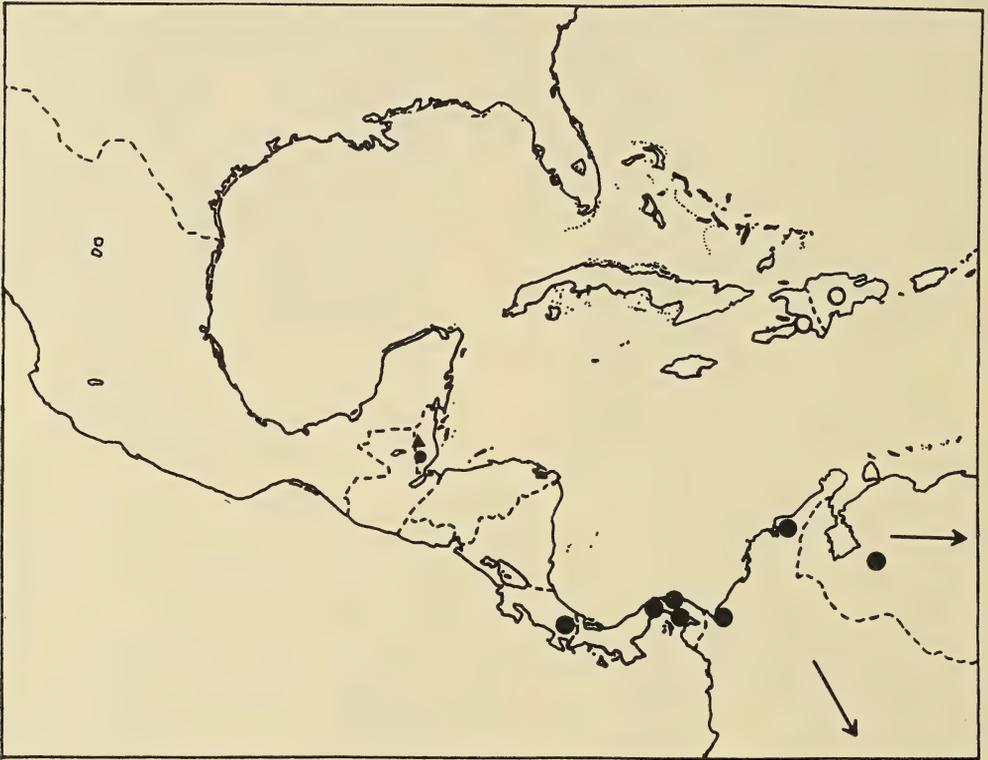


FIG. 4—Distribution of *Odontadenia*

- *O. polyneura* (Urb.) Woods.
- ▲ *O. Schippii* Woods.
- *O. caudigera* Woods.
- *O. grandiflora* (Meyer) Miq.

Arrows indicate main distribution of *Odontadenia* (22 species in South America)

Of the 48 species of *Forsteronia* recognized at present, a group of four, constituting the § *Corymbosae*, are of particular interest, including *F. corymbosa* (Jacq.) G. F. W. Meyer of Cuba and Hispaniola, *F. floribunda* (Sw.) G. F. W. Meyer of Jamaica, *F. portoricensis* Woods. of Puerto Rico, and *F. peninsularis* Woods. of British Honduras. The occurrence of *F. corymbosa* in Cuba and Hispaniola is of incidental interest, since the chief vegetational affinity of the latter has been considered that of Jamaica.¹⁰ Nevertheless, among present records of Apocynaceae, not a single instance is found of a distribution common to Jamaica and Hispaniola except in the case of species of wide distribution throughout the Greater Antilles as a whole. On the other hand, numerous instances of distributions

⁹ R. E. Woodson, Jr., Ann. Missouri Bot. Gard. 22: 153-224. 1935.

¹⁰ Cf. J. W. Harshberger, Phytogeographic Survey of North America (Leipzig, 1911).

involving Cuba and Hispaniola are found, such as in *Mesechites* § *Antillechites*, with two endemic species each of Cuba and Hispaniola; *Asketanthera*, with one Cuban species and three species of Hispaniola; and *Angadenia Berterii* (A. DC.) Miers, common to Cuba and Hispaniola—to confine examples to but one subfamily, the Echioideae.

The remainder of *Forsteronia* consists of species limited to South America, save for five: *F. chiriquensis* Woods. of the northern highland of Panama; *F. myriantha* Donn. Sm. of British Honduras, Guatemala, Costa Rica, and Panama; *F. spicata* (Jacq.) G. F. W. Meyer of southern Mexico (Chiapas, Guerrero), Guatemala, Nicaragua, Salvador, northern Colombia (Magdalena, Atlantico), and Cuba; *F. viridescens* Blake of British Honduras; and the poorly known endemic *F. Wilsoni* (Griseb.) Woods. of Jamaica. It is probable that future collections will disclose the presence of *F. spicata* in the Yucatan Peninsula.

The distributional conditions observed in *Forsteronia* are obtained essentially in *Plumeria*, *Rauwolfia*, and *Tabernaemontana*. Of particular interest is the exceptionally wide occurrence of *Rauwolfia hirsuta* Jacq. throughout the Antillean-Caribbean region, and the presence of *Plumeria obtusa* L. in Cuba, Jamaica, Hispaniola, Puerto Rico, and British Honduras. It is probably significant that this species has been collected upon the Swan Islands, approximately 156 km. off the Caribbean coast of Honduras, directly in the span of the trans-Caribbean land bridge, although the geologic origins of the islands are somewhat obscure. Nevertheless, it is interesting to note that of the fauna of Swan Island, 22 species of land snails are known, being equally distributed between Cuban and Central American affinities.¹¹

From the somewhat abbreviated records which have been discussed, tangible relationships between the present distribution of Apocynaceae and geologic history should be established with respect to the Greater Antilles, South America, and our region of Central America. Outlines of the time element involved also appear possible to infer from the following records: (1) The existence of a broad land bridge connecting North and South America and the Greater Antilles (including Cuba, Jamaica, Hispaniola, and Puerto Rico) from Late Upper Cretaceous until Lower Eocene; (2) the intermittent dissection of this triple land bridge after Lower Eocene; (3) the continued exposure of at least portions of Cuba (southwestern Oriente), Jamaica, Hispaniola, and Puerto Rico since before Cretaceous, frequently as isolated island masses, within which the development of endemism might well be expected.

In this connection it is appropriate to call to mind the unfortunate fact that our knowledge of the flora of interior Honduras and northern Nicaragua, undoubtedly the most interesting of Central America, is practically negligible. In this most ancient "core" of Central America will certainly be found the most convincing evidence for the correlation of the floras of Central America, northern South America, and the Greater Antilles.

AFFINITIES WITH SOUTH AMERICA

The affinity of the apocynaceous floras of the Yucatan Peninsula and South America is strikingly shown in seven genera. Of these, six demonstrate a high degree of isolated endemism. In only one genus, *Prestonia*, consisting of 61 recognized species,¹² is the

¹¹ H. A. Pilsbry, Land Molluscs of the Caribbean Islands. Proc. Acad. Nat. Sci. Phila. **82**: 221-261. 1930.

¹² Cf. R. E. Woodson, Jr., Ann. Missouri Bot. Gard. **23**: 276. 1936.

generic distribution continuous from southern Mexico to Argentina. Even in this example, however, no species is common to both Central and South America, and the three species known from the Yucatan Peninsula—*P. amanuensis* Woods., *P. concolor* (Blake) Woods., and *P. Schippii* Woods.—are all endemic to British Honduras.

More spectacular are the ranges of the genus *Couma*, evidently confined to South America save for *C. guatemalensis* Standl. of British Honduras and northern Guatemala; *Lacmellea*, apparently with but a single species, *L. edulis* Karst., occurring in Colombia and in British Honduras; and *Laubertia*, with two Central American species, *L. peninsularis* Woods.—British Honduras—and *L. Pringlei* (Greenm.) Woods.—highlands of Morelos and Sinaloa, Mexico—and two species of South America, *L. sanctae-martae* (Rusby) Woods.—northern Colombia—and *L. Boissierii* A. DC.—northern Peru. A still more complicated instance illustrating the same general affinity is found in the genus *Thevetia*, represented in the Yucatan Peninsula by two species: the endemic *Th. Gaumeri* Hemsl. and *Th. peruviana* (Pers.) K. Sch., which has proved to be so adept in naturalizing from cultivation that its truly indigenous range is unknown.

Thevetia may well be considered as a genus of relatively great age. It appears possible, at the present writing, that *Th. peruviana* may not be South American in origin, but probably Central American, or even Antillean. Excepting this species, however, we find that the remaining congeners consist of five species of southern Mexico and immediately adjacent Central America, and a single closely related species, *Th. bicornuta* Muell.-Arg., isolated in highland Paraguay!

Stemmadenia is represented in the Yucatan Peninsula by two species: *S. Donnell-Smithii* (Rose) Woods.—extreme southern Mexico, British Honduras, Guatemala, Honduras, Nicaragua, Costa Rica—and *S. Galeottiana* (A. Rich.) Miers—Veracruz, Oaxaca, Yucatan. Also to be expected in future collections of Yucatan plants is *S. grandiflora* (Jacq.) Miers, which extends virtually throughout Central America and along the Caribbean shores of Colombia and Venezuela, with a single record from Surinam. That this genus may be considered as of relatively great age is strongly indicated by the occurrence of *S. obovata* (Hook. & Arn.) K. Sch., widespread in southern Mexico and northern Central America, in the province of Guayas, Ecuador, together with an imperfectly authenticated record in northern Bolivia. Similar affinities of the floras of northern Central America and western Ecuador have been noted in other genera of Apocynaceae, as well as of other families of Flowering Plants, and appear to indicate geological factors (apparently involving the distant Galapagos Islands in such cases as the genus *Vallesia*) which at present are poorly understood.

AFFINITIES WITH THE GREATER ANTILLES

The many complications found in the preceding discussions of the apocynaceous affinities of Yucatan, South America, and the Greater Antilles, as well as those of Yucatan and South America, are considerably reduced in considering the strict affinities of Yucatan and the Greater Antilles. An additional factor, however, is encountered in evidence which supports the assumption of recent transference of Antillean species to the Caribbean shores of Central America possibly through the agency of air currents.

Evidence of relict endemism is not wholly lacking, however. The genus *Urechites* con-

sists of two closely related species: *U. lutea* (L.) Britton, occurring very commonly in extreme peninsular Florida, the Bahama Islands, Cuba, Jamaica, Hispaniola, Puerto Rico, and the Virgin and Leeward Islands (together with a single unsubstantiated record from the vicinity of Santa Marta, Colombia), and *U. Andrieuxii* Muell.-Arg., which is endemic to the interior of the Yucatan Peninsula.



FIG. 5.—Distribution of *Urechites*

● *U. lutea* (L.) Britton.

○ *U. Andrieuxii* Muell.-Arg.

The genus *Echites* is constituted by six species, as now recognized. Of these, five are wholly Central American, including *E. elegantula* Woods., *E. tuxtensis* Standl., and *E. yucatanensis* Millsp., which are endemic to the Yucatan Peninsula and (in the case of *E. tuxtensis*) immediately adjoining Mexico. The sixth species is *E. umbellata* Jacq., which has much the same distribution as *Urechites lutea*, being a very familiar liana of the coastal thickets of extreme peninsular Florida, the Bahama Islands, Cuba, Jamaica, and Hispaniola. This chiefly Antillean range recently has been extended by several collections upon the Caribbean shores of the Yucatan Peninsula. It is not more than 200 km. from Cape San Antonio, Cuba, to Cape Catoche, Yucatan, and it does not appear without reason to assume that the prevailing northeasterly winds, frequently of great violence, may have been an important factor in the distribution of the light, comose seeds across the Channel of Yucatan.

Similarly, upon the coasts of the Yucatan Peninsula has been collected *Rhabdadenia*

biflora (Jacq.) Muell.-Arg., the seeds of which possess silky comas apparently designed for aerial transportation. This species occurs throughout virtually the same territory as *Urechites lutea*, with the addition of the Caribbean coast of Colombia, whence it has apparently spread to the coastal thickets of the Guianas, extreme northeastern Brazil (Para, Maranhão), and Caribbean Panama. *Cameraria latifolia* L., which disseminates by means

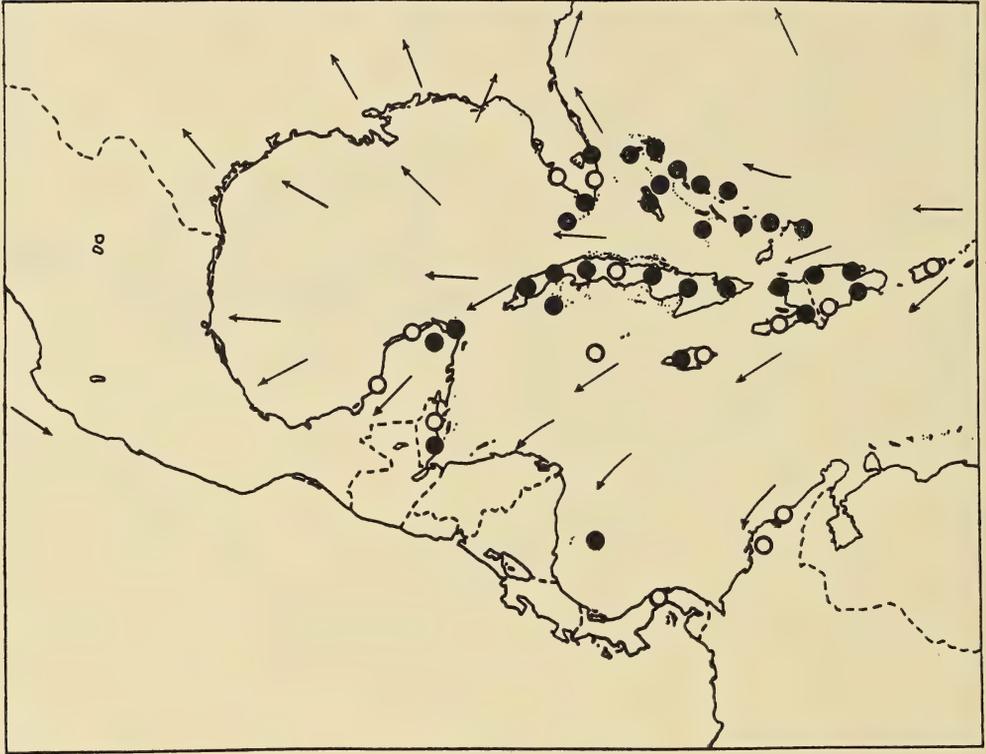


FIG. 6—Prevalence of Winds and Distribution of *Echites umbellata* and *Rhabdadenia biflora*
(wind currents shown by arrows)

● *E. umbellata* Jacq.

○ *Rh. biflora* (Jacq.) Muell.-Arg.

of an eccentric, papery wing produced upon the small, one-seeded follicles, has also been collected infrequently upon the shores of British Honduras, where it might well have been transferred by the prevailing wind currents from its indigenous range in Cuba.

Provided it be granted that aerial transportation of comose or winged seeds over a body of water somewhat more than 200 km. is possible, and in the presence of the northeasterly prevalence of winds, it appears entirely reasonable that such species as *Cameraria latifolia*, *Echites umbellata*, and *Rhabdadenia biflora* represent the most recent additions to the apocynaceous flora of the Yucatan Peninsula. It is quite within reason, naturally, that the distribution of other species and genera which are considered as "relicts" may be accountable to the same factor, but in view of the prevalence of endemism, certainly with less obvious reason.

AFFINITIES OF SOUTHERN MEXICO AND CENTRAL AMERICA

Of least interest from the standpoint of historical floristics is the apocynaceous element of the Yucatan flora with affinities strictly with southern Mexico and Central America. This numerically minor element consists of three genera only: *Cufodontia*, *Fernaldia*, and *Plumeriopsis*. It may be said at the outset that these three genera are not closely related morphologically to genera either of South America or of the Antilles, with the exception of *Plumeriopsis*, which includes a single species previously referred to *Thevetia*. The two genera are doubtless closely allied.

Fruit of *Cufodontia* is at present unknown to the writer, but from the standpoint of floral morphology this genus is thought to be rather more closely related to *Aspidosperma* than to other Apocynaceae. At present *Cufodontia* consists of three species: *C. arborea* Woods., of Oaxaca, Mexico, *C. Lundelliana* Woods., of Peten and the interior highlands of British Honduras, and *C. stegomeris* Woods., of southwestern Costa Rica. This genus has been collected only in small quantity by recent expeditions, and its rarity, combined with the evident endemism of species in relatively small and ancient areas, might be considered evidence of an early derivation, possibly from *Aspidosperma*, or a common progenitor.

Fernaldia is a bitypic genus including *F. pandurata* (A. DC.) Woods. distributed from southeastern Mexico—Tamaulipas, San Luis Potosi, Veracruz, Guerrero, Oaxaca, Yucatan—to El Salvador. *F. brachypharynx* Woods. is at present known only from Guatemala. Because the genus occupies much territory of recent deposition, and since its floral morphology is relatively elaborate, it is possible to assume that it is of relatively recent origin. If it is assumed to be of relatively great age, however (although such considerations of "relative age" based upon small morphological details have never attracted the present writer), it may be considered to have had its "origin of dispersal" in the ancient highlands of Oaxaca, perhaps, from whence it has gradually spread to more recent land.

Plumeriopsis is represented by a single species, *P. Ahouai* (L.) Rusby & Woods., which ranges from southern Mexico throughout Central America (chiefly on the Atlantic coast) to northern Colombia. These small trees show every sign of "youthful vigor" in their habit of occupying clearings in a most exuberant fashion, as well as in their preference for rather low altitudes. Since *Plumeriopsis* is of decidedly close relationship with *Thevetia*, and is found in greatest abundance in the center of distribution of the latter genus in the Yucatan Peninsula and adjacent southern Mexico, it is thought reasonable to consider that *P. Ahouai* probably has had its origin in Yucatan or southern Mexico, and is in the act of invading South America via the isthmus of Panama.

SUMMARY

1. The flora of the Yucatan Peninsula (including the Mexican states of Campeche and Yucatan, the territory of Quintana Roo, British Honduras, and the Guatemalan department of Peten) is found to contain somewhat over one-half the number of apocynaceous genera known for the entire Western Hemisphere. The number of species is proportionally low, however, averaging somewhat less than two for each genus.

2. The indigenous element of this remarkable apocynaceous flora is believed to be composed by the blending of floral affinities characteristic of South America, the Greater Antilles, and Central America (including southern Mexico). Those of the Greater Antilles and South America are numerically the most important, and the most interesting from the standpoint of "historical floristics."

3. The greater number of Apocynaceae of the Yucatan Peninsula are thought to be "relicts" of relatively great age within the approximate limits of their present distribution. Certain species of the Caribbean shores, however, are thought to be more recent "adventives" from the Greater Antilles, through the agency of wind dissemination.

4. An attempt is made to correlate the appearance of South American and Antillean elements with available records of geologic submergences and exposures in the Antillean-Caribbean region. Upon this basis, it appears necessary to assume for most of the genera an age extending at least to Cretaceous.

TAXONOMY

CHARACTERS OF THE FAMILY APOCYNACEAE: Chiefly laticiferous trees, shrubs, lianas, or herbs. Leaves opposite, verticillate, or alternate. Calyx gamosepalous, the lobes usually cleft nearly to the receptacle, imbricated, frequently bearing various glandular appendages ("squameellae") within. Corolla gamopetalous, usually salverform to infundibuliform, the limb 5- (rarely 4-) parted, actinomorphic, the lobes sinistrorsely or dextrorsely contorted. Stamens 5 (rarely 4), alternate with the corolla lobes, epipetalous, the anthers 4-locular. Ovary 2-carpellary (in our genera), apocarpous or syncarpous, 1- to 2-locular, the placentation axile or parietal, bearing few to many anatropous or orthotropous ovules, produced into a common stylar shaft surmounted by a rather massive stigma of diversified construction. Fruit apocarpous or syncarpous, follicular, capsular, baccate, or drupaceous; seeds chiefly albuminous, naked, comose, or provided with a papery wing, accompanied by fleshy arils in some genera; embryo straight, typically dicotyledonous.

The Apocynaceae are a large, chiefly tropical family containing upwards of 300 valid genera of both hemispheres. Because of the abundant latex of nearly all genera, the family will probably be employed in the future as a source of rubber. At the present time the Russian "Textile Fibres Trust" has carried the production of paper from the fibers of *Trachomitum venetum* (L.) Woods. well beyond the experimental stage. Many arboreal genera are useful for their timber, an outstanding example being the large South American "Ax-breaker" trees of the genus *Aspidosperma*. Nearly the entire family contains various modifications of the poisonous alkaloid "apocynin" to which the "Ordeal Tree" (*Carissa Carandas* L.) of Asia owes its lethal properties. Nevertheless, use as food is made of some members of the family, as the potable latex of the South American "Cow-trees" (*Couma* spp.), and the flowers of *Fernaldia*, which are used to flavor beverages and other decoctions in El Salvador.

The flowers of the family are frequently large and showy, and such genera as *Allamanda*, *Lochnera*, *Nerium*, *Plumeria*, *Tabernaemontana*, and *Thevetia* are among the most frequently encountered tropical ornamentals. In temperate latitudes species of *Apocynum*, *Amsonia*, and *Vinca* are commonly cultivated in gardens; and in conservatories, in addition to the tropical genera mentioned above, are occasionally found species of *Acokanthera*, *Beaumontia*, *Carissa*, *Mandevilla* (including *Dipladenia*), and *Strophanthus*.

To the genera known to occur in the Yucatan Peninsula upon the basis of present records (indicated in lightface type) have here been added several known to occur in closely adjacent territory and which may possibly be found within our boundaries in the future (indicated in **boldface**).

- A. Anthers not connivent, not agglutinated to the stigma, without an enlarged, sterile connective; aestivation of corolla lobes predominantly sinistrorse.
- B. Ovary apocarpous to the base, or nearly so.
- C. Carpels containing many ovules.
 - D. Calyx squameelliferous within; seeds enclosed within fleshy arils at maturity.
 - E. Corolla salverform; calyx lobes and bracts scarious or only slightly foliaceous, relatively small 1. TABERNAEMONTANA
 - EE. Corolla infundibuliform to salverform; calyx lobes and bracts conspicuously foliaceous, large and showy 2. STEMMADENIA
 - DD. Calyx destitute of squameellae; seeds not arillate.
 - E. Trees and shrubs.
 - F. Calyx lobes 5, essentially equal in aestivation, cleft nearly to the receptacle.
 - G. Ovules multiseriate; corolla large and showy 3. PLUMERIA

- GG. Ovules 2-seriate; corolla relatively small.
- H. Trees, rarely shrubs; ovary surrounded by an annular nectary; fruit laterally compressed, containing numerous broadly winged seeds . . . 4. ASPIDOSPERMA
- HH. Shrubs; nectary absent; fruit essentially terete; seeds not winged; leaves 3- or 4-nate, rarely opposite . . . 5. TONDUZIA
- FF. Calyx lobes 4, the two outer connate, completely enclosing the smaller pair within . . . 6. CUFODONTIA
- EE. Small, subsucculent herbs . . . 7. LOCHNERA
- CC. Carpels containing 1 or 2 ovules.
- D. Ovary not accompanied by a nectary; fruit dry, samara-like, 1-seeded . . . 8. CAMERARIA
- DD. Ovary surrounded by an annular nectary; fruit pulpy, 2-seeded.
- E. Flowers large and showy; calyx squamelliferous within; leaves alternate.
- F. Corolla lobes equaling or surpassing the tube, spreading; fruit drupaceous . . . 9. THEVETIA
- FF. Corolla lobes much shorter than the tube, reflexed; fruit baccate . . . 10. PLUMERIOPSIS
- EE. Flowers relatively small; calyx destitute of squamellae; leaves verticillate . . . 11. RAUWOLFIA
- BB. Ovary syncarpous throughout.
- C. Ovary 2-locular; placentation axile; leaves opposite . . . 12. LACMELLEA
- CC. Ovary 1-locular; placentation parietal; leaves verticillate, rarely opposite or alternate.
- D. Corolla infundibuliform, large and showy; fruit capsular, spiny; shrubs and lianas . . . 13. ALLAMANDA
- DD. Corolla salverform, relatively small; fruit fleshy, indehiscent, smooth; trees . . . 14. COUMA
- AA. Anthers connivent and agglutinated to the stigma, consisting of an enlarged, 2-lobed, sterile connective bearing dorsally toward the apex the smaller, parallel sporangia; aestivation of corolla lobes predominantly dextrorse.
- B. Anther connectives with thick, obtuse, basal lobes, sporangia uniformly fertile; stigma pentagonal-umbraculiform; upper surface of leaves glandular upon the midrib, at least at the base.
- C. Inflorescence compound, at least obscurely dichotomous.
- D. Corolla infundibuliform; anthers with linear apical appendages . . . 15. TINTINNABULARIA
- DD. Corolla salverform; anthers without linear appendages . . . 16. MESECHITES
- CC. Inflorescence simple . . . 17. MANDEVILLA
- BB. Anther connectives with slender or attenuate basal lobes, or (cf. *Fernaldia* and *Echites elegantula*), if with obtuse basal lobes, the sporangia with conspicuous, protuberant, sterile bases; stigma fusiform to subcapitate; leaves eglandular (except in *Forsteronia*).
- C. Calyx squamelliferous within.
- D. Squamellae alternate with the calyx lobes, or indefinitely distributed.
- E. Corolla salverform, relatively small.
- F. Inflorescence thyriform; seeds apically comose; leaves glandular at the base of the midrib above; lianas . . . 18. FORSTERONIA
- FF. Inflorescence umbellate; seeds naked; leaves not glandular; small trees . . . 19. MALOUETIA
- EE. Corolla infundibuliform, large and showy.
- F. Corolla with showy, petaloid faucal appendages within; leaves ternate; shrubs . . . 20. NERIUM
- FF. Corolla exappendiculate within; leaves opposite; lianas.
- G. Anthers usually with linear, apical appendages; placenta chaffy in fruit . . . 21. URECHITES
- GG. Anthers without appendages; placenta not chaffy . . . 22. ODONTADENIA

- DD. Squamellae as many as the calyx lobes and opposite them (occasionally deeply lacerate).
- E. Corolla exappendiculate within, without a callose, annulate orifice; anthers deeply included.
- F. Corolla infundibuliform, villous within, at least the lobes 23. FERNALDIA
- FF. Corolla salverform, glabrous within 24. ECHITES
- EE. Corolla usually with ligular appendages above the insertion of the stamens, with a callose, annulate orifice; anthers usually somewhat exserted, at least the tips, or barely included 25. PRESTONIA
- CC. Calyx destitute of squamellae.
- D. Corolla infundibuliform, the tube not spirally contorted 26. RHABDADENIA
- DD. Corolla salverform, the tube spirally contorted 27. LAUBERTIA

I. TABERNAEMONTANA L.

TABERNAEMONTANA L. Sp. Pl. 308. 1753; A. DC. in DC. Prodr. 8: 361. 1844; Miers, Apoc. So. Am. 53. 1878; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 147. 1895.

Shrubs and small- to moderate-sized trees; leaves opposite; inflorescence compound-cymose, usually many-flowered; calyx 5-parted, the lobes equal, cleft nearly to the receptacle, relatively small, scarious, or only slightly foliaceous, bearing many squamellae within; corolla salverform; anthers not connivent, without an enlarged connective; ovary apocarpous, containing many ovules, with or without a basal, annular nectary; fruit follicular, containing many naked seeds embedded amongst fleshy arils.

Type species: *T. citrifolia* L. (Cuba and Hispaniola).

Flowers relatively small, borne in extensive inflorescences.

Anthers yellowish throughout, not tinted with greenish blue, inserted within the lower third of the corolla tube, always wholly included 1. *T. arborea*

Anthers margined with greenish blue, inserted above midway within the corolla tube.

Anthers barely included or slightly included; corolla lobes scarcely equaling the tube 2. *T. chrysocarpa*

Anthers about half exserted; corolla lobes somewhat longer than the tube 3. *T. amygdalifolia*

Flowers relatively large, borne in reduced inflorescences 4. *T. coronaria*

I. TABERNAEMONTANA ARBOREA Rose, Bot. Gaz. 18: 206. 1893.

Tabernaemontana Schippii Standl. Field Mus. Publ. Bot. 8: 34. 1930.

Trees, occasionally attaining a height of 20 m., wholly glabrous; leaves elliptic, acuminate, rarely obtusish, 8 to 20 cm. long, 3 to 9 cm. broad, membranaceous, the petiole 1.0 to 2.5 cm. long; inflorescence pseudo-terminal, much branched, many-flowered, about half equaling the leaves; calyx lobes oblong-ovate, acute to obtuse, 0.25 cm. long, glabrous to puberulent-papillate without; corolla tube 0.8 to 0.9 cm. long, about 0.15 cm. in diameter at the base, minutely papillate without, the lobes dolabriform, obtuse, 0.8 to 1.5 cm. long; stamens inserted within the lower third of the corolla tube, the anthers yellowish, wholly included; ovary without a nectary; follicles reniform, 6 to 8 cm. long, 4 to 5 cm. broad, verrucose.—British Honduras; Guatemala (Alta Verapaz, Peten, Quetzaltenango).

BRITISH HONDURAS: Stann Creek District—Big Creek, *Schipp* 168; Middlesex, *Schipp* 423; Stann Creek Valley, *Schipp* 975. GUATEMALA: Dept. Peten, vicinity of La Libertad, *Aguilar* 326.

OBSERVATIONS: Called "Cojón" in Guatemala.

2. *TABERNAEMONTANA CHRYSOCARPA* Blake, Contr. Gray Herb. n.s. 52: 81. 1917.

Tabernaemontana amblyblasta Blake, Contr. U. S. Nat. Herb. 24: 18. 1922.

Shrubs or small trees attaining 10 m., wholly glabrous; leaves obovate to oblong, acuminate to obtuse, 8 to 24 cm. long, 3 to 9 cm. broad, firmly membranaceous to subcoriaceous, the petioles 1 to 2 cm. long; inflorescence lateral or pseudo-terminal, much branched, many-flowered, equaling or usually surpassing the leaves, the primary peduncles conspicuously elongate; calyx lobes ovate, obtuse, 0.18 to 0.23 cm. long, papillate without; corolla tube 0.6 to 0.9 cm. long, about 0.2 cm. in diameter at the base, glabrous without, the lobes dolabriform, obtuse, 1.0 to 1.2 cm. long; stamens inserted within the upper third of the corolla tube, the anthers margined with greenish blue, barely included or slightly exerted; ovary with an adnate, annular nectary; follicles reniform, obtuse, 2.5 to 3.0 cm. long, 1.5 to 2.0 cm. broad, striate, otherwise smooth.—Mexico (Campeche); British Honduras; Guatemala (Izabal, Peten); Honduras (Atlantida); Costa Rica (Santa Clara); Panama (Bocas del Toro).

CAMPECHE: Campeche, *Seler & Seler 4007*. Champoton, *Steere 1771*. San Felipe, *Lundell 1444*. BRITISH HONDURAS: Corozal District—Corozal—Santa Rita road, *Lundell 4723*. Orange Walk District—near Honey Camp, *Meyer 4*; Tower Hill Estate, *Karling 27*. Belize District—Maskall, *Gentle 1353*; Belize River, *Lundell 4049, 4058*; Belize—Sibun road, *Gentle 4*; Manatee Lagoon, *Peck 118*. El Cayo District—El Cayo, *Chanek 35*; San Agustin, *Lundell 6665*; Duck Run, *Bartlett 13133*. Stann Creek District—Big Creek, *Schipp 122*. Toledo District—Temash River, *Stevenson & Smart s.n.*; Cornejo Creek, *Kinloch 30*; Eldorado, *Schipp 1057*. GUATEMALA: Dept. Peten, El Paso, *Lundell 1456*. La Libertad, *Lundell 2354, 2505, 2845, 3106, 3228, 3278, 3433, 3468, 4868*.

OBSERVATIONS: Called "Cojón de Caballo" and "Lechoso" in Guatemala.

3. *TABERNAEMONTANA AMYGDALIFOLIA* Jacq. Select. Stirp. Amer. 1: 39. 1763; A. DC. in DC. Prodr. 8: 37. 1844.

Tabernaemontana acapulcensis Miers, Apoc. So. Am. 57. 1878.

Tabernaemontana Deamii Donn. Sm. Bot. Gaz. 52: 50. 1911.

Shrubs or small trees 3 to 5 m. tall; leaves oblong to ovate-elliptic, acuminate to obtusish, 3 to 12 cm. long, 1 to 5 cm. broad, membranaceous, the petioles 0.5 to 1.5 cm. long; inflorescence pseudo-terminal to lateral, much branched, few-to many-flowered, usually somewhat shorter than the leaves; calyx lobes ovate, acute to obtuse, 0.2 to 0.3 cm. long, glabrous; corolla tube 1.4 to 1.7 cm. long, about 0.2 cm. in diameter at the base, glabrous without, the lobes broadly dolabriform, obtuse, 1.5 to 2.2 cm. long; stamens inserted near the orifice of the corolla tube, the anthers margined with greenish blue, about half exerted; ovary with an adnate, annular nectary; follicles reniform-ovoid, shortly acuminate, 3 to 6 cm. long, 1.5 to 2.0 cm. broad, obscurely angled, otherwise smooth.—Mexico (Jalisco, Oaxaca, Campeche, Yucatan); British Honduras; Guatemala (Jalapa, Zacapa); Honduras; El Salvador; Nicaragua (Managua, Masaya); Panama (Bocas del Toro, Chiriqui); Colombia (Magdalena).

YUCATAN: Chichen Itza, *Bequaert 13, Steere 1544, 1668*. Maxcanu, *Gaumer 23229*. Izamal, *Greenman 429*. Dzitas, *Seler & Seler 3963*. Kancabdzonot, *Gaumer 23633*. Without locality, *Valdez 62, Gaumer 555, Schott 432*. CAMPECHE: Campeche, *Lundell 1400*. QUINTANA ROO: Cozumel Island, *Gaumer 42*. San Miguel, Cozumel Island, *Millsbaugh 1493, Steere 2639*. Caleta, Cozumel Island, *Millsbaugh 1511*. Lake Chichankanab, *Gaumer 1844, 1845*. BRITISH HONDURAS: Stann Creek District—Big Creek, *Schipp 122, 943*.

OBSERVATIONS: Called "Cañada del Macho" in southern Mexico; "Leche de Perra," "Cojon de Puerco Macho," "Amatillo," and "Chilindrón" in El Salvador.

4. *TABERNAEMONTANA CORONARIA* (Jacq.) Willd., a cultivated exotic, is distinguished by its relatively large (6 to 7 cm. long), fragrant, white flowers, which are frequently double, resembling a *Gardenia*.—The plant is an ornamental shrub widespread in tropical cultivation.

2. **STEMMADENIA** Benth.

STEMMADENIA Benth. Bot. Voy. Sulph. 124. *pl.* 44. 1855; Miers, Apoc. So. Am. 74. 1878; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 148. 1895; Woodson, Ann. Missouri Bot. Gard. 15: 341. 1928.

Odontostigma A. Rich. Fl. Cub. Fanerogam. 2: 86. 1853, not Zoll. & Mor.

Shrubs or moderate-sized trees; leaves opposite, inflorescence cymose, few-flowered; calyx 5-parted, the lobes very unequal, closely imbricated, large and showy, bearing many squamellae within; corolla salverform or infundibuliform, large and showy; anthers not connivent, without an enlarged connective; ovary apocarpous, containing many ovules, surrounded by a fleshy, annular nectary; fruit follicular, containing naked seeds embedded amongst fleshy arils.

Type species: *S. glabra* Benth. (Honduras; El Salvador; Nicaragua; Costa Rica).

Corolla infundibuliform 1. *S. Galeottiana*
 Corolla salverform 2. *S. Donnell-Smithii*

1. *STEMMADENIA GALEOTTIANA* (A. Rich.) Miers, Apoc. So. Am. 76. 1878; Woodson, Ann. Missouri Bot. Gard. 15: 361. *pl.* 47, *figs.* 2-3. 1928.

Odontostigma Galeottiana A. Rich. Fl. Cub. Fanerogam. 2: 86. 1853.

Echites bignoniaeflora Schl. Linnæa 26: 372. 1853.

Stemmadenia bignoniaeflora (Schl.) Miers, loc. cit. 1878.

Stemmadenia insignis Miers, loc. cit. 1878.

Stemmadenia bella Miers, loc. cit. 77. 1878.

Shrubs 1 to 3 m. tall; leaves elliptic, 9 to 12 cm. long, 4 to 5 cm. broad, glabrous or slightly puberulent beneath, membranaceous, the petioles 0.8 to 1.1 cm. long; inflorescence 1- to 4-flowered; calyx lobes 1.0 to 1.4 cm. long; corolla infundibuliform, the proper tube 0.8 to 1.0 cm. long, about 0.35 cm. in diameter at the base, the throat cylindrical, 4 to 5 cm. long, 1.0 to 1.3 cm. in diameter at the orifice, the lobes obliquely obovate, obtuse, 2.5 to 3.0 cm. long; follicles broadly reniform, 2.0 to 2.5 cm. long, 1.5 to 1.7 cm. broad, verrucose.—Mexico (Veracruz, Oaxaca, Yucatan); Guatemala (Peten).

YUCATAN: Merida, *Millspaugh* 27. Izamal, *Gaumer* 23204. Merida, Quinta del Obispo, *Schott* 430. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2406, 3559.

OBSERVATIONS: Called "Ixlaó" in Peten, where it is planted as "living fence-posts," according to Lundell.

2. *STEMMADENIA DONNELL-SMITHII* (Rose) Woodson, Ann. Missouri Bot. Gard. 15: 369. 1928.

Tabernaemontana Donnell-Smithii Rose, Bot. Gaz. 18: 206. 1893.

Tabernaemontana Donnell-Smithii Rose var. *costaricensis* Donn. Sm. Bot. Gaz. 24: 397. 1897.

Trees 5 to 18 m. tall, wholly glabrous; leaves obovate-elliptic, subcaudate-acuminate, 7 to 16 cm. long, 3 to 8 cm. broad, glabrous above, minutely puberulent in the axils of the midrib beneath, membranaceous, the petioles 0.2 to 0.8 cm. long; inflorescence 1- to 4-flowered; calyx lobes ovate, 2.0 to 2.5 cm. long; corolla salverform, the tube 2.5 to 3.0 cm. long, about 0.3 cm. in diameter at the base, glabrous without, the lobes dolabriform, 1.5 to 2.0 cm. long; follicles broadly reniform, 3.0 to 3.5 cm. long, about 3 cm. broad, verrucose.—

Mexico (Guerrero); British Honduras; Guatemala (Amatitlan, Escuintla, Izabal, Mazatenango, Peten, Retalhuleu, Solola); Honduras (Atlantida); El Salvador; Nicaragua; Costa Rica (Alajuela, Puntarenas).

BRITISH HONDURAS: El Cayo District—Valentin, *Lundell* 6243; El Cayo, *Lundell* 6152; Cohune Ridge, *Lundell* 6480. Stann Creek District—Middlesex, *Schipp* 411; *Record* 13; Stann Creek Valley, *Schipp* 958. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett* 12556, 12557.

OBSERVATIONS: Known as "Huevo de Caballo" in Peten.

3. PLUMERIA L.

PLUMERIA [Tourn.] L. Sp. Pl. 210. 1753; A. DC. in DC. Prodr. 8: 389. 1844, in part; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 136. 1895.

Small trees; leaves alternate; inflorescence terminal or pseudo-terminal, fastigiately thyriform, usually greatly congested, bearing few to numerous handsome, waxy flowers; calyx 5-parted, equal to subequal, cleft nearly to the receptacle, destitute of squamellae; corolla salverform, exappendiculate within, the limb 5-parted; stamens included, the anthers not connivent, without an enlarged connective; carpels 2, apocarpous, strikingly subinferior, bearing many ovules, not accompanied by a nectary; follicles 2, apocarpous, containing many dry, basally winged seeds.

Type species: *P. rubra* L. (Central America generally).

Inflorescence ordinarily relatively lax, corymbose, the secondary peduncles usually well developed and of about equal length; corolla lobes fully convolute in the bud, the aestivation usually strikingly spiral; leaves firmly membranaceous 1. *P. rubra*
 Inflorescence ordinarily congested, "subumbellate," the secondary peduncles usually greatly foreshortened; corolla lobes about half convolute in the bud, longitudinal in aestivation; leaves coriaceous or subcoriaceous 2. *P. obtusa*

1. PLUMERIA RUBRA L. Sp. Pl. 210. 1753; A. DC. in DC. Prodr. 8: 390. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 136. 1895.

Plumeria acuminata Ait. Hort. Kew. 2: 70. 1789.

Plumeria tricolor R. & P. Fl. Peruv. 2: 20. 1799.

Plumeria lutea R. & P. loc. cit. 1799.

Plumeria acutifolia Poir. Encycl. Suppl. 2: 667. 1811.

Plumeria mexicana Lodd. Bot. Cab. pl. 1024. 1825.

Plumeria Lambertiana Lindl. Bot. Reg. pl. 1378. 1830.

Small trees 1.5 to 8.0 m. tall, with thickened, corky branches; leaves obovate to oblong-lanceolate, acuminate to obtuse, 12 to 50 cm. long, 3 to 15 cm. broad, firmly membranaceous, glabrous, to generally pubescent beneath, the petioles 1.5 to 11.0 cm. long; inflorescence ordinarily relatively lax, corymbose, the secondary peduncles pronounced and of about equal length; corolla white, yellow, red or parti-colored, the tube 1.0 to 2.5 cm. long, about 0.2 cm. in diameter at the base, the lobes usually broadly obovate, obtuse, 2.5 to 6.0 cm. long, wholly convolute in the bud, the aestivation strikingly spiral.—Throughout Central America, where it is probably native; cultivated and naturalizing throughout the tropics of both hemispheres.

YUCATAN: La Vega, *Goldman* 629. Chichen Itza, *Steere* 1436. Pozo del Toro, *Schott* 429. Merida, *Schott* 670. CAMPECHE: Tuxpeña, *Lundell* 1375. BRITISH HONDURAS: Belize District—Belize—Sibun River road, *Gentle* 12. El Cayo District—El Cayo, *Chanek* 37; San Agustín, *Lundell* 6846. Toledo District—Jacinto Hills, *Schipp* S-592. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2811, 2822, 2955, 3023.

OBSERVATIONS: Various color forms of *P. rubra* are of wide occurrence, the most frequent of which are the following:

PLUMERIA RUBRA L. forma TYPICA.—Corolla pure rose, or with a yellow “eye.”

PLUMERIA RUBRA L. forma ACUTIFOLIA (Ait.) Woods, Ann. Missouri Bot. Gard. 25: 211. 1938.—Corolla white, usually with a yellow “eye,” occasionally flushed with rose without.

PLUMERIA RUBRA L. forma LUTEA (R. & P.) Woods, loc. cit. 1938.—Corolla yellow, occasionally flushed with rose without.

PLUMERIA RUBRA L. forma TRICOLOR (R. & P.) Woods, loc. cit. 1938.—Corolla predominantly white, but the outer margin of the lobes rose; usually with a yellow “eye.”

The Spanish name “Flor de Mayo” is gradually yielding to the French “Frangipanier” for this species in Central America.

2. PLUMERIA OBTUSA L. Sp. Pl. 210. 1753; A. DC. in DC. Prodr. 8: 392. 1844.

Small trees or shrubs 2 to 6 m. tall; leaves obovate to obovate-oblong, rounded or emarginate to very shortly acuminate, 3.5 to 10 cm. long, 1 to 6 cm. broad, coriaceous or subcoriaceous, usually more or less lustrous above, glabrous, or pubescent beneath, the petioles 1 to 3 cm. long; inflorescence usually more or less congested or “subumbellate,” the secondary peduncles ordinarily greatly foreshortened; corolla white with a yellow “eye,” the tube 0.9 to 2.0 cm. long, about 0.1 cm. in diameter at the base, the lobes usually broadly obovate, obtuse, 1.5 to 4.0 cm. long, about half convolute in the bud, the aestivation longitudinal or only slightly spiral.—Throughout the Bahama Islands, the Greater Antilles, and rarely in Yucatan.

YUCATAN: Southeast of Kancabdzonot, Gaumer 23880. Chichen Itza, Steere 1320.

OBSERVATIONS: It appears that two varieties of this species occur throughout its range in the Bahamas and the Greater Antilles, having leaves wholly glabrous (the typical variety) or variously pubescent beneath. The specimens of Yucatan are all of the latter, which may be recognized as follows:

PLUMERIA OBTUSA L. var. SERICIFOLIA (Wright) Woods, Ann. Missouri Bot. Gard. 25: 214. 1938.

Plumeria sericifolia Wright, ex Griseb. Cat. Pl. Cub. 171. 1866.

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

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

4. ASPIDOSPERMA Mart. & Zucc.

ASPIDOSPERMA Mart. & Zucc. Nov. Gen. Bras. 1: 57. 1824; A. DC. in DC. Prodr. 8: 396. 1844; Miers, Apoc. So. Am. 21. 1878; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 141. 1895.

Trees, rarely shrubs; leaves alternate (in our species); inflorescence compound-corymbose to thyriform, many-flowered; calyx 5-parted, the lobes essentially equal, cleft nearly to the receptacle, destitute of squamellae; corolla salverform; anthers not connivent, without an enlarged connective; ovary apocarpous, containing many 2-seriate ovules, surrounded by a low, annular nectary; fruit follicular, greatly compressed; seeds strongly compressed, provided with a broad, eccentric or essentially concentric, papery wing.

Type species: *A. tomentosum* Mart. & Zucc. (Brazil).

Follicles glabrous, or essentially so; secondary venation of leaves relatively distant; latex white.

Leaves broadly oval; cotyledons ovate 1. *A. megalocarpon*

Leaves narrowly obovate-oblong; cotyledons orbicular 2. *A. Lundellianum*

Follicles densely and minutely ferruginous-velutinous; secondary venation of leaves extremely dense; latex “dark, dull red” 3. *A. cruentum*

1. *ASPIDOSPERMA MEGALOCARPON* Muell.-Arg. *Linnaea* **30**: 400. 1860.

Large trees; leaves alternate, broadly oval, shortly and obtusely acuminate to obtuse, 8 to 12 cm. long, 4 to 7 cm. broad, secondary veins arcuate and relatively distant, glabrous, subcoriaceous, the petioles 1.0 to 1.5 cm. long; follicles orbicular-subreniform, obscurely acuminate, 8 to 9 cm. long, 7 to 8 cm. broad, minutely verrucose, otherwise glabrous; seeds orbicular, 7 to 8 cm. in diameter, the cotyledons broadly ovate, rounded, about 2 cm. long and broad.—Guatemala (Escuintla, Mazatenango, Peten).

GUATEMALA: Dept. Peten, Uaxactun, *Bartlett 12660*.

2. *ASPIDOSPERMA LUNDELLIANUM* Woodson, *Amer. Journ. Bot.* **22**: 684. 1935.

Large trees; leaves alternate, rather narrowly obovate-oblong, acute to obtuse, 9 to 13 cm. long, 2.5 to 4.5 cm. broad, glabrous, coriaceous to subcoriaceous, secondary veins oblique, relatively distant, the petioles 1.7 to 2.0 cm. long; follicles very broadly reniform, inconspicuously acuminate, 7.5 to 8.0 cm. long, 5.5 to 6.0 cm. broad, minutely verrucose, otherwise glabrous; seeds orbicular, 6.5 to 7.0 cm. in diameter, the cotyledons orbicular, 2 cm. in diameter.—Mexico (Campeche).

CAMPECHE: Tuxpeña, *Lundell 1284*.

3. *ASPIDOSPERMA CRUENTUM* Woodson, *Amer. Journ. Bot.* **22**: 684. 1935.

Large trees; leaves alternate, oblong-elliptic, obtuse, 6 to 8 cm. long, 2.5 to 3.0 cm. broad, glabrous, coriaceous, secondary veins oblique, extremely dense, the petioles 1.5 to 1.7 cm. long; follicles obovate-reniform, obscurely acuminate, 16 to 18 cm. long, 8 to 10 cm. broad, very densely and minutely ferruginous-velutinous; seeds orbicular, about 8 cm. in diameter, the cotyledons ovate-cordate, about 2 cm. long and 1.7 cm. broad.—British Honduras; Guatemala (Peten).

BRITISH HONDURAS: El Cayo District—Valentin, *Lundell 6326*. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett 12570, 12663*.

OBSERVATIONS: The description of the latex of this species by H. H. Bartlett as "dark, dull red" is extraordinary, not only for *Aspidosperma*, but for the Apocynaceae as a whole.

5. *TONDUZIA* Pittier

Although no species of *Tonduzia* is recorded as yet from the Yucatan Peninsula, it is altogether likely that it may be discovered in the near future. The genus, which at present consists of three species extending from southern Mexico to Costa Rica, is composed of shrubs or small trees with clusters of white, salverform corollas 0.8 to 1.8 cm. long and terete follicles containing numerous dry, compressed seeds.

6. *CUFODONTIA* Woodson

CUFODONTIA Woodson, in *Cuf. Archivio Bot.* **10**: 14. *pl.* 2. 1934.

Shrubs and small to medium-sized trees; leaves alternate; inflorescence cymose, several-flowered, terminal or lateral; calyx 4-parted, extremely imbricated, the lobes very unequal, the two outer connate, and completely enclosing the smaller pair within, destitute of squamellae; corolla salverform, relatively small, 5-parted; anthers not connivent, without an enlarged connective; ovary apocarpous, containing numerous ovules, destitute of a nectary; fruit unknown, presumably follicular.

Type species: *C. stegomeris* Woods. (Costa Rica).

1. CUFODONTIA LUNDELLIANA Woodson, in Cuf. Archivio Bot. **10**: 16. 1934.

Trees, minutely lepidote-puberulous throughout; leaves elliptic, acute to shortly acuminate, 5 to 10 cm. long, 1.5 to 4.0 cm. broad, firmly membranaceous, the petioles 1.0 to 1.5 cm. long; inflorescence subpaniculate, bearing numerous small, greenish-white flowers; calyx lobes very unequal, the connate outer pair 0.3 to 0.35 cm. long, the inner 0.20 to 0.25 cm. long; corolla tube 0.3 to 0.4 cm. long, the lobes of about equal length.—British Honduras; Guatemala (Petén).

BRITISH HONDURAS: El Cayo District—Valentin, *Lundell* 6220. GUATEMALA: Dept. Petén, La Libertad, *Lundell* 3408.

7. LOCHNERA Reichb.

Lochnera rosea (L.) Reichb., the common "Periwinkle," is an ornamental "Pan-tropic Weed" of extraordinarily wide occurrence through both hemispheres. The plants are succulent, erect herbs, with broadly oval leaves, and axillary, white or rose, salverform corollas in clusters of 1 to 3. It is possibly native to southeastern Asia.

8. CAMERARIA L.

CAMERARIA L. Sp. Pl. 210. 1753; A. DC. in DC. Prodr. **8**: 388. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. **4**²: 139. fig. 54-A. 1895.

Shrubs; leaves opposite; inflorescence terminal, cymose, few-flowered; calyx 5-parted, the lobes essentially equal, cleft nearly to the receptacle, destitute of squamellae; corolla salverform, relatively small, white; anthers not connivent, without an enlarged connective; ovary apocarpous, containing 1 to 4 ovules, without a nectary; fruit apocarpous, indehiscent, samara-like, with a broad, inaequilateral wing, usually containing a single naked seed.

Type species: *C. latifolia* L. (Cuba; British Honduras).

1. CAMERARIA LATIFOLIA L. Sp. Pl. 210. 1753; A. DC. in DC. Prodr. **8**: 388. 1844.

Cameraria belizensis Standl. Tropical Woods **7**: 8. 1926.

Shrubs or small trees, 1 to 3 m. tall, wholly glabrous; leaves ovate, obtuse to minutely emarginate, 2 to 4 cm. long, 1 to 2 cm. broad, rigidly chartaceous, lustrous above, opaque beneath, secondary venation very dense, the petioles 0.1 to 0.3 cm. long; inflorescence terminal, 1- to 4-flowered, shorter than the leaves; calyx lobes ovate, acute, 0.1 to 0.15 cm. long; corolla salverform, white, the tube 0.9 to 1.1 cm. long, about 0.1 cm. in diameter at the base, somewhat inflated at the orifice, the lobes obovate, 1.3 to 1.5 cm. long; fruits 3.5 to 4.0 cm. long, 1.5 to 2.0 cm. broad.—Cuba; British Honduras.

BRITISH HONDURAS: Belize District—Manatee Pine Ridge, *Gentle* 97; Northern River, *Gentle* 1294; Bakers Pine Ridge, *Lundell* 3823.

OBSERVATIONS: Called "White Poison-wood" and "Chechem de Caballo" in British Honduras, where it is said to be frequent in the pinelands, particularly about ponds.

9. THEVETIA Adans.

THEVETIA (L.) Adans. Fam. 2: 171. 1763; A. DC. in DC. Prodr. 8: 343. 1844; K. Sch. in Engl. & Prantl 4²: 159. 1895.

Shrubs and small trees; leaves alternate; inflorescence cymose, few- to several-flowered; calyx 5-parted, the lobes essentially equal, cleft nearly to the receptacle, somewhat foliaceous, bearing many squamellae within; corolla salverform, the tube much shorter than the lobes, closed by the convergence of 5 small, villous scales at the orifice, the lobes broadly obovate-dolabriform, spreading; anthers not connivent, without an enlarged connective; ovary apocarpous, containing 2 to 4 ovules, surrounded by a fleshy, annular nectary; fruit syncarpous, drupaceous, containing 2, or occasionally 4, large, naked seeds.

Type species: *Th. peruviana* (Pers.) K. Sch. (? Central America).

Leaves elliptic-ob lanceolate, acute to very shortly and abruptly acuminate; drupes 2 to

3 cm. broad 1. *Th. Gaumeri*
 Leaves linear to linear-lanceolate, long acuminate; drupes 4.0 to 4.5 cm. broad 2. *Th. peruviana*

1. THEVETIA GAUMERI Hemsl. in Hook. Icon. Pl. 16: pl. 1517. 1886.

Thevetia spathulata Millsp. Field Col. Mus. Bot. Ser. 1: 383. 1898.

Thevetia Steerei Woodson, Amer. Journ. Bot. 22: 685. 1935.

Shrubs and small trees, occasionally attaining 10 m., wholly glabrous; leaves elliptic-ob lanceolate, acute to very abruptly acuminate, 7 to 18 cm. long, 1.5 to 3.5 cm. broad, firmly membranaceous, secondary venation arcuate, rather distant, not obvious upon the lower surface, the petioles 1 to 2 cm. long; inflorescence terminal or lateral, bearing several handsome orange or pinkish yellow flowers; calyx lobes 0.8 to 1.0 cm. long; corolla salverform, the tube about 1 cm. long, about 0.2 cm. in diameter at the base, the lobes broadly obovate, 2.5 to 4.0 cm. long, spreading; drupes 2 to 3 cm. broad, bright red.—Mexico (Yucatan, Campeche, Quintana Roo); British Honduras.

YUCATAN: Izamal, *Gaumer 717*. Port Silam, *Gaumer 678*. Progreso, *Steere 3056*. Kancabdzonot, *Gaumer 23571*. Chichen Itza, *Steere 1090, 1096*. Tizimin, *Swallen 2542*. Chan-konjoni, *Bequaert 57*. CAMPECHE: Tuxpeña, *Lundell 984*. QUINTANA ROO: San Miguel, Cozumel Island, *Gaumer 7*; *Steere 2669*; Lake Chichankanab, *Gaumer 23743*. BRITISH HONDURAS: Corozal District—Alfonsoville, *Lundell 4751*. Orange Walk District—Honey Camp, *Lundell LP21*.

OBSERVATIONS: Very variable in the size of the foliage and flowers. The fruits are attractive and pulpy, but exceedingly poisonous.

2. THEVETIA PERUVIANA (Pers.) K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 159. 1895.

Cerbera Thevetia L. Sp. Pl. ed. 2. 304. 1762.

Cerbera peruviana Pers. Syn. 1: 267. 1805.

Thevetia nerifolia Juss. ex Steud. Nomencl. 180. 1821.

Thevetia Thevetia (L.) Millsp. Field Col. Mus. Bot. Ser. 2: 83. 1900.

Erect or clambering shrubs, frequently liana-like, or small trees, glabrous throughout; leaves linear to linear-lanceolate, narrowly acuminate, 7 to 12 cm. long, 0.6 to 1.3 cm. broad, firmly membranaceous, lustrous above, the petioles 0.3 to 0.5 cm. long; inflorescence terminal or lateral, bearing several showy, orange or pinkish yellow flowers; calyx lobes ovate to ovate-lanceolate, 0.4 to 0.6 cm. long; corolla salverform, the tube 1.0 to 1.5 cm. long, about 0.3 cm. in diameter at the base, the lobes broadly obovate, 3.5 to 4.5 cm. long; drupes 4.0 to 4.5 cm. broad, bright red.—Found throughout Central America (where it is possibly native), and one of the most frequently planted ornamentals of both hemispheres.

YUCATAN: Merida, *Schott 321*. Valladolid, *Steere 1686*. CAMPECHE: Champoton, *Steere*

1975. Campeche, *Seler & Seler 4010*. QUINTANA ROO: Lake Chichankanab, *Gaumer 1840*. BRITISH HONDURAS: Belize District—Big Falls, *Lundell 4057*. El Cayo District—El Cayo, *Chanek 33*; San Antonio, *Bartlett 13045*. GUATEMALA: Dept. Peten, San Andres, Lake Peten, *Lundell 3133*. La Libertad, *Lundell 3266*.

OBSERVATIONS: Known as "Acitz" in the Maya region of northern Guatemala. The brilliant red, poisonous drupes are sometimes called "Huevos de Tigre" in Spanish America.

10. PLUMERIOPSIS Rusby & Woodson

PLUMERIOPSIS Rusby & Woodson, in Woodson, Ann. Missouri Bot. Gard. **24**: 11. 1937.

Small trees, leaves alternate; inflorescence racemose, terminal or lateral, bearing several handsome flowers; calyx 5-parted, the lobes essentially equal, foliaceous, bearing many squamellae within; corolla salverform, the tube closed by 5 dentiform, villosulose scales, the lobes broadly and obliquely obovate, reflexed; anthers not connivent, without an enlarged connective; ovary apocarpous, each carpel containing 1 or 2 ovules, surrounded by a fleshy, multifid nectary; fruit a berry containing 2 or 3 large, naked seeds.

Type species: *P. Ahouai* (L.) Rusby & Woodson (Central America and northern Colombia).

1. PLUMERIOPSIS AHOUI (L.) Rusby & Woodson, in Woodson, Ann. Missouri Bot. Gard. **24**: 11. 1937.

Cerbera Ahouai L. Sp. Pl. ed. 2. 303. 1762.

Cerbera nitida H. B. K. Nov. Gen. **3**: 225. 1819.

Thevetia Ahouai (L.) A. DC. in DC. Prodr. **8**: 344. 1844.

Thevetia nitida (H. B. K.) A. DC. loc. cit. 345. 1844.

Small trees, occasionally 12 m. tall; leaves obovate to obovate-lanceolate, obtuse to very abruptly acuminate, 8 to 20 cm. long, 3 to 7 cm. broad, firmly membranaceous, wholly glabrous, or sparsely puberulent beneath, the petioles 0.6 to 1.0 cm. long; calyx lobes ovate, acute to acuminate, 0.5 to 0.7 cm. long; corolla salverform, creamy white, the tube 2.5 to 3.5 cm. long, about 0.3 cm. in diameter at the base, somewhat inflated at the orifice, the lobes obovate-dolabriform, 1.7 to 2.5 cm. long, reflexed; berries somewhat obreniform, 3.5 to 4.5 cm. broad, brilliant red, containing 2 to 4 large, naked seeds.—Very common throughout southern Mexico and Central America; less common along the Caribbean coast of Colombia.

CAMPECHE: Tuxpeña, *Lundell 984, 1011*. Champoton, *Steere 1885, 1923*. BRITISH HONDURAS: Orange Walk District—near Honey Camp, *Meyer 178*. El Cayo District—Belize River, *Lundell 4047*; Cocquericot, *Bartlett 12036*; El Cayo, *Chanek 34*. Stann Creek District—Mullins River road, *Schipp 218*. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett 12346*. La Libertad, *Lundell 2421, 4062*. Flores, Lake Peten, *Lundell 3239*.

OBSERVATIONS: Known as "Cojon de Perro" in Guatemala.

11. RAUWOLFIA L.

RAUWOLFIA L. Sp. Pl. ed. 2. 303. 1762; A. DC. in DC. Prodr. **8**: 337. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. **4**²: 153. 1895; Markg. in Fedde, Repert. **20**: 115. 1924.

Shrubs or small trees; leaves verticillate (in our species); inflorescence cymose, terminal or lateral, bearing many small, greenish flowers; calyx 5-parted, destitute of squamellae, the lobes essentially equal; corolla salverform or tubular-salverform; anthers not connivent,

without an enlarged connective; ovary apocarpous, each carpel containing 1 or 2 ovules, surrounded by a low annular nectary; fruit syncarpous, drupaceous, containing 1 or 2 naked seeds.

Type species: *R. tetraphylla* L. (Greater Antilles generally, except Jamaica).

I. *RAUWOLFIA HIRSUTA* Jacq. Enum. Pl. Carib. 14. 1760.

Rauwolfia canescens L. Sp. Pl. ed. 2. 303. 1762; A. DC. in DC. Prodr. 8: 340. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 153. 1895; Markg. in Fedde, Repert. 20: 119. 1924.

Shrubs or small trees 1 to 3 m. tall, wholly glabrous to densely puberulent throughout; leaves chiefly 4-nate, very unequal at each node, ovate to obovate-elliptic, shortly acuminate to obtuse, 4 to 10 cm. long, 1.5 to 6.0 cm. broad, membranaceous, the petioles 0.4 to 0.7 cm. long, glandular above; inflorescence lateral, much shorter than the leaves, bearing several small, greenish flowers; calyx lobes ovate, acute, about 0.1 cm. long; corolla tubular-salverform, the tube 0.15 to 0.2 cm. long, about 0.1 cm. in diameter at the base, the lobes about 0.1 cm. long or somewhat less; drupes greenish, somewhat compressed-obovoid to compressed-subspherical, 0.6 to 0.9 cm. broad, usually containing 2 seeds.—General throughout southeastern Mexico, Central America, Cuba, Hispaniola, and adjacent islands.

YUCATAN: Xcabal, *Gaumer* 610. Chichen Itza, *Steere* 1104, 1363, *Steggerda* 16. Tioul, *Seler & Seler* 3910. CAMPECHE: Tuxpeña, *Lundell* 900. QUINTANA ROO: Lake Chichankanab, *Gaumer* 1490, 1869. BRITISH HONDURAS: Corozal District—*Gentle* 495; *Lundell* 4768. Belize District—Belize—Sibun River road, *Gentle* 36. El Cayo District, *Chanek* 120. GUATEMALA: Dept. Peten, La Libertad, *Aguilar* 138; *Lundell* 2493, 3399.

OBSERVATIONS: An almost ubiquitous thicket-shrub throughout its range.

12. *LACMELLEA* Karst.

LACMELLEA Karst. Linnaea 28: 449. 1856; Miers, Apoc. So. Am. 14. 1878; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 125. 1895.

Small trees; leaves opposite; inflorescence lateral, cymose; calyx 5-parted, the lobes closely imbricated, destitute of squamellae; corolla salverform, the limb 5-parted; stamens attached about midway within the corolla tube, the anthers not connivent, without an enlarged connective; ovary syncarpous, 2-locular, bearing 2 to 4 ovules, destitute of a nectary; fruit a 1-seeded berry.

Type species: *L. edulis* Karst. (Colombia; British Honduras).

I. *LACMELLEA EDULIS* Karst. Linnaea 28: 449. 1856; Fl. Colomb. 2: pl. 152. 1862; Miers, Apoc. So. Am. 14. 1878; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 125. 1895; Woodson, Tropical Woods 44: 22. 1935.

Small trees, wholly glabrous; leaves oblong-elliptic, rather abruptly and narrowly acuminate, 7 to 16 cm. long, 2.0 to 4.5 cm. broad, subcoriaceous, the petioles 0.5 to 1.0 cm. long; inflorescences opposite-lateral, much shorter than the leaves, bearing 3 to 7 small, greenish white flowers; calyx lobes closely imbricated, obtuse, 0.15 to 0.2 cm. long; corolla salverform, the tube 0.5 to 0.7 cm. long, the lobes oblong-dolabriform, 0.45 to 0.6 cm. long, suberect; berries subspherical to broadly ovoid, 1.5 to 2.0 cm. long, containing a single, stony, spherical seed.—Known only from northern Colombia and British Honduras.

BRITISH HONDURAS: Toledo District—Rio Grande, *Schipp* 1234.

OBSERVATIONS: Schipp reports that the berries are yellow and have the odor of mangoes; the wood light and brittle. Apparently rare throughout its distribution.

13. ALLAMANDA L.

ALLAMANDA L. Mant. ed. 2. 214. 1771; A. DC. in DC. Prodr. 8: 318. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 127. 1897.

Orelia Aubl. Pl. Guian. 1: 271. 1775.

Erect or clambering shrubs, frequently liana-like; leaves 4-nate; inflorescence cymose, few-flowered, lateral or pseudo-terminal; calyx 5-parted, destitute of squamellae, conspicuously foliaceous; corolla showy, infundibuliform, the limb 5-parted; anthers not connivent, without an enlarged connective; ovary syncarpous, 1-locular, containing numerous ovules, surrounded by a low, annular nectary; fruit a globose, spiny capsule containing many dry, compressed, winged seeds.

Type species: *A. cathartica* L. (probably native to South America).

1. ALLAMANDA CATHARTICA L. Mant. ed. 2. 214. 1771; A. DC. in DC. Prodr. 8: 318. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 127. fig. 49, E-G. 1895.

Orelia grandiflora Aubl. Pl. Guian. 1: 271. 1775.

Allamanda grandiflora (Aubl.) Lam. Encycl. Suppl. 4: 601. 1791.

Wholly glabrous to variously pubescent; leaves obovate to oblong-lanceolate, shortly acuminate, 6 to 12 cm. long, 2.5 to 6.0 cm. broad, subcoriaceous to membranaceous, the petioles 0.2 to 0.3 cm. long; inflorescence lateral or pseudo-terminal, bearing few to several showy, yellow flowers; calyx lobes ovate to ovate-lanceolate, acute, 0.5 to 1.2 cm. long; corolla infundibuliform, the proper tube 2.0 to 3.5 cm. long, about 0.2 cm. in diameter at the base, the throat broadly tubular-conical, 3 to 4 cm. long, about 2.5 to 3.5 cm. in diameter, the lobes obliquely obovate, 2.5 to 3.5 cm. long, spreading; capsules globose, about 4 cm. in diameter, covered with many spines about 1 cm. long.—Widely cultivated in the tropics of both hemispheres; probably native to South America.

14. COUMA Aubl.

COUMA Aubl. Pl. Guian. Suppl. 39. pl. 392. 1775; A. DC. in DC. Prodr. 8: 322. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 132. 1895.

Colophora Mart. in Buchn. Rep. Pharm. 35: 196. 1830.

Large or medium-sized trees; leaves opposite or verticillate; inflorescence lateral, cymose, many-flowered; calyx 5-parted, destitute of squamellae; corolla salverform, rather small, the limb 5-parted; anthers not connivent, without an enlarged connective; ovary syncarpous, 1-locular, containing many ovules, destitute of a nectary; fruit a several-seeded berry.

Type species: *C. guyanensis* Aubl. (the Guianas; northern Brazil; eastern Peru).

1. COUMA GUATEMALENSIS Standl. Tropical Woods 7: 8. 1926.

Medium-sized trees with very thick, reddish bark; leaves 3-nate, obovate-elliptic, shortly and obtusely acuminate, 9 to 12 cm. long, 4.5 to 7.0 cm. broad, membranaceous, essentially glabrous above, minutely puberulent beneath, the petioles about 1 cm. long; inflorescence about equaling the leaves, bearing many rather small, yellowish flowers; calyx lobes oblong-lanceolate, obtuse, 0.2 to 0.25 cm. long, minutely puberulent; corolla salverform, puberulent-papillate without, the tube 0.7 to 0.9 cm. long, about 0.1 cm. in diameter at the base, the lobes oblong-dolabriform, obtuse, 0.4 to 0.6 cm. long, spreading; stamens inserted somewhat above midway within the corolla tube; berries subglobose, about 3 cm. in diameter.—Northern Guatemala and British Honduras.

BRITISH HONDURAS: Without locality, *Hope*. GUATEMALA: Entre Rios, *Kuylen 69*.

OBSERVATIONS: The latex of this tree is potable and is supposedly used as a substitute for chicle. The leaves are sometimes used by bushmen to make a tea-like infusion (M. O. Hope). The berries of *C. guyanensis* are reported to be edible, and the same may apply to our species. The local name is reported as "Palo de Vaca."

15. TINTINNABULARIA Woodson

This curious, monotypic genus (cf. R. E. Woodson, Jr., Ann. Missouri Bot. Gard. **23**: 389. 1936) has recently been discovered in the Department of Alta Verapaz, Guatemala. Future exploration may disclose its presence in the neighboring Department of Peten.

16. MESECHITES Muell.-Arg.

MESECHITES Muell.-Arg. in Mart. Fl. Bras. **6**¹: 150. 1860; Woodson, Ann. Missouri Bot. Gard. **20**: 629. 1933.

Lianas; leaves opposite, bearing a cluster of glands upon the upper surface at the base of the midrib; inflorescence dichotomous, alternate-lateral, bearing several flowers; calyx 5-parted, the lobes somewhat unequal, imbricated, bearing marginal squamellae within; corolla salverform, the limb 5-parted; anthers connivent, with an enlarged, obtusely lobed connective; ovary apocarpous, surrounded by 5 distinct or concrescent nectaries, the stigma umbraculiform; fruit a pair of slender, terete follicles containing many comose seeds.

Type species: *M. Mansoana* (A. DC.) Woodson (Brazil; Bolivia).

1. MESECHITES TRIFIDA (Jacq.) Muell.-Arg. in Mart. Fl. Bras. **6**¹: 151. 1860.

Echites trifida Jacq. Enum. Pl. Carib. 13. 1760; A. DC. in DC. Prodr. **8**: 454. 1844; Miers, Apoc. So. Am. 202. 1878.

Suffruticose lianas, wholly glabrous; leaves ovate to ovate-oblong, abruptly acuminate to obtuse, 5 to 12 cm. long, 2 to 8 cm. broad, the petioles 0.5 to 1.5 cm. long; inflorescence alternate-lateral, bearing several mediocre greenish white flowers; calyx lobes ovate-oblong, obtuse, 0.3 to 0.5 cm. long; corolla tube 1.5 to 2.5 cm. long, about 0.15 cm. in diameter at the base, the lobes obliquely obovate-oblong, 0.75 to 1.5 cm. long, reflexed; follicles slender, attenuate, 15 to 40 cm. long.—Throughout Central America; Colombia; Ecuador; Venezuela; the Guianas; northern Brazil.

GUATEMALA: Dept. Peten, La Libertad, *Lundell 2276, 3469*.

17. MANDEVILLA Lindl.

MANDEVILLA Lindl. Bot. Reg. n.s. **3**: pl. 7. 1840; Miers, Apoc. So. Am. 184. 1878; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. **4**²: 170. 1895; Woodson, Ann. Missouri Bot. Gard. **20**: 645. 1933.

Exothostemon G. Don, Gen. Hist. **4**: 82. 1838.

Amblyanthera Muell.-Arg. in Mart. Fl. Bras. **6**¹: 141. 1860.

Lianas, rarely suffrutescens herbs; leaves opposite, bearing a cluster of small glands at the base or along the entire length of the midrib upon the upper surface; inflorescence alternate-lateral, racemose, bearing few to many flowers; calyx 5-parted, the lobes essentially equal, bearing within alternate, opposite, or many indefinitely distributed squamellae; corolla salverform, to infundibuliform, the limb 5-parted; anthers connivent, with an en-

larged, obtusely lobed connective; ovary apocarpous, surrounded by 5 separate or concrescent nectaries, the stigma umbraculiform; fruit a pair of elongate, terete follicles containing many comose seeds.

Type species: *M. laxa* (R. & P.) Woodson (Bolivia; Argentina).

Corolla tube straight; leaves with a small cluster of glands at the base of the midrib above.

Corolla tube 0.4 to 0.6 cm. long, the lobes about equally long; nectaries about half as long as the ovary 1. *M. torosa*

Corolla tube 1.0 to 1.5 cm. long, the lobes 0.25 to 0.35 cm. long; nectaries about as long as the ovary 2. *M. tubiflora*

Corolla tube somewhat curved; leaves with small glands along the length of the midrib.

Corolla salverform; leaves 2 to 10 cm. long, glabrous to sparsely pubescent . . . 3. *M. subsagittata*

Corolla infundibuliform; leaves 5 to 20 cm. long, always coarsely pubescent . . . 4. *M. hirsuta*

1. MANDEVILLA TOROSA (Jacq.) Woodson, Ann. Missouri Bot. Gard. **19**: 64. 1932.

Echites torosa Jacq. Enum. Pl. Carib. 13. 1760; A. DC. in DC. Prodr. **8**: 449. 1844.

Echites torulosa L. Sp. Pl. ed. 2. 307. 1762.

Slender twiners; leaves elliptic, acute to acuminate, obscurely cordate, 2 to 7 cm. long, 0.7 to 3.0 cm. broad, membranaceous, glabrous to minutely pilose, glandular at the base of the midrib above, the petioles 0.15 to 0.4 cm. long; inflorescences about as long as the leaves, bearing 3 to 12 white or cream flowers; calyx lobes lanceolate, acuminate, 0.15 to 0.2 cm. long, glabrous; corolla salverform, glabrous without, the tube straight, 0.4 to 0.6 cm. long, about 0.1 cm. in diameter at the base, the lobes obovate-oblong, 0.4 to 0.5 cm. long, spreading; follicles moniliform, 9 to 20 cm. long, glabrous.—Mexico (Yucatan, Quintana Roo); Jamaica.

YUCATAN: Uxmal, *Schott 673*. Chicxulub, *Gaumer 23423*. Izamal, *Gaumer 883*. QUINTANA ROO: Lake Chichankanab, *Gaumer 2013*.

OBSERVATIONS: Common and very uniform in Jamaica; infrequent and variable in Yucatan.

2. MANDEVILLA TUBIFLORA (Mart. & Gal.) Woodson, Ann. Missouri Bot. Gard. **19**: 52. 1932.

Echites tubiflora Mart. & Gal. Bull. Acad. Roy. Brux. **11**¹: 358. 1844.

Amblyanthera tubiflora (Mart. & Gal.) Muell.-Arg. Linnaea **30**: 423. 1860.

Echites cobanensis Donn. Sm. Bot. Gaz. **40**: 6. 1905.

Slender lianas; leaves lanceolate to oblong-lanceolate, cordate, acuminate, 4 to 10 cm. long, 0.7 to 4.0 cm. broad, above puberulent to glabrate, with a cluster of glands at the base of the midrib, beneath densely tomentulose, the petioles 0.4 to 1.0 cm. long; inflorescence about as long as the leaves, bearing 8 to 20 yellowish flowers; calyx lobes ovate to ovate-lanceolate, acute to acuminate, 0.1 to 0.2 cm. long; corolla salverform, glabrous without, the tube straight, 1.0 to 1.5 cm. long, about 0.1 cm. in diameter at the base, the lobes obovate, 0.25 to 0.35 cm. long, spreading; follicles unknown.—Mexico (Veracruz, Oaxaca, Yucatan); Guatemala (Alta Verapaz).

YUCATAN: Data incomplete, *Gaumer 23969*.

3. MANDEVILLA SUBSAGITTATA (R. & P.) Woodson, Ann. Missouri Bot. Gard. **19**: 69. 1932.

Echites subsagittata R. & P. Fl. Peruv. **2**: 19. 1799.

Echites jasminiflora Mart. & Gal. Bull. Acad. Roy. Brux. **11**¹: 357. 1844.

Echites microcalyx A. DC. in DC. Prodr. **8**: 456. 1844.

Echites cuspidifera Blake, Contr. Gray Herb. **52**: 79. 1917.

Slender, glabrous or variously pubescent lianas; leaves oblong-elliptic, cordate-auriculate, acuminate, 2 to 10 cm. long, 0.5 to 3.0 cm. broad, delicately membranaceous, glandular

along the midrib above; inflorescence as long as the leaves or somewhat longer, bearing 8 to 20 yellow, red-flushed flowers; calyx lobes ovate, acuminate, 0.1 to 0.15 cm. long; corolla salverform, the tube somewhat curved, 2.0 to 2.5 cm. long, about 0.2 cm. in diameter at the base, the lobes obovate, acuminate, 1.0 to 1.5 cm. long; follicles moniliform, 10 to 20 cm. long.—Very common throughout southern Mexico, Central America, and the northern half of South America (except Brazil, according to present records).

YUCATAN: Buena Vista Xbac, *Gaumer 1158*. San Anselmo, *Gaumer 2013*. Uxmal, *Steere 2068*. Peto, *Steere 2253*. Chichen Itza, *Steere 1122, 1290, 1323, 1584*. Merida, *Moritz 1153*. CAMPECHE: Tuxpeña, *Lundell 954*. QUINTANA ROO: Lake Chichankanab, *Gaumer 2014, 2228*; *Steere 2401*. BRITISH HONDURAS: Corozal District—*Gentle 274*; *Lundell 4996*. Orange Walk District—Honey Camp, *Lundell s.n.* Belize District—Belize—Sibun River road, *Gentle 34*; lower Belize River, *Record s.n.*; Maskall, *Gentle 1030*; near Manatee Lagoon, *Peck 35*; Sibun River, *Bartlett 11394*. El Cayo District—Duck Run, *Bartlett 11559*; Vaquero, *Lundell 6884*; San Agustín, *Lundell 6633*. Stann Creek District—Stann Creek Railway, *Schipp 368*. GUATEMALA: Dept. Peten, La Libertad, *Lundell 2333, 2363*.

OBSERVATIONS: Like many other common lianas of the family, popularly known as “Bejuco de Culebra.”

4. MANDEVILLA HIRSUTA (A. Rich.) K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. **42**: 171. 1895; Woodson, Ann. Missouri Bot. Gard. **20**: 762. 1933.

Echites hirsuta A. Rich. Actes Soc. Hist. Nat. Paris **1**: 107. 1792.

Echites tomentosa Vahl, Symb. Bot. **3**: 44. 1794.

Echites fluminensis A. DC. in DC. Prodr. **8**: 452. 1844.

Mandevilla denticulata Blake, Contr. Gray Herb. **52**: 81. 1917.

Rather stout, pubescent lianas; leaves obovate to oblong-elliptic, cordate, abruptly acuminate, 5 to 20 cm. long, 2 to 8 cm. broad, glandular along the midrib and harshly strigillose above, the petioles 0.1 to 0.4 cm. long; inflorescence as long as the leaves or somewhat longer, bearing 5 to 25 showy, yellow, red-flushed flowers; calyx lobes ovate-lanceolate to lanceolate, acuminate, somewhat petaloid, 0.5 to 1.0 cm. long, subtended by showy, petaloid, caducous bracts; corolla infundibuliform, pubescent without, the proper tube slightly curved, 2.0 to 3.5 cm. long, about 0.2 cm. in diameter at the base, the throat conical or campanulate, 1.5 to 2.0 cm. long, about 1.7 cm. in diameter, the lobes obovate-dolabriform, acuminate, 1.5 to 1.7 cm. long, spreading; follicles stout, articulated, 6 to 15 cm. long.—Throughout Central America and South America as far southward as São Paulo.

BRITISH HONDURAS: El Cayo District—San Agustín, *Lundell 6619, 6632*; Mountain Pine Ridge, *Bartlett 13050*. Stann Creek District—Middlesex, *Schipp 56*. Toledo District—New Haven, *Peck 696*.

OBSERVATIONS: Undoubtedly one of the most frequent and widespread of the indigenous tropical American Apocynaceae.

18. FORSTERONIA G. F. W. Meyer

FORSTERONIA G. F. W. Meyer, Fl. Esseq. 133. 1818; A. DC. in DC. Prodr. **8**: 436. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. **42**: 187. 1895; Woodson, Ann. Missouri Bot. Gard. **22**: 153. 1935.

Thyrsanthus Benth. in Hook. Journ. Bot. **3**: 245. 1841.

Lianas; leaves opposite, bearing a small cluster of glands at the base of the midrib upon the upper surface, or destitute of glands; inflorescence terminal or lateral, thyrsiform, bear-

ing many small, greenish white flowers; calyx 5-parted, the lobes equal, bearing within 1 to several marginal squamellae, or without squamellae; corolla salverform-subrotate, small, the limb deeply 5-parted; anthers connivent, with an enlarged, obtusely lobed connective, usually more or less exserted; ovary apocarpous, surrounded by 5 small nectaries; fruit a pair of slender, terete follicles containing many comose seeds.

Type species: *F. spicata* (Jacq.) G. F. W. Meyer (south Mexico; Guatemala; El Salvador; Nicaragua; Cuba; Caribbean coast of Colombia).

Leaves glandular at the base of the midrib above; corolla 0.3 to 0.4 cm. long.

Anther tips barely exserted; corolla puberulent papillate without, the lobes scarcely longer than the tube 1. *F. viridescens*

Anthers wholly exserted; corolla glabrous without or essentially so, the lobes about twice as long as the tube 2. *F. myriantha*

Leaves eglandular; corolla 0.6 to 0.65 cm. long 3. *F. peninsularis*

1. FORSTERONIA VIRIDESCENS Blake, Contr. Gray Herb. **52**: 80. 1917.

Rather stout lianas; leaves oblong-elliptic, shortly acuminate, 9 to 13 cm. long, 2.5 to 6.0 cm. broad, coriaceous or subcoriaceous, glabrous, glandular at the base of the midrib above; inflorescence somewhat shorter than the leaves, bearing many small, greenish white flowers; calyx lobes ovate, acute, 0.1 to 0.13 cm. long, puberulent-papillate; corolla densely puberulent-papillate without, the tube 0.15 to 0.17 cm. long, about 0.075 cm. in diameter at the base, the lobes ovate-oblong, 0.18 to 0.2 cm. long; anthers barely exserted, minutely barbellate at the tips; follicles unknown.—British Honduras.

BRITISH HONDURAS: Belize District—near Manatee Lagoon, *Peck* 450. Stann Creek District—Middlesex, *Schipp* 360.

2. FORSTERONIA MYRIANTHA Donn. Sm. Bot. Gaz. **27**: 435. 1899; Woodson, Ann. Missouri Bot. Gard. **22**: 197. 1935.

Rather stout glabrous to puberulent lianas; leaves elliptic to oval, acute to acuminate, 4.5 to 10.0 cm. long, 2.0 to 4.5 cm. broad, membranaceous, glandular at the base of the midrib above, the petiole 0.2 to 0.45 cm. long; inflorescence somewhat shorter than the leaves, bearing many small, white flowers; calyx lobes ovate, acute to obtuse, 0.1 to 0.12 cm. long, puberulent; corolla essentially glabrous without, villosulose within, the tube 0.07 to 0.09 cm. long, about 0.05 cm. in diameter at the base, the lobes 0.25 to 0.3 cm. long; anthers wholly exserted, glabrous; follicles unknown.—British Honduras; Guatemala (Peten, Santa Rosa, Sacatepequez); Costa Rica (Alajuela, Cartago).

BRITISH HONDURAS: Toledo District—Temash River, *Schipp* 1315. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2540.

3. FORSTERONIA PENINSULARIS Woodson, Ann. Missouri Bot. Gard. **22**: 215. 1935.

Rather stout lianas, glabrous; leaves oblong-elliptic, acute to acuminate, 4.5 to 5.5 cm. long, 1.7 to 2.2 cm. broad, firmly membranaceous, eglandular, the petioles 0.5 to 0.8 cm. long; inflorescence somewhat shorter than the leaves, bearing many small, greenish white flowers; calyx lobes ovate, obtuse, 0.15 cm. long; corolla glabrous without, villosulose within, the tube 0.2 cm. long, about 0.08 cm. in diameter at the base, the lobes oblong, 0.4 to 0.45 cm. long; anthers wholly exserted, glabrous; follicles terete, slender, 15 to 20 cm. long.—British Honduras.

BRITISH HONDURAS: Belize District—Maskall, Northern River, *Gentle* 1281. El Cayo District—Valentin, *Lundell* 6358.

19. MALOUETIA A. DC.

MALOUETIA A. DC. in DC. Prodr. 8: 378. 1844; Miers, Apoc. So. Am. 86. 1878; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 186. 1895; Woodson, Ann. Missouri Bot. Gard. 22: 238. 1935.

Robbia A. DC. loc. cit. 444. 1844.

Shrubs or small trees; leaves opposite, eglandular, bearing inconspicuous pits in the axils of the midrib beneath; inflorescence cymose, terminal, rarely lateral, umbellate, bearing several rather small flowers; calyx 5-parted, the lobes imbricated, subequal, bearing small, marginal squamellae within; corolla salverform, the limb 5-parted; anthers included (in our species, unusual for the genus), connivent, with an enlarged, narrowly lobed connective; ovary apocarpous, containing numerous ovules, surrounded by 5 separate or concrecent nectaries; stigma fusiform; fruit a pair of follicles containing numerous naked seeds.

Type species: *M. Tamaquarina* (Aubl.) A. DC. (the Guianas; northeastern Brazil).

I. MALOUETIA GUATEMALENSIS (Muell.-Arg.) Standl. Journ. Wash. Acad. Sci. 15: 459. 1925.

Stemmadenia guatemalensis Muell.-Arg. Linnaea 30: 410. 1860.

Malouetia panamensis Heurck & Muell.-Arg. in Heurck, Obs. Bot. 185. 1871.

Small trees 5 to 10 m. tall, wholly glabrous; leaves oblong- to ovate-elliptic, subcaudate-acuminate, 6 to 25 cm. long, 2 to 10 cm. broad, firmly membranaceous, the petioles 0.5 to 1.0 cm. long; inflorescence terminal or lateral, much shorter than the leaves, bearing numerous small, greenish white flowers; calyx lobes ovate, acute to obtuse, 0.15 to 0.25 cm. long; corolla salverform, the tube 0.4 to 0.55 cm. long, about 0.15 cm. in diameter at the base, the lobes obliquely ovate-oblong, acuminate, 0.7 to 1.2 cm. long; anthers wholly included; follicles stout, fusiform, divaricate, 10 to 13 cm. long, 1 to 2 cm. in diameter.—British Honduras; Guatemala (Izabal); Honduras (Atlantida); Nicaragua; Costa Rica (Limon); Panama (Bocas del Toro, Colon, Canal Zone).

BRITISH HONDURAS: Stann Creek District—South Stann Creek, *Schipp* 653. Data incomplete, *Peck* 671.

OBSERVATIONS: Apparently always found in brackish swamps. Possesses a light, pithy wood resembling that of *Ochroma*.

20. NERIUM L.

Nerium Oleander L., the ubiquitous tropical ornamental, is cultivated throughout the Yucatan Peninsula, and apparently is an escape at times. One of the very few Apocynaceae without latex.

21. URECHITES Muell.-Arg.

URECHITES Muell.-Arg. Bot. Zeit. 18: 22. 1860; Miers, Apoc. So. Am. 124. 1878; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 171. 1895; Woodson, Ann. Missouri Bot. Gard. 23: 198. 1936.

Charionna Miers, loc. cit. 110. 1878.

Slender lianas; leaves opposite, rarely 3-nate, eglandular; inflorescence lateral, rarely terminal, cymose, bearing several handsome flowers; calyx 5-parted, the lobes subequal, bearing within several marginal squamellae; corolla infundibuliform, the limb 5-parted; anthers connivent, with an enlarged, narrowly lobed connective, usually with linear, apical appendages; ovary apocarpous, containing many ovules, surrounded by 5 concrecent nectaries; fruit a pair of terete, slender follicles containing numerous comose, rostrate seeds accompanied by copious placental chaff.

Type species: *U. lutea* (L.) Britton (extreme peninsular Florida; throughout the Bahama Islands and the Antilles; also reported from the Caribbean coast of Colombia).

1. URECHITES ANDRIEUXII Muell.-Arg. *Linnaea* **30**: 442. 1860; Woodson, *Ann Missouri Bot. Gard.* **23**: 203. 1936.

Slender lianas, wholly glabrous at maturity; leaves oblong- to obovate-elliptic, shortly acuminate, 5 to 12 cm. long, 2.5 to 7.0 cm. broad, the petioles 0.8 to 2.0 cm. long; inflorescence alternate-lateral, somewhat longer than the leaves, bearing few to several showy, cream-colored flowers; calyx lobes oblong- to ovate-lanceolate, acute, 0.5 to 0.8 cm. long; corolla infundibuliform, glabrous without, the proper tube 1.0 to 1.5 cm. long, about 0.3 cm. in diameter at the base, the throat broadly tubular, 2.5 to 3.0 cm. long, about 0.5 to 0.8 cm. in diameter, the lobes obliquely obovate, acuminate, 1.5 to 2.3 cm. long, spreading; follicles terete, acuminate, 15 to 28 cm. long, the seeds accompanied by copious placental chaff.—Mexico (Campeche); British Honduras; Guatemala (Peten, Zacapa).

CAMPECHE: Tuxpeña, *Lundell* 842. Champoton, *Steere* 1918. BRITISH HONDURAS: Corozal District—San Andres, *Lundell* 4736; Santa Rita, *Gentle* 800. Orange Walk District—Honey Camp, *Lundell* LP38. Belize District—Belize River, *Lundell* 4046; Belize—Sibun River road, *Gentle* 22; Bakers Pine Ridge, *Lundell* 6982; Belize, *Lundell* 1872A; Northern River, *Gentle* 1037. Stann Creek District—Stann Creek, *Schipp* 491. GUATEMALA: Dept. Peten, Santa Cruz, *Bartlett* 12366. El Paso, *Lundell* 1524. Monte Polol, *Lundell* 3445. La Libertad, *Lundell* 3533.

22. ODONTADENIA Benth.

ODONTADENIA Benth. in Hook. *Journ. Bot.* **3**: 242. 1841; A. DC. in DC. *Prodr.* **8**: 359. 1844; Miers, *Apoc. So. Am.* 126. 1878; K. Sch. in Engl. & Prantl, *Nat. Pflanzenfam.* **4**²: 169. 1895; Woodson, *Ann. Missouri Bot. Gard.* **22**: 270. 1935.

Anisolobus A. DC. in DC. *Prodr.* **8**: 395. 1844.

Lianas; leaves opposite, eglandular; inflorescence lateral or terminal, cymose, bearing several handsome flowers; calyx 5-parted, the lobes more or less unequal to essentially equal, bearing numerous squamellae within; corolla infundibuliform (in our species), the limb 5-parted; anthers connivent, with an enlarged, narrowly lobed connective; ovary apocarpous, containing many ovules, surrounded by a fleshy, annular nectary; fruit a pair of rather stout, terete follicles containing numerous large, comose seeds.

Type species: *O. grandiflora* (Meyer) Miq. (southern Costa Rica; Panama; Colombia; Venezuela; the Guianas; northern Brazil, and northeastern Peru [Loreto]).

Calyx lobes essentially equal, glabrous; corolla proper-tube suburceolate, 0.8 to 0.9 cm. long, the throat 1.6 to 1.7 cm. long 1. *O. caudigera*
 Calyx lobes very unequal, densely and minutely puberulent; corolla proper-tube cylindrical, 1.5 to 1.7 cm. long, the throat 2.5 to 2.7 cm. long 2. *O. Schippii*

1. ODONTADENIA CAUDIGERA Woodson, *Ann. Missouri Bot. Gard.* **23**: 384. 1936.

Rather stout, wholly glabrous lianas; leaves broadly elliptic, subcaudate-acuminate, 14 to 23 cm. long, 7 to 11 cm. broad, the petioles 2.0 to 2.5 cm. long; inflorescences opposite-lateral, bearing 3 to 6 showy, cream-colored flowers; calyx lobes essentially equal, ovate, obtuse, 0.6 to 0.7 cm. long; corolla subinfundibuliform, the proper tube urceolate, 0.8 to 0.9 cm. long, about 0.5 cm. in diameter at the base, sharply constricted at the stamens, the throat cylindrical, 1.6 to 1.7 cm. long, about 0.6 cm. in diameter, the lobes broadly obovate, 2.0 to 2.1 cm. long, spreading.—British Honduras.

BRITISH HONDURAS: Belize District—Sibun River, *Lundell* 6944. Stann Creek District—

Middlesex, *Schipp S-25*; Stann Creek, *Kinloch s. n.* Toledo District—Columbia road, *Schipp S-672*.

2. *ODONTADENIA SCHIPPII* Woodson, Ann. Missouri Bot. Gard. **22**: 292. 1935.

Rather stout lianas, essentially glabrous; leaves broadly elliptic to oval, shortly and obtusely acuminate, 6.5 to 12.0 cm. long, 3.0 to 5.5 cm. broad, the petioles 1.0 to 1.5 cm. long; inflorescences opposite-lateral, bearing several showy, cream-colored flowers; calyx lobes very unequal, closely imbricated, 0.5 to 1.0 cm. long, minutely puberulent without; corolla infundibuliform, glabrous without, the proper tube 1.5 to 1.7 cm. long, about 0.4 cm. in diameter at the base, the throat tubular-conical, 2.5 to 2.7 cm. long, about 0.5 to 0.6 cm. in diameter, the lobes obliquely obovate, 1.3 to 1.5 cm. long, spreading.—British Honduras.

BRITISH HONDURAS: Toledo District—Camp 36, Guatemala–British Honduras boundary survey, *Schipp S-709*.

23. *FERNALDIA* Woodson

FERNALDIA Woodson, Ann. Missouri Bot. Gard. **19**: 48. 1932; *ibid.* **23**: 260. *pl.* 5. 1936.

Rather stout lianas; leaves opposite, eglandular; inflorescence alternate-lateral, cymose, bearing numerous handsome flowers; calyx 5-parted, the lobes equal, bearing a single opposite squamella within; corolla infundibuliform, the limb 5-parted, the tube somewhat curved; anthers connivent, with an enlarged, obtusely lobed connective, the sporangia with inwardly protuberant, sterile bases; ovary apocarpous, containing many ovules, surrounded by a delicate, 4-lobed nectary; fruit a pair of elongate follicles containing many comose seeds.

Type species: *F. pandurata* (A. DC.) Woodson.

1. *FERNALDIA PANDURATA* (A. DC.) Woodson, Ann. Missouri Bot. Gard. **19**: 48. 1932.

Echites pandurata A. DC. in DC. Prodr. **8**: 458. 1844.

Urechites Karwinskii Muell.-Arg. Linnaea **30**: 440. 1860.

Mandevilla velutina K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. **4**²: 171. 1895.

Mandevillea potosina Brandeg. Univ. Calif. Publ. Bot. **4**: 276. 1912, sphalm.

Echites pinguisfolia Standl. Field Mus. Publ. Bot. **8**: 35. 1930.

Puberulent or essentially glabrous lianas; leaves oblong-elliptic to broadly ovate, usually more or less pandurate, at least the lower, shortly acuminate, 4 to 13 cm. long, 1.5 to 8.0 cm. broad, both surfaces puberulent, or the upper glabrate, the petioles 1 to 2 cm. long; inflorescences somewhat shorter than the leaves, bearing several handsome, cream-colored flowers; calyx lobes ovate, acute to obtuse, 0.1 to 0.2 cm. long, minutely puberulent; corolla infundibuliform, essentially glabrous without, the proper tube 2.0 to 2.2 cm. long, about 0.15 cm. in diameter at the base, somewhat curved, the throat campanulate-conical, 0.9 to 1.2 cm. long, 0.7 to 0.9 cm. in diameter, the lobes obliquely obovate, 1.0 to 1.3 cm. long, densely arachnoid-villous within; follicles terete, acuminate, 9 to 14 cm. long.—Mexico (Tamaulipas, San Luis Potosi, Veracruz, Guerrero, Oaxaca, Yucatan); El Salvador. Reported from Costa Rica.

YUCATAN: Izamal, *Gaumer 815*.

OBSERVATIONS: Popular names in El Salvador are "Loroco" or "Floroco." The flowers are said to be edible after cooking, and to be prized as a flavoring for rice.

24. ECHITES P. Br.

ECHITES P. Br. Hist. Jam. **2**: 182. 1756; Jacq. Enum. Pl. Carib. **13**. 1760; A. DC. in DC. Prodr. **8**: 446. 1844, in part; Woodson, Ann. Missouri Bot. Gard. **23**: 217. 1936.

Lianas; leaves opposite, eglandular; inflorescence cymose, alternate-lateral; calyx 5-parted, the lobes essentially equal, bearing a single opposite squamella within; corolla salverform, the limb 5-parted; anthers connivent, with an enlarged, usually narrowly lobed connective, the sporangia with inwardly protuberant bases; ovary apocarpous, containing many ovules, surrounded by 5 separate or concrescent nectaries; fruit a pair of terete follicles containing many comose seeds.

Type species: *E. umbellata* Jacq. (extreme peninsular Florida; Bahama Islands; Cuba; Jamaica; Hispaniola; Mexico (Yucatan); British Honduras.

Corolla 1.25 to 2.5 cm. long, the lobes narrowly oblong- to elliptic-lanceolate, reflexed 1. *E. tuxtlensis*

Corolla 5 to 8 cm. long, the lobes obliquely obovate, spreading.

Corolla tube not spirally contorted.

Leaves coriaceous or subcoriaceous, more or less pandurate, lustrous and with verrucose venation above 2. *E. yucatanensis*

Leaves delicately membranaceous, never pandurate, opaque above, the venation not verrucose 3. *E. elegantula*

Corolla tube spirally contorted 4. *E. umbellata*

1. ECHITES TUXTLENSIS Standl. Contr. U. S. Nat. Herb. **23**: 1164. 1924; Woodson, Ann. Missouri Bot. Gard. **23**: 218. 1936.

Rather slender lianas, glabrous throughout; leaves narrowly lanceolate- to obovate-elliptic, acuminate, 6 to 10 cm. long, 1.5 to 3.5 cm. broad, the petioles 0.3 to 0.8 cm. long; inflorescences lax, dichotomous, bearing several to numerous small, yellowish green flowers; calyx lobes ovate, acute to acuminate, about 0.1 cm. long; corolla tube 0.8 to 1.0 cm. long, about 0.1 cm. in diameter at the base, the lobes oblong- to elliptic-lanceolate, acuminate, somewhat shorter than the tube, reflexed; follicles unknown.—Mexico (Chiapas, Yucatan); British Honduras; Costa Rica.

YUCATAN: Progreso, *Flores s. n.* BRITISH HONDURAS: Corozal District—*Gentle* 439. Belize District—Maskall, Northern River, *Gentle* 1022.

2. ECHITES YUCATANENSIS Millsp. ex Standl. Field Mus. Publ. Bot. **8**: 35. 1930; Woodson, Ann. Missouri Bot. Gard. **23**: 221. 1936.

Rather stout lianas, glabrous throughout; leaves ovate to oblong-elliptic, usually irregularly pandurate, acuminate, 7 to 12 cm. long, 2.5 to 7.0 cm. broad, coriaceous to subcoriaceous, dark green and lustrous above, the petioles 1 to 2 cm. long; inflorescences subumbellate, bearing 3 to 9 greenish flowers; calyx lobes ovate-lanceolate, acuminate, 0.18 to 0.2 cm. long; corolla tube 4.0 to 4.5 cm. long, about 0.2 cm. in diameter at the base, the lobes obliquely obovate, acuminate, 2.5 to 3.0 cm. long, spreading; follicles relatively slender, 16 to 25 cm. long.—Mexico (Campeche, Yucatan); British Honduras.

YUCATAN: Izamal, *Gaumer* 817. Xkantunil, *Gaumer* 817. Chichen Itza, *Steere* 1085, 1305, 1471. Tizimin, *Swallen* 2503. Tical, *Gaumer* 23816. CAMPECHE: Tuxpeña, *Lundell* 1350. QUINTANA ROO: Lake Chichankanab, *Gaumer* 1979. BRITISH HONDURAS: Orange Walk District—Honey Camp, vicinity of Tower Hill, *Karling* 28.

3. ECHITES ELEGANTULA Woodson, Amer. Journ. Bot. **22**: 686. 1935; Ann. Missouri Bot. Gard. **23**: 222. 1936.

Rather slender lianas, wholly glabrous; leaves ovate-elliptic, acutely subcaudate-acuminate, 5 to 8 cm. long, 2.0 to 3.5 cm. broad, delicately membranaceous, opaque, the petioles 0.5

to 1.0 cm. long; inflorescence subumbellate, bearing 4 to 8 showy, greenish cream-colored flowers; calyx lobes lanceolate, acuminate, 0.3 to 0.5 cm. long; corolla tube 5.0 to 5.5 cm. long, about 0.15 cm. in diameter at the base, the lobes obliquely obovate, obtuse, 3.0 to 3.5 cm. long, spreading; follicles unknown.—Mexico (Yucatan).

YUCATAN: Chichen Itza, *Steere 1477*.

4. *ECHITES UMBELLATA* Jacq. Enum. Pl. Carib. 13. 1760; A. DC. in DC. Prodr. 8: 447. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 165. 1895; Woodson, Ann. Missouri Bot. Gard. 23: 224. 1936.

Tabernaemontana Echites L. Syst. Pl. ed. 10. 945. 1759.

Echites litorea H. B. K. Nov. Gen. 3: 212. 1819.

Echites Echites (L.) Britton, in Small, Fl. Miami, 147. 1913.

Rather slender lianas; leaves narrowly oblong-elliptic to suborbicular, acuminate to obtuse, 4 to 12 cm. long, 2.0 to 7.6 cm. broad, greenish yellow, glabrous, the petioles 0.3 to 1.0 cm. long; inflorescences subumbellate, bearing 2 to 7 greenish yellow flowers; calyx lobes ovate, acute, 0.15 to 0.5 cm. long; corolla tube 3.5 to 6.0 cm. long, about 0.15 to 0.2 cm. in diameter at the base, the lobes obovate, obtuse, 1.1 to 3.0 cm. long; follicles relatively stout, divaricate, 9 to 26 cm. long.—Extreme peninsular Florida; Bahama Islands; Cuba; Jamaica; Hispaniola; Mexico (Yucatan, Quintana Roo); British Honduras. Also found on San Andres Island, off the coast of Nicaragua.

YUCATAN: Sisal, *Schott 38*. Suitun, *Gaumer 23838*. Uxmal, *Steere 1987*. Progreso, *Steere 3097*. QUINTANA ROO: Isla Mujeres, *Goldman 646*. BRITISH HONDURAS: Corozal District—Corozal—Consejo road, *Gentle 805*. Orange Walk District—Honey Camp, *Lundell 515*.

OBSERVATIONS: A ubiquitous liana of thickets and brackish swamps.

25. PRESTONIA R. Br.

PRESTONIA R. Br. Mem. Wern. Soc. 1: 69. 1811; A. DC. Prodr. 8: 428. 1844; Miers, Apoc. So. Am. 143. 1878; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. 4²: 188. 1895; Woodson, Ann. Missouri Bot. Gard. 23: 276. 1936.

Haemadictyon Lindl. Trans. Hort. Soc. 6: 70. 1826.

Belandra Blake, Contr. Gray Herb. 52: 78. 1917.

Lianas; leaves opposite, eglandular; inflorescence lateral, cymose, simple; calyx 5-parted, the lobes essentially equal, usually somewhat foliaceous, bearing a single opposite squamella within; corolla salverform, rarely infundibuliform, the limb 5-parted, the tube usually with strap-shaped appendages opposite the lobes within, with a thick callose orifice; anthers usually somewhat exserted, connivent, with an enlarged, narrowly lobed connective; ovary apocarpous, containing many ovules, surrounded by 5 separate or concrescent nectaries; fruit a pair of follicles containing many comose seeds.

Type species: *P. tomentosa* R. Br. (Colombia; Venezuela; the Guianas; Brazil; Peru (Loreto); Bolivia (Santa Cruz, La Paz); Paraguay.

Plants glabrous throughout, or essentially so; corolla with ligular appendages above the insertion of the stamens within.

Calyx lobes 0.4 to 0.5 cm. long; anthers glabrous, or essentially so; nectary thick and fleshy, about equaling the ovary 1. *P. concolor*

Calyx lobes 1.0 to 1.2 cm. long; anthers minutely hirtellous; nectaries thin and diaphanous, much surpassing the ovary 2. *P. Schippii*

Plants ferruginous-tomentose throughout; corolla with callous protuberances above the insertion of the stamens within 3. *P. amanuensis*

1. *PRESTONIA CONCOLOR* (Blake) Woodson, in Standl. & Record, Field Mus. Publ. Bot. **12**: 327. 1936.

Belandra concolor Blake, Contr. Gray Herb. **52**: 78. 1917.

Rather slender lianas, essentially glabrous throughout; leaves oblong-elliptic, shortly acuminate, 9 to 13 cm. long, 3 to 5 cm. broad, subcoriaceous, the petioles 0.6 to 0.9 cm. long; inflorescences simple, about as long as the leaves, bearing 30 to 40 greenish yellow flowers; calyx lobes ovate-elliptic, acute, 0.4 to 0.5 cm. long; corolla glabrous without, the tube 1.5 to 1.8 cm. long, about 0.3 cm. in diameter at the base, bearing within ligular appendages above the insertion of the stamens; anthers essentially glabrous, slightly exerted; ovary about equaled by the fleshy, annular nectary.—British Honduras; Guatemala (Peten).

BRITISH HONDURAS: Belize District—Sibun River, *Gentle 1505*. Toledo District—Rio Grande, *Peck 953*; *Schipp S-465*; Jacinto Creek, *Schipp S-564*. GUATEMALA: Dept. Peten, El Paso, *Lundell 1567*.

2. *PRESTONIA SCHIPPII* Woodson, Ann. Missouri Bot. Gard. **23**: 337. 1936.

Rather slender lianas, essentially glabrous throughout; leaves oblong-elliptic, shortly acuminate, 10 to 17 cm. long, 4 to 7 cm. broad, firmly membranaceous, the petioles 1.2 to 1.6 cm. long; inflorescences much shorter than the leaves, bearing 10 to 12 cream-colored flowers; calyx lobes narrowly obovate-elliptic, acute, 1.0 to 1.2 cm. long, about 0.3 cm. in diameter at the base, bearing ligular appendages above the insertion of the stamens within, the lobes obliquely obovate, 0.9 to 1.0 cm. long; anthers minutely hirtellous, slightly exerted; ovary deeply concealed by the thin, tubular nectary.—British Honduras.

BRITISH HONDURAS: Toledo District—Eldorado, *Schipp S-388*.

3. *PRESTONIA AMANUENSIS* Woodson, Ann. Missouri Bot. Gard. **23**: 359. 1936.

Rather stout lianas, ferruginous-tomentose throughout; leaves broadly ovate, shortly acuminate, firmly membranaceous, 6 to 9 cm. long, 4 to 7 cm. broad, the petioles 0.2 to 0.3 cm. long; inflorescences subumbellate, much shorter than the leaves, bearing 6 to 12 cream-colored flowers; calyx lobes ovate-lanceolate, acuminate, 1.1 to 1.3 cm. long; corolla ferruginous-tomentose without, the tube 2.0 to 2.2 cm. long, about 0.3 cm. in diameter at the base, bearing short callose protuberances above the insertion of the stamens within, the lobes obliquely obovate, 0.8 to 0.9 cm. long; anthers glabrous, slightly exerted.—British Honduras.

BRITISH HONDURAS: El Cayo District—Cohune Ridge, *Lundell 6462*. Stann Creek District—Stann Creek Railway, *Schipp S-7*.

OBSERVATIONS: This species has been mistaken for *P. mexicana* A. DC., which has corollas of larger size and with longer, linear epistaminal appendages.

26. *RHABDADENIA* Muell.-Arg.

RHABDADENIA Muell.-Arg. in Mart. Fl. Bras. **6**¹: 173. 1860; Miers, Apoc. So. Am. **118**. 1878; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. **4**²: 170. 1895; Woodson, Ann. Missouri Bot. Gard. **23**: 205. 1936.

Lianas; leaves opposite, eglandular; inflorescence alternate-lateral to subterminal, few-flowered; calyx 5-parted, the lobes subequal, destitute of squamellae; corolla infundibuliform, the limb 5-parted; anthers connivent, with an enlarged, narrowly lobed connective; ovary apocarpous, containing many ovules, surrounded by 5 separate nectaries; fruit a pair of elongate, terete follicles containing numerous comose, rostrate seeds.

Type species: *Rh. Pohlii* Muell.-Arg. (Colombia, Venezuela, Brazil, Paraguay, Argentina).

1. *RHABDADENIA BIFLORA* (Jacq.) Muell.-Arg. in Mart. Fl. Bras. **6**¹: 175. 1860; Miers, Apoc. So. Am. **121**. 1878; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. **4**²: 170. 1895; Woodson, Ann. Missouri Bot. Gard. **23**: 206. 1936.

Slender to rather stout, wholly glabrous lianas; leaves obovate-oblong to lanceolate, abruptly mucronulate, pale yellowish green, 5 to 12 cm. long, 1.5 to 5.0 cm. broad, the petioles 1 to 2 cm. long; inflorescences about equaling the leaves, bearing 1 to 5 showy, cream-colored flowers; calyx lobes ovate-oblong, mucronulate, subfoliaceous, spreading; corolla infundibuliform, the proper tube 1.5 to 2.0 cm. long, about 0.2 cm. in diameter at the base, the throat conical, 2 to 3 cm. long, about 1.5 cm. in diameter, the lobes obliquely obovate, 2.0 to 2.5 cm. long.—Extreme peninsular Florida; Cuba; Jamaica; Hispaniola; Puerto Rico; Mexico (Yucatan, Campeche, Quintana Roo); British Honduras; Panama (Colon, Canal Zone); Colombia (Magdalena); the Guianas; northeastern Brazil (Para, Maranhão).

YUCATAN: Manglares, *Schott 812*. Progreso, *Flores s. n.* Port Silam, *Gaumer 653*. Las Bocas de Silam, *Gaumer 23335*. CAMPECHE: Champoton, *Steere 1910, 1936, 1937*. QUINTANA ROO: Tancah, *Steere 2578, 2579*. BRITISH HONDURAS: Corozal District—Pueblo Nuevo, *Lundell 4792*. Orange Walk District—Honey Camp, *Lundell 627*. Belize District—Belize—Sibun River road, *Gentle 10*; Belize, *Lundell 1813, 4055*. Stann Creek District—Stann Creek, *Schipp 148, 376, 491*.

OBSERVATIONS: Apparently always found in low ground adjacent to the coast, frequently in mangrove swamps.

27. LAUBERTIA A. DC.

- LAUBERTIA A. DC. in DC. Prodr. **8**: 486. 1844; K. Sch. in Engl. & Prantl, Nat. Pflanzenfam. **4**²: 170. 1895; Woodson, Ann. Missouri Bot. Gard. **23**: 370. 1936.

Streptotrachelus Greenm. Proc. Amer. Acad. **32**: 298. 1897.

Rather stout lianas; leaves opposite, rarely verticillate, eglandular; inflorescences cymose, dichotomous or trichotomous, alternate-lateral to terminal, several-flowered; calyx 5-parted, the lobes essentially equal, subfoliaceous, destitute of squamellae; corolla salverform, the tube spirally twisted (in our species), with a callose orifice, but without appendages within, the limb 5-parted; anthers connivent, with an enlarged, narrowly lobed connective; ovary apocarpous, containing many ovules, surrounded by 5 separate or crescent nectaries; fruit a pair of elongate, terete follicles containing many comose seeds.

Type species: *L. Boissieri* A. DC. (Ecuador; Peru).

1. *LAUBERTIA PENINSULARIS* Woodson, Ann. Missouri Bot. Gard. **23**: 374. 1936.

Rather stout lianas, minutely and closely ferruginous-tomentulose throughout; leaves ovate-elliptic, acuminate, 6 to 13 cm. long, 4 to 7 cm. broad, membranaceous, the petioles 2.0 to 2.3 cm. long; inflorescence somewhat shorter than the leaves, bearing 10 to 20 cream-colored flowers; calyx lobes oblong-elliptic, acute, 0.9 to 1.1 cm. long; corolla tube 1.3 to 1.4 cm. long, about 0.25 cm. in diameter at the base, the lobes obliquely obovate, 0.9 to 1.0 cm. long, reflexed; anthers barely included.—British Honduras.

BRITISH HONDURAS: Toledo District—British Honduras-Guatemala boundary survey, *Schipp s. n.*

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XVI

The Bromeliaceae of the Yucatan Peninsula

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With twenty text figures

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THE BROMELIACEAE OF THE YUCATAN PENINSULA

Among the Bromeliaceae are some of the most conspicuous elements of the flora of the Yucatan Peninsula. A familiar sight among Maya ruins, along rivers, in villages, on hill-tops, and in savannas are the trees burdened with epiphytic bromeliads. A few species of *Tillandsia*, namely *T. Schiedeana*, *T. Balbisiana*, *T. festucoides*, *T. juncea*, *T. polystachya*, *T. fasciculata*, and *T. Valenzuelana*, along with *Aechmea bracteata*, comprise the bulk of this growth. With its large, brilliantly red bracts, *Aechmea bracteata* is the most conspicuous single species; it usually grows in masses in crotches of trees. On the low sand dunes along the north coast of the state of Yucatan, *Tillandsia dasylyriifolia* is one of the characteristic plants.

Of the species strictly terrestrial, *Bromelia Karatas* has a wider distribution and occurs in greater abundance than any of the other bromeliads. It is especially prominent in the deciduous forest in the vicinity of Chichen Itza, Yucatan, and in marginal forests bordering the savannas of central Peten, Guatemala.

In the high advanced forests with closed canopy, epiphytic bromeliads are not as evident as in open country, although the number of species appears to be greater. This is especially true in the wet forests of southern British Honduras. A few species, such as *Vriesia heliconioides*, grow on tree trunks in the dense shade of rain forest; others, such as *Catopsis Lundelliana*, have been found only in the crowns of the tallest trees.

Exclusive of the pineapple, which is found only in cultivation in our area, the bromeliad flora of the Yucatan Peninsula now totals 52 species in 10 genera. The distribution within the peninsula is given in Table I.

TABLE I

Genera	Yucatan	Campeche	Quintana Roo	British Honduras	Peten	Total
<i>Pitcairnia</i>.....	...	...	...	2	1	2
<i>Hechtia</i>	1	...	...	...	...	1
<i>Tillandsia</i>	10	2	7	21	14	26
<i>Vriesia</i>.....	...	...	...	3	2	3
<i>Guzmania</i>.....	...	...	...	2	...	2
<i>Catopsis</i>	1	...	...	8	3	8
<i>Billbergia</i>.....	...	...	...	1	1	1
<i>Bromelia</i>	3	...	1	1	1	3
<i>Aechmea</i>	1	...	2	4	4	5
<i>Androlepis</i>.....	...	...	...	1	1	1
TOTAL.....	16	2	10	43	27	52

In British Honduras 43 species are represented, compared with 16 in the state of Yucatan, the driest section of the peninsula. Nine of the British Honduran species were found by Mr. W. A. Schipp in the mountainous country along the Peten border, and are known from single collections in our area. Further exploration in Campeche and Quintana Roo doubtless will give those areas a representation comparable to that of Peten. Although future collecting will unquestionably increase the number of species for the peninsula, probably double the present total, the increase doubtless will be greatest in the wet mountainous interior of southern British Honduras, and southern Peten.

The geographic distribution of the Bromeliaceae of the Yucatan Peninsula is presented in Table 2. Of the 52 species, 41 are represented elsewhere in Central America and 36 in Mexico proper; hence the closest affinities of the bromeliaceous flora are with those regions. The South American and Antillean affinities are about equal, 26 and 22 respectively. Nine of the species range into the southern United States, notably into southern Florida. The four endemic species, *Tillandsia chlorophylla*, *Vriesia Schippii*, *Pitcairnia petiolata*, and *Billbergia viridiflora*, are known only from Peten and southern British Honduras. The last two were originally described from cultivation without origin designated.

TABLE 2

Genera	Endemic	Southern United States	Mexican	Central American	Antillean	South American	Total
<i>Pitcairnia</i>	1	...	1	...	...	1	2
<i>Hechtia</i>.....	...	...	1	...	...	...	1
<i>Tillandsia</i>	1	7	21	22	16	14	26
<i>Vriesia</i>	1	...	...	2	...	1	3
<i>Guzmania</i>.....	...	...	1	2	1	1	2
<i>Catopsis</i>.....	...	2	5	8	3	3	8
<i>Billbergia</i>	1	...	...	...	...	...	1
<i>Bromelia</i>.....	...	...	3	3	2	2	3
<i>Aechmea</i>.....	...	...	4	3	...	4	5
<i>Androlepis</i>.....	...	...	...	1	...	...	1
TOTAL.....	4	9	36	41	22	26	52

In constructing the keys and descriptions in this paper the characters of only the local species have been taken into account. The selection of illustrations has been threefold: species of economic importance to the Indians, species useful in clarifying the keys, and species never before illustrated. No new species are presented here, but the distribution of several is notable. The material studied is largely from the University of Michigan Herbarium, the Gray Herbarium, the Field Museum of Natural History, the United States National Herbarium, the Missouri Botanical Garden, the British Museum of Natural History, and the herbarium of the Royal Botanic Garden at Kew.

BROMELIACEAE J. St.-Hil.

Herbs, largely epiphytic; leaves usually basal, imbricate, elongate with a dilated base, simple, entire or spinose-serrate, bearing peltate scales at least when young; inflorescence simple or compound, usually bearing conspicuous bracts; flowers perfect or with only the stamens or pistil functional; perianth heterochlamydeous; sepals 3, firmer than the petals; petals 3; stamens 6; style 3-parted, ovary superior to inferior, 3-celled; fruit capsular or baccate; seeds naked, winged or plumose, embryo small, basal, endosperm mealy.

Ovary wholly or partly superior; fruit capsular; seeds appendaged.

Seeds caudate or winged, not plumose; leaves either petiolate or coarsely serrate.

Flowers perfect, 45 mm. long or more; inflorescence simple 1. PITCAIRNIA

Flowers functionally dioecious, 6 to 7 mm. long; inflorescence amply paniculate 2. HECHTIA

Seeds plumose; leaves entire, not petiolate.

Flowers distichous or single.

Petals naked 3. TILLANDSIA

Petals bearing 2 scales near the base; inflorescence simple; leaf-blades ligulate; scape-bracts polystichous; floral bracts equaling or exceeding the sepals 4. VRIESIA

- Flowers polystichous.
 Floral bracts imbricate; sepals symmetric; seed-appendage basal, straight.
 Petals free; leaf-blades narrowly triangular or filiform 3. TILLANDSIA
 Petals fused or agglutinated; leaf-blades ligulate 5. GUZMANIA
 Floral bracts remote; sepals usually asymmetric; seed-appendage apical,
 folded over 6. CATOPSIS
 Ovary inferior; fruit baccate; seeds naked; leaves mostly serrate.
 Ovaries remaining distinct; inflorescence without a foliaceous coma.
 Pedicels 4 to 5 cm. long, very slender; pollen-grains sulcate; sepals unarmed 7. BILLBERGIA
 Pedicels short or none.
 Petals attached to the filament tube but with free margins, fleshy, 25 to 40
 mm. long; inflorescence densely floccose or lepidote 8. BROMELIA
 Petals free.
 Petals bearing 2 scales; anthers unappendaged 9. AECHMEA
 Petals naked; anthers bearing 2 large scales; spikes subglobose or ovoid,
 short, 1- to 5-flowered 10. ANDROLEPIS
 Ovaries fusing into a syncarp; inflorescence bearing a coma of foliaceous bracts 11. ANANAS

I. PITCAIRNIA L'Hérit.

Plants terrestrial; leaves fasciculate, petiolate, their sheaths small, their blades lanceolate; inflorescence simple; flowers perfect, subsessile or pedicellate; sepals free; petals free, slightly zygomorphic, appendaged; stamens about equaling the petals; ovary partly superior; ovules numerous, caudate; fruit capsular.

- Inflorescence lax at base; floral bracts shorter than the sepals 1. *P. recurvata*
 Inflorescence dense throughout; floral bracts exceeding the sepals 2. *P. petiolata*

1. PITCAIRNIA RECURVATA (Scheidw.) K. Koch, Ind. Sem. Hort. Berol. 1857: App. 4. 1858.

Puya recurvata Scheidw. Allg. Gart. 10: 275. 1842.

Up to 15 dm. tall; rhizome elongate; leaves entire, some reduced to short broad dark brown sheaths, others with a long channeled petiole and a linear-lanceolate acuminate blade up to 1 m. long and 4 cm. wide, glabrous above, white-furfuraceous beneath; scape stout, white-furfuraceous; inflorescence racemose, lax except near the apex, up to 45 cm. long; floral bracts broadly ovate, acute, erect, rose or green, soon glabrous; pedicels 2 cm. long; sepals oblong, 20 to 25 mm. long; petals yellowish white; ovary half superior.—Terrestrial; on limestone hilltops and cliffs in Peten; Veracruz, British Honduras, Guatemala, and Colombia.

BRITISH HONDURAS: Toledo District—Camp 34, British Honduras—Guatemala boundary survey, *Schipp* S-808. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2921, 3770. San Andres, Lake Peten, *Lundell* 3217.

LOCAL NAME: *Azucena silvestre* (*Lundell* 3217, 3770).

2. PITCAIRNIA PETIOLATA (Koch & Bouché) Baker, Jour. Bot. 19: 307. 1881. FIG. 1.

Neumannia petiolata Koch & Bouché; K. Koch, Ind. Sem. Hort. Berol. 1856: App. 2. 1857.

Plant about 1 m. high; leaves with long serrulate petioles; blades 8 to 9 dm. long, 30 to 55 mm. wide, acuminate, entire, soon glabrous; scape elongate, its bracts imbricate, the lower ones subfoliaceous, the upper ovate, acuminate, brownish purple; inflorescence subspicate, up to 4 dm. long, 4 cm. thick; floral bracts broadly ovate, acute, 55 mm. long, brownish purple; flowers 45 to 60 mm. long, glabrous; pedicels stout; sepals 20 to 24 mm. long, abruptly acuminate; petals greenish white or yellow; ovary nearly all superior.—Terrestrial; in peat soil in deep forest at Middlesex, and along sandy ravines and open banks of streams in granitic Mountain Pine Ridge, British Honduras; British Honduras and Guatemala.

BRITISH HONDURAS: Stann Creek District—Middlesex, *Schipp* 456. El Cayo District—Mountain Pine Ridge, *Bartlett* 11929; San Agustin, banks of Rio Frio, *Lundell* 6566.

In living plants, bracts of the inflorescence are reddish, and the petals are yellow (*Lundell* 6566).

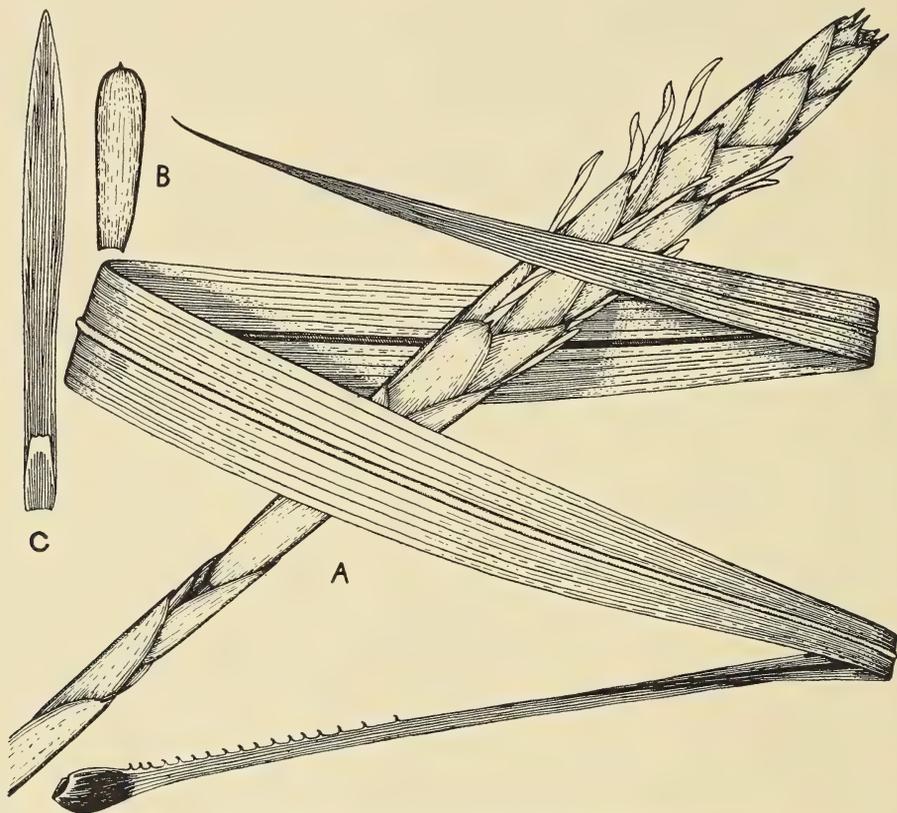


FIG. 1.—*Pitcairnia petiolata* (Koch & Bouché) Baker
A, plant, half nat. size; B, sepal; C, petal. (B, C, nat. size.)

2. HECHTIA KL.

1. HECHTIA SCHOTTII Baker; Hemsl. Biol. Centr. Am. Bot. **3**: 318. 1884.

Hechtia bracteata Mez in DC. Monog. Phan. **9**: 550. 1896.

Hechtia myriantha Mez, Engl. Bot. Jahrb. **30**: Beibl. 67: 6. 1901.

Hechtia macrophylla Greenman, Field Mus. Publ. Bot. **2**: 247. 1907.

A coarse herb, probably over 2 m. high; leaves 5 to 10 dm. long; blades narrowly triangular, acuminate, pungent, laxly spinose-serrate with hooked teeth 5 mm. long, glabrous above, finely pale-lepidote beneath; scape erect, stout; inflorescence laxly and amply paniculate, pyramidal, 1 m. in diameter, densely pale-flocculose; primary bracts ovate, acuminate, up to 6 cm. long, dark brown; branches straight, slender, laxly flowered except near apex; floral bracts broadly ovate, 4 to 5 mm. long, about equaling the sepals, thin; flowers functionally dioecious, subspreading, subsessile, 6 to 7 mm. long; sepals broadly elliptic, obtuse, 4 mm. long; petals broadly elliptic, short-connate; capsule ovoid, acute, 9 mm. long; seeds with a small blunt wing.—Terrestrial; Veracruz and Yucatan.

YUCATAN: Maxcanu, *Schott 645* (type in British Museum); *Gaumer 23839*. Xcholac, *Gaumer 578*. Without definite locality, *Gaumer 24449*.

As shown by *Gaumer 24449*, the plant produces long stout stolons.

3. TILLANDSIA L.

Mostly epiphytic, caulescent or acaulescent herbs of very variable size and habit; leaves polystichous or distichous, linear, ligulate or narrowly triangular, entire; scape usually elongate; inflorescence from amply compound to 1-flowered, usually of distichous-flowered spikes, rarely simple and polystichous-flowered; flowers perfect; sepals free or the posterior ones joined; petals free, naked; stamens from exerted to deeply included; ovary superior; fruit a capsule; seeds slender, their coma white, straight, basal.

Floral bracts less than twice as long as the internodes.

Leaf-blades 1 cm. or more wide; sepals 14 to 25 mm. long.

Floral bracts strongly nerved; branches merely flexuous 1. *T. utriculata*

Floral bracts even or but faintly nerved near the margin; branches usually geniculate 2. *T. dasyliiriifolia*

Leaf-blades 1 to 2 mm. wide; sepals 7 to 8 mm. long 3. *T. filifolia*

Floral bracts at least twice as long as the internodes or the inflorescence 1-flowered.

Leaf-blades ligulate, 15 to 70 mm. wide.

Inflorescence of many spikes; sepals 6 to 20 mm. long.

Sepals asymmetric, 6 to 7 mm. long 4. *T. Rothschuhian*

Sepals symmetric, 15 to 20 mm. long.

Sheaths of the primary bracts all shorter than the usually divided axillary branches 5. *T. excelsa*

Sheaths of the primary bracts exceeding the lowest of the always simple branches 6. *T. Leiboldiana*

Inflorescence of one or a few spikes.

Floral bracts ecarinate; scape-bracts polystichous 7. *T. grandis*

Floral bracts sharply carinate; scape-bracts distichous 8. *T. multicaulis*

Leaf-blades narrowly triangular or linear.

Plants with a distinct stem; leaf-blades very narrow; inflorescence simple.

Leaves polystichous; scape elongate, covered by its bracts 9. *T. Schiedeana*

Leaves distichous; scape largely naked or lacking.

Stem 1 to 10 cm. long; scape conspicuous 10. *T. recurvata*

Stem up to 8 m. long; scape none 11. *T. usneoides*

Plants stemless.

Flowers obviously distichous; primary bracts shorter than the spikes or the inflorescence simple.

Flowers spreading; floral bracts separated 12. *T. monadelph*

Flowers erect or suberect; floral bracts imbricate.

Leaf-sheaths inflated, forming a pseudobulb.

Floral bracts coriaceous, nearly or quite even; leaf-blades straight or arched 13. *T. Balbisiana*

Floral bracts thin; leaf-blades coiled or contorted.

Leaves and bracts finely appressed-lepidote.

Leaf-blades abruptly contracted from the sheaths; floral bracts 15 mm. long 14. *T. bulbosa*

Leaf-blades merging into the sheaths; floral bracts 20 to 35 mm. long 15. *T. circinnata*

Leaves and bracts coarsely spreading-lepidote.

Leaf-blades mostly flat, the outer ones spirally recurved 16. *T. streptophylla*

Leaf-blades involute-subulate; scape none 17. *T. pruinos*

Leaf-sheaths nearly or quite flat, open.

Leaf-blades linear-subulate to filiform; leaves fasciculate.

Spikes arching-recurved, slender 18. *T. festucoides*

Spikes straight, erect, stout 19. *T. juncea*

Leaf-blades definitely if narrowly triangular.

Floral bracts coriaceous, nearly or quite even.

Spikes not over 12 mm. wide; leaf-sheaths pale 20. *T. polystachya*

- Spikes up to 40 mm. wide; leaf-sheaths castaneous.
 Sepals alate; bracts massed below the inflorescence 21. *T. punctulata*
 Sepals merely carinate; bracts not massed below
 the inflorescence 22. *T. fasciculata*
 Floral bracts thin, prominently nerved.
 Floral bracts shorter than the sepals 23. *T. chlorophylla*
 Floral bracts exceeding the sepals.
 Lower primary bracts long-acuminate or the in-
 florescence simple 24. *T. Valenzuelana*
 Lower primary bracts merely apiculate 25. *T. subimbricata*
 Flowers polystichous or the primary bracts concealing them and
 making them appear so.
 Leaf-blades linear-subulate to filiform; scape long, slender . . . 19. *T. juncea*
 Leaf-blades narrowly triangular; scape short and obscured by the
 leaves 26. *T. brachycaulos*

1. *TILLANDSIA UTRICULATA* L. Sp. Pl. 286. 1753.

FIG. 2.

Stemless, up to 2 m. high; leaves 4 to 10 dm. long, obscurely lepidote; blades narrowly triangular, 2 to 7 cm. wide; scape erect, elongate, its lower bracts subfoliaceous and imbricate; inflorescence amply and laxly paniculate or rarely simple, glabrous; primary bracts shorter than the elongate sterile bases of the branches; ultimate branches up to 35 cm. long, lax; rhachis slender, undulate; floral bracts erect, remote, obtuse, ecarinate, strongly nerved, much shorter than the sepals; flowers erect; pedicels up to 5 mm. long; sepals narrow, obtuse, 14 to 18 mm. long; petals white, 3 to 4 cm. long; stamens exserted.—Epiphytic in forests; Georgia, Florida, West Indies, Tamaulipas, British Honduras, Venezuela.

BRITISH HONDURAS: Belize District—Gracie Rock, Sibun River, *Gentle 1696*.

2. *TILLANDSIA DASYLIRIIFOLIA* Baker, Jour. Bot. 25: 304. 1887.

FIG. 3.

Stemless, up to 15 dm. high; leaves 7 dm. long, obscurely lepidote; blades narrowly triangular, 6 cm. wide; scape erect, elongate; inflorescence lax, usually amply paniculate, glabrous; primary bracts short; branches suberect to ascending, up to 45 cm. long, laxly flowered; rhachis stout, geniculate; floral bracts broadly ovate, ecarinate, remote, shorter than the sepals, coriaceous, nearly or quite even; flowers erect; sepals obtuse, 25 mm. long; petals white or greenish, 3 to 4 cm. long; stamens exserted.—Abundant as a terrestrial on sand dunes of the north coast of Yucatan; frequent as an epiphyte on trees of coastal forests of Yucatan and in the savanna country of central Peten; southern Mexico to Honduras.

YUCATAN: Silam, *Gaumer 651*. Progreso, *Gaumer 23224*; *Lundell & Lundell 7391*. QUINTANA ROO: Holbox Island, *Gaumer* (type in herb. Kew). Lake Chichankanab, *Gaumer 1905*. BRITISH HONDURAS: Belize District—Belize, *O'Neill 8510*. GUATEMALA: Dept. Peten, La Libertad, *Lundell 2552, 2630, 2643, 2912*.

A very sticky white honey-like gum exudes from the axils of the bracts, according to *Gaumer 23224*.

3. *TILLANDSIA FILIFOLIA* Schlecht. & Cham. Linnaea 6: 53. 1831.

Plant 30 cm. high; leaves many, rosulate, 15 to 30 cm. long, densely cinereous-lepidote, blades filiform, 1 mm. broad; scape erect, 1 mm. thick, its bracts barely imbricate, mostly filiform-caudate; inflorescence laxly paniculate, 15 cm. long; primary bracts very short; spikes laxly 10- to 16-flowered; rhachis very slender, flexuous; floral bracts elliptic, 7 to 8 mm. long, submembranaceous, strongly nerved; flowers suberect; sepals elliptic, 7 to 8 mm. long; petals pale lilac, 10 mm. long; stamens barely exserted.—Epiphytic in wet forests; rare in the Yucatan Peninsula; southern Mexico to Costa Rica.

BRITISH HONDURAS: Stann Creek District—Cockscomb Mountains, *Schipp S-104*. El Cayo District—Valentin, *Lundell 6226*. GUATEMALA: Dept. Peten, Santa Teresa, Subin River, *Lundell 2680*.

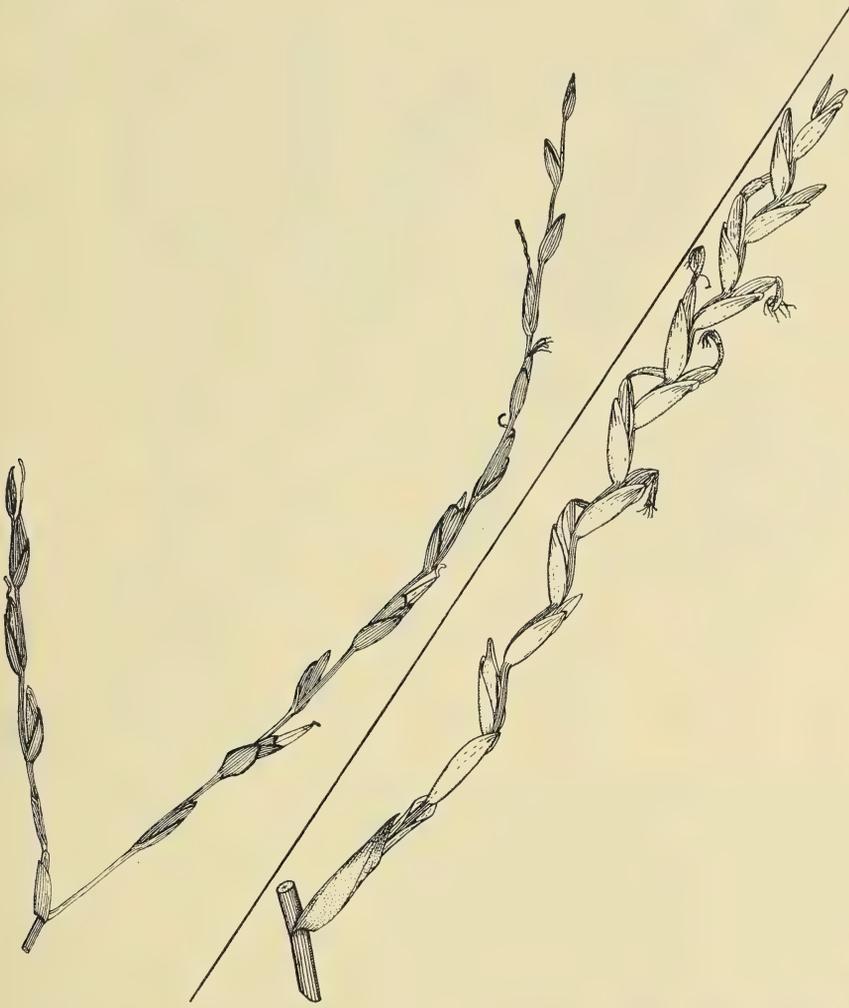


FIG. 2—*Tillandsia utriculata* L.
Spikes, half nat. size.

FIG. 3—*Tillandsia dasyliriifolia* Baker
Spike, half nat. size.

4. *TILLANDSIA ROTSCHUHIANA* Mez in DC. Monog. Phan. **9**: 645. 1896, in key; Engl. Bot. Jahrb. **30**: Beibl. 67: 8. 1901. FIG. 4.

Plant 45 to 55 cm. high; leaves rosulate, 25 cm. long, finely appressed-lepidote; blades ligulate, acute, 2 cm. wide; scape erect, its bracts imbricate, elliptic, acute; inflorescence densely paniculate, 15 cm. long; primary bracts shorter than the spikes; spikes strict, 5 cm. long, densely 10-flowered; floral bracts imbricate, very broadly ovate, obtuse, 9 mm. long, ecarinate, even, glabrous; sepals asymmetric, obovate, truncate, 7 mm. long.—Epiphytic in mountain forests; British Honduras and Nicaragua.

BRITISH HONDURAS: Toledo District—Camp 34, British Honduras—Guatemala boundary survey, Schipp S-813.

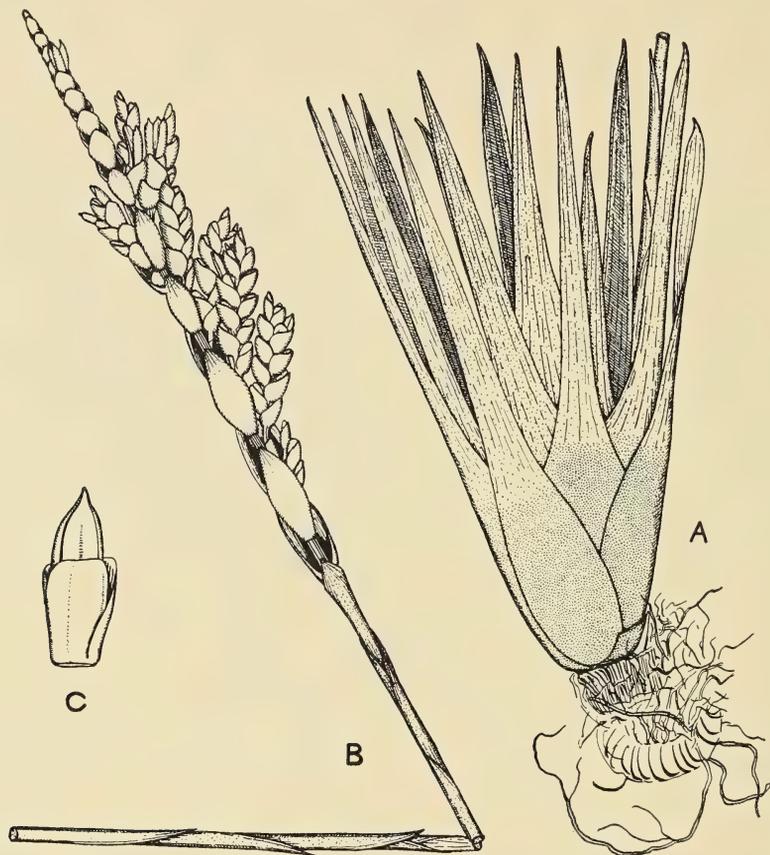


FIG. 4—*Tillandsia Rothschuhiana* Mez
A, leaf-rosette; B, scape and inflorescence; C, sepals and capsule.
(A, B, half nat. size; C, one and one-half times nat. size.)

5. *TILLANDSIA EXCELSA* Griseb. Fl. Brit. W. Ind. 597. 1864.

Often over 1 m. high; leaves rosulate, 45 cm. long, obscurely lepidote; blades ligulate, acute, 6 cm. wide or less; scape erect; scape-bracts foliaceous and concealing the scape; inflorescence amply paniculate, pyramidal, glabrous; primary bracts foliaceous, large; spikes densely 8-flowered; floral bracts imbricate but exposing the rhachis, narrowly elliptic, acute, ecarinate, exceeding the sepals; sepals narrowly lanceolate, acute, 15 to 20 mm. long; petals 30 mm. long, violet; stamens included.—Epiphytic or growing as a terrestrial in peaty soil in swamp forest shade; common (Schipp); Central America, Cuba, and Jamaica.

BRITISH HONDURAS: Toledo District—Camp 36, British Honduras—Guatemala boundary survey, Schipp S-815.

6. *TILLANDSIA LEIBOLDIANA* Schlecht. Linnaea 18: 414. 1844.

Stemless, up to 6 dm. high; leaves rosulate, 1 to 3 dm. long; blades ligulate, acute, 25 mm. wide, obscurely lepidote; scape usually erect; scape-bracts foliaceous but the uppermost red,

concealing the scape; inflorescence compound with simple branches, 1 to 3 dm. long; primary bracts large, mostly exceeding the spikes, red or red and green; spikes sessile, narrow, acute, 7-flowered, 6 cm. long; floral bracts imbricate, narrowly ovate, acute, 2 cm. long, usually concealing the rhachis, carinate, glabrous; sepals 16 mm. long; petals 3 cm. long, violet; stamens included.—An epiphyte in dense forest shade; common at high altitude (Schipf); Veracruz to Costa Rica.

BRITISH HONDURAS: Toledo District—Camp 34, British Honduras—Guatemala boundary survey, *Schipf S-810*.

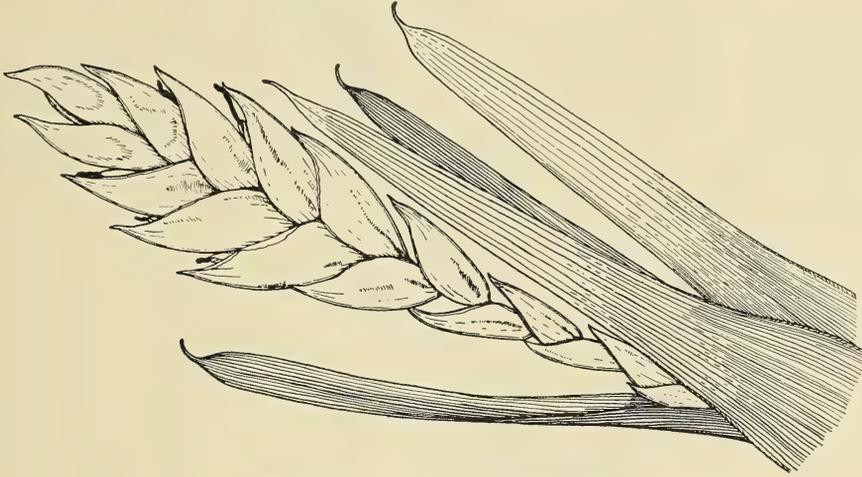


FIG. 5.—*Tillandsia multicaulis* Steud.
Plant, half nat. size.

7. *TILLANDSIA GRANDIS* Schlecht. *Linnaea* 18: 424. 1844.

Platystachys viridiflora Beer, *Bromel.* 81. 1857.

Tillandsia viridiflora Baker, *Jour. Bot.* 26: 81. 1888.

Plant 5 to 20 dm. high; leaves rosulate, up to 55 cm. long; blades ligulate, acute or acuminate, 3 to 7 cm. high; scape erect, stout; scape-bracts imbricate, the lower foliaceous; inflorescence simple or few-branched, pale green; primary bracts very short; racemes spreading or ascending, bracteate at base, oblong, up to 3 dm. long and 7 cm. wide; rhachis stout; floral bracts spreading at anthesis, broad, 3 to 5 cm. long, ecarinate, even, glabrous; pedicels 1 cm. long; sepals elliptic, obtuse, ecarinate, 30 to 45 mm. long; petals 8 to 12 cm. long, green or greenish white, flaccid after anthesis; stamens exerted.—Epiphytic in forests or terrestrial on cliffs; southeastern Mexico to British Honduras.

BRITISH HONDURAS: Toledo District—Camp 32, British Honduras—Guatemala boundary survey, *Schipf S-811*.

8. *TILLANDSIA MULTICAULIS* Steud. *Nom. Bot. ed. 2.* 2: 688. 1841.

FIG. 5.

Tillandsia caespitosa Schlecht. & Cham. *Linnaea* 6: 54. 1831. Not *T. caespitosa* LeConte, 1828.

Leaves densely rosulate, 3 to 4 dm. long, obscurely lepidote; sheaths large, colored; blades ligulate, acute, 35 mm. wide; scapes several from the leaf-axils, erect, slender; scape-bracts imbricate, carinate, distichous; inflorescences simple, acute, complanate, 14 cm. long, 4 to 6 cm. wide, glabrous; floral bracts imbricate, sharply carinate, 5 cm. long, bright red; sepals narrow, elliptic, 36 mm. long; petals 7 cm. long, blue; stamens exerted.—Epiphytic in dense forests; Veracruz to Panama.

BRITISH HONDURAS: Toledo District—Camp 34, British Honduras—Guatemala boundary survey, *Schipp S-809*.

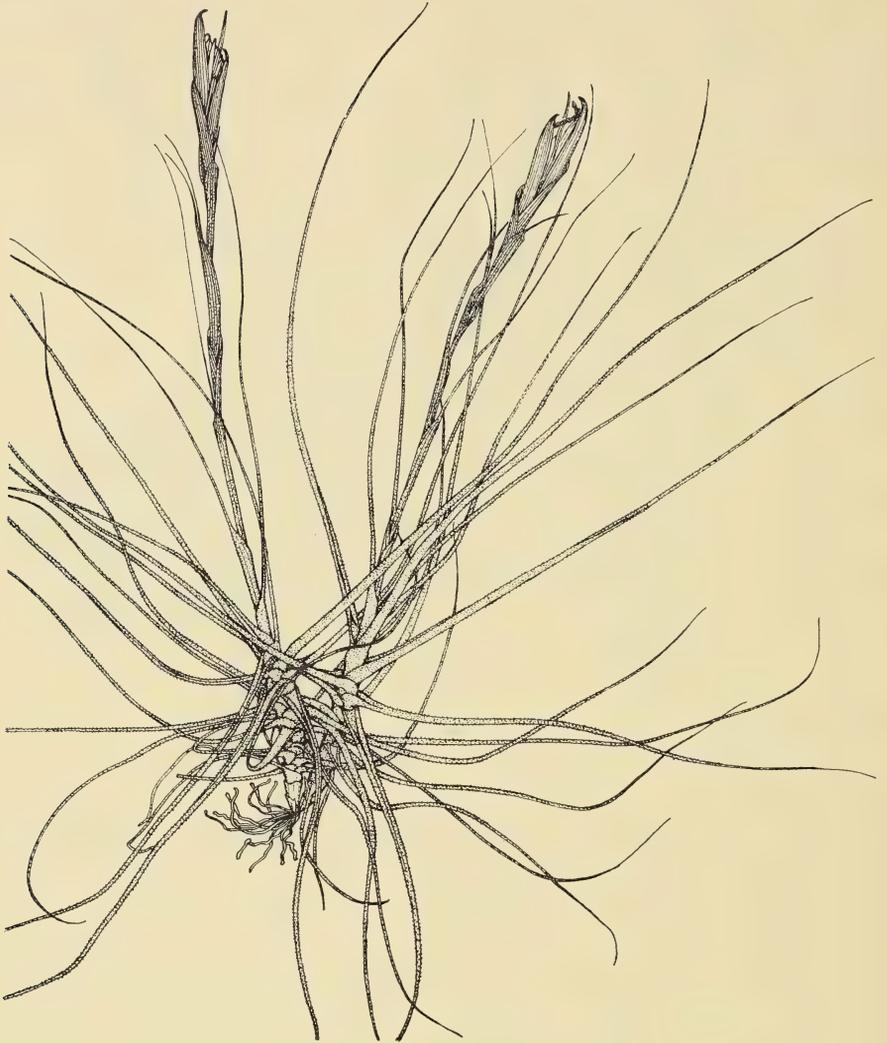


FIG. 6—*Tillandsia Schiedeana* Steud.
Plant, half nat. size.

9. *TILLANDSIA SCHIEDEANA* Steud. *Nom. Bot.* ed. 2: 688. 1841.

Tillandsia vestita Schlecht. & Cham. *Linnaea* 6: 52. 1831. Not *T. vestita* Willd. 1830.

Caulicent, up to 4 dm. long; stem simple or few-branched; leaves polystichous, up to 25 cm. long, densely lepidote with the scales appressed to spreading; blades very narrow, filiform-acuminate, involute; scape erect, slender; its bracts imbricate, the lower ones foliaceous; inflorescence simple, lanceolate, acute, terete, 7 cm. long, 8 mm. thick, dense; floral bracts lance-elliptic, obtuse or apiculate, 3 cm. long, thin, nerved, roseate, glabrous or lepidote; sepals acute, 2 cm. long; petals yellow, 46 mm. long; stamens exerted.—

FIG. 6.

Epiphytic; abundant in forest throughout the Yucatan Peninsula; Mexico and the West Indies to Colombia and Venezuela.

YUCATAN: Merida, *Schott 161*, Izamal, *Gaumer 427*; *Greenman 402*. Port Silam, *Gaumer 664*. Chichen Itza, *Lundell & Lundell 7334*. Without definite locality, *Gaumer 24422*. CAMPECHE: Tuxpeña, *Lundell 1383*. QUINTANA ROO: Lake Chichankanab, *Gaumer 1767*, 1914. BRITISH HONDURAS: El Cayo District—El Cayo, *Bartlett 11970*, 12906; Cohune Ridge, *Lundell 6449*; near Camp 6, *Genile 2374*; El Cayo, *Chanek 115*. Toledo District—*Peck 944*; Rio Grande, *Schipp S-455*. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett 12287*. Tikal, *Bartlett 12651*. La Libertad, *Lundell 2517*, 2534, 2592, 3929.

LOCAL NAME: *Xeen* (Millsp. Field Mus. Bot. **1**: 291. 1896).

10. *TILLANDSIA RECURVATA* L. Sp. Pl. ed. 2. 410. 1762.

Renealmia recurvata L. Sp. Pl. 287. 1753.

Diaphoranthema recurvata Beer, Bromel. 156. 1857.

Plants often in dense masses; stems simple or few-branched, 1 to 10 cm. long; roots present; leaves distichous, 3 to 17 cm. long, pruinose-lepidote; blades suberect to recurved, linear, terete, 0.5 to 2 mm. thick; scape terminal, up to 13 cm. long, 0.5 mm. thick; scape-bracts 1 or 2 just beneath the inflorescence, narrowly lanceolate, lepidote; inflorescence usually 1- or 2-flowered; floral bracts like the scape-bracts but smaller, longer or shorter than the sepals, lepidote; flowers erect; sepals lanceolate, 4 to 9 mm. long, thin; petals narrow, white or pale violet; stamens deeply included, exceeding the pistil.—Epiphytic in thickets and open woods; extreme southern United States to Argentina and Chile.

YUCATAN: Merida, *Schott 35*. Port Silam, *Gaumer 659*. San Anselmo, *Gaumer 1912*. Izamal, *Greenman 401*. QUINTANA ROO: Lake Chichankanab, *Gaumer 1913*.

11. *TILLANDSIA USNEOIDES* L. Sp. Pl. ed. 2. 411. 1762.

Renealmia usneoides L. Sp. Pl. 287. 1753.

Dendropogon usneoides Raf. Fl. Tell. **4**: 25. 1838.

Strepsia usneoides Steud. Nom. Bot. ed. 2. **2**: 645. 1841.

Plant forming slender branching strands up to 8 m. long; roots absent; stem less than 1 mm. thick, sympodial, the internodes 3 to 6 cm. long with only the extreme base covered by the leaves, curved; leaves distichous, 5 cm. long, densely lepidote; blades filiform; scape lacking; inflorescence 1-flowered; floral bract shorter than the sepals, ovate, lepidote; sepals acute, 7 mm. long, thin, glabrous; petals narrow, 9 to 11 mm. long, pale green or blue; stamens deeply included, exceeding the pistil.—Hanging from trees often in dense masses; locally abundant in the Yucatan Peninsula; Virginia and Texas to Argentina and Chile.

YUCATAN: Port Silam, *Gaumer 663*. GUATEMALA: Dept. Peten: Uaxactun, *Bartlett 12226*. Yaxha, *Lundell 2210*.

LOCAL NAMES: *Umex nohoch uinic*, *paste* (*Bartlett 12226*); *mex-nuxib*, *barba española* (Millsp. Field Mus. Bot. **1**: 292. 1896); *meexnuxib*, *soscilchac* (Standl. Field Mus. Bot. **3**: 322. 1930).

12. *TILLANDSIA MONADELPHA* (E. Morren) Baker, Jour. Bot. **25**: 281. 1887.

FIG. 7.

Phytarrhiza monadelpha E. Morren, Belg. Hort. **32**: 168. 1882.

Tillandsia monobotrya Mez, Repert. Sp. Nov. **16**: 77. 1919.

Tillandsia digitata "Mez" Standley, Smithson. Misc. Coll. **78**^s: 12. 1927. Not *T. digitata* Mez, 1896.

Plant up to 35 cm. high; leaves rosulate, 2 dm. long, obscurely lepidote, blades narrowly triangular, 10 to 15 mm. wide; scape erect, slender; scape-bracts imbricate, lance-elliptic; inflorescence simple, complanate; rhachis exposed, straight, angled; floral bracts ovate,

acute, 17 mm. long, equaling the sepals, carinate, soon glabrous; flowers spreading, 3 cm. long; sepals lance-elliptic; petals white with ovate reflexed blade; stamens deeply included, exceeding the style.—Epiphytic in wet forests; British Honduras to Ecuador and Guiana.

BRITISH HONDURAS: Stann Creek District—Middlesex, *Schipp* 390.



FIG. 7.—*Tillandsia monadelpha* (E. Morren) Baker
Plant, half nat. size.

13. *TILLANDSIA BALBISIANA* Schultes in R. & S. Syst. Veg. 7: 1212. 1830.

Plants up to 65 cm. high; leaves rosulate, minutely lepidote; sheaths forming a slender pseudobulb up to 12 cm. long; blades sharply spreading or recurved, narrowly triangular, 1 cm. wide, involute; scape erect or suberect, slender; scape-bracts imbricate, the lower ones subfoliaceous; inflorescence usually few-branched, slender; sheaths of the primary bracts shorter than the spikes; spikes sessile, linear, complanate, up to 12 cm. long and 1 cm. wide; floral bracts imbricate, ovate, 15 to 22 mm. long, exceeding the sepals, nearly or quite even, usually glabrous, ecarinate; posterior sepals connate; petals violet, 30 to 45 mm. long; stamens exserted.—Epiphytic; abundant in forests throughout the Yucatan Peninsula; Florida and Mexico to Venezuela and Panama.

YUCATAN: Merida, *Schott* 842. Chichen Itza, *Lundell & Lundell* 7330, 7333, 7442, 7522, 7923. Progreso, *Lundell & Lundell* 8116. BRITISH HONDURAS: Belize District—Northern River, *Gentle* 1337. El Cayo District—Mountain Pine Ridge, Rio On, *Lundell* 6795. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett* 12515. La Libertad, *Lundell* 2913. Topoxte, *Lundell* 3960.

14. *TILLANDSIA BULBOSA* Hook. Exot. Fl. pl. 173. 1826.

Plants usually in dense masses; leaves few, finely appressed-cinereous-lepidote; sheaths inflated and forming a dense ovoid pseudobulb, abruptly contracted into the blades, 2 to 5 cm. long; blades involute, contorted, up to 3 dm. long; scape short, erect; scape-bracts foliaceous, elongate; inflorescence simple or few-branched; primary bracts subfoliaceous with their sheaths shorter than the spikes; spikes lanceolate, complanate, 2 to 5 cm. long; floral bracts imbricate, ovate, acute, 15 mm. long, appressed-lepidote; sepals oblong, apiculate, 13 mm. long; petals 3 to 4 cm. long, blue or violet; stamens exserted.—Epiphytic; infrequent

but widely distributed through the Yucatan Peninsula, sometimes locally abundant; southern Mexico and the West Indies to Brazil and Colombia.

QUINTANA ROO: Lake Chichankanab, *Gaumer* 23722. BRITISH HONDURAS: Belize District—Belize, *Bartlett* 11202; Big Falls, Belize River, *Lundell* 3957; Maskall, *Gentle* 1236, 1314; Manatee Lagoon, *Peck* 965. Stann Creek District—Melinda Pine Ridge, *Gentle* 1936; Stann Creek Railway, *Schipp* 114. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2628, 2932.

15. *TILLANDSIA CIRCINNATA* Schlecht. *Linnaea* **18**: 430. 1844.

Tillandsia yucatanana Baker, *Jour. Bot.* **25**: 280. 1887.

Plant up to 45 cm. tall; leaves covered with coarse appressed cinereous scales; sheaths large, ovate, merging with the blades; blades involute, contorted, up to 2 dm. long; scape erect; scape-bracts imbricate, foliaceous; inflorescence simple or of a few spikes; primary bracts subfoliaceous, their sheaths shorter than the spikes; spikes narrowly lanceolate, up to 12 cm. long; floral bracts imbricate, elliptic, acute, 20 to 35 mm. long, densely appressed-lepidote, thin; sepals lance-oblong, about 2 cm. long; petals violet, 4 cm. long.—Epiphytic in forests; southern Florida, Bahamas, Cuba, Hispaniola, and Mexico.

YUCATAN: Merida, *Schott* 250 (type of *Tillandsia yucatanana* in British Museum), 842 in part, 891.

16. *TILLANDSIA STREPTOPHYLLA* Scheidw.; Morren, *Hortic. Belg.* **3**: 252. 1836.

Plants reaching at least 45 cm.; leaves many, 5 dm. long, covered with large spreading cinereous scales; sheaths broad, up to 1 dm. long, forming a large pseudobulb; blades narrowly triangular, 2 to 3 cm. wide, the outer ones recurving and supporting the plant; scape erect; scape-bracts foliaceous, densely imbricate; inflorescence pinnate, 3 dm. long; primary bracts large but their sheaths shorter than the spikes; spikes more or less spreading, bracteate at base, linear, complanate, 8 to 23 cm. long; floral bracts imbricate but exposing the rhachis, densely lepidote, green, 2 to 3 cm. long; sepals lance-elliptic, 20 to 25 mm. long, glabrous; petals 4 cm. long, purple; stamens exerted.—Epiphytic; occasional in forests of the Yucatan Peninsula; Veracruz to Honduras, Jamaica.

YUCATAN: Merida, *Schott* 349. Port Silam, *Gaumer* 668. Yokdzonoot, *Lundell & Lundell* 7491. QUINTANA ROO: Lake Chichankanab, *Gaumer* 23723. BRITISH HONDURAS: Belize District—Big Falls, Belize River, *Lundell* 3955; Maskall, *Gentle* 1235. El Cayo District—Mountain Pine Ridge, *Bartlett* 11894, 13113; Duck Run, *Bartlett* 12982. Stann Creek District—Mullins River road, *Schipp* 5-10.

LOCAL NAMES: *Wild pine* (*Lundell* 3955); *xholohbenal* (Millsp. *Field Mus. Bot.* **1**: 291. 1896); *x-holom-x-al*, *xoloblenal*, *xholobenal*, *hkolomxal*, *muliix* (*Standl. Field Mus. Bot.* **3**: 222. 1930).

17. *TILLANDSIA PRUINOSA* Sw. *Fl. Ind. Occ.* 594. 1797.

Plants 8 to 20 cm. high; leaves up to 2 dm. long, covered with coarse spreading scales; sheaths broad, 2 to 4 cm. long, inflated and forming a pseudobulb; blades involute, contorted; scape none; inflorescence simple or rarely of 2 or 3 spikes; spikes broad, complanate, up to 7 cm. long; floral bracts imbricate, much exceeding the sepals, 20 to 26 mm. long, carinate, densely lepidote; sepals broad, elliptic, obtuse; petals violet, 3 cm. long; stamens exerted.—Epiphytic in forests; infrequent in the Yucatan Peninsula; Greater Antilles, Veracruz to Ecuador and Brazil.

BRITISH HONDURAS: El Cayo District—Valentin, *Lundell* 6272. GUATEMALA: Dept. Peten, Santa Teresa, Subin River, *Lundell* 2900. La Libertad, *Lundell* 2626, 2911.

18. *TILLANDSIA FESTUCOIDES* Brongn.; Mez in DC. Monog. Phan. **9**: 678. 1896. FIG. 8.

Plant stemless, 55 cm. high; leaves fasciculate, minutely appressed-lepidote; blades linear-subulate to filiform; scape slender; scape-bracts imbricate, the lower foliaceous; inflorescence digitate, up to 17 cm. long; primary bracts filiform-laminate, their sheaths shorter than the branches; branches arching-recurved, linear, 3 to 9 cm. long; floral bracts laxly imbricate, lance-ovate, 17 to 22 mm. long, carinate; sepals 17 mm. long, connate posteriorly; petals 3 cm. long; stamens exserted.—Epiphytic; abundant in the southern part of the Yucatan Peninsula, especially in the savanna country of central Peten; southern Mexico to Costa Rica, Greater Antilles.



FIG. 8—*Tillandsia festucoides* Brongn.
Plant, half nat. size.

BRITISH HONDURAS: Belize District—Big Falls, Belize River, *Lundell* 3958. El Cayo District—Mountain Pine Ridge, *Bartlett* 11901; El Cayo, *Bartlett* 11971; Valentin, *Lundell* 6376. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett* 12144. La Libertad, *Lundell* 2449, 2562, 2588, 2837, 2907, 3928; *Aguilar* 351.

19. *TILLANDSIA JUNCEA* (R. & P.) Poir. in Lam. Encyc. Suppl. **5**: 309. 1817.

Bonapartea juncea R. & P. Fl. Per. **3**: 38. 1802.

Plant 2 to 4 dm. high, stemless but often bearing scaly rhizomes; leaves densely fasciculate, finely lepidote; blades linear-subulate; scape erect, stout; scape-bracts densely imbricate, filiform-laminate; inflorescence densely digitate or rarely simple with polystichous flowers; primary bracts massed beneath the inflorescence, their sheaths shorter than the spikes; spikes stout, up to 4 cm. long; floral bracts densely imbricate, broadly ovate, longer than the sepals, carinate, densely lepidote; sepals 15 to 20 mm. long, connate posteriorly; petals violet, 4 cm. long; stamens exserted.—Epiphytic; occasional in forests at the base of the Yucatan Peninsula, sometimes locally abundant; Veracruz to Peru and Trinidad, Greater Antilles.

BRITISH HONDURAS: Stann Creek District—Hope Creek, *Schipp* 133. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett* 12286, 12512. La Libertad, *Lundell* 2470, 2838, 3959.

20. *TILLANDSIA POLYSTACHYA* L. Sp. Pl. ed. 2. 410. 1762.

Plant 20 to 65 cm. high; leaves many in a spreading rosette, finely lepidote; sheaths broad but not inflated, brownish toward base; blades narrowly triangular, 10 to 25 mm. wide; scape slender; scape-bracts imbricate, foliaceous; inflorescence few-branched or rarely simple; primary bracts shorter than the spikes; spikes sessile, erect, linear, 3 to 10 cm. long, 1 cm. wide, complanate; floral bracts imbricate, broadly ovate, 15 to 20 mm. long, nearly or quite even, mostly glabrous; sepals about equaling the bracts; petals 3 cm. long, violet; stamens exerted.—Epiphytic; frequent in the southern part of the Yucatan Peninsula; Mexico and the West Indies to Bolivia and Brazil.

BRITISH HONDURAS: Orange Walk District—New River, *O'Neill* 8512. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett* 12169, 12513. Tikal, *Bartlett* 12655. La Libertad, *Lundell* 2163, 2593, 2607, 2910.

LOCAL NAME: *Ixchuec* (*Bartlett* 12169).

21. *TILLANDSIA PUNCTULATA* Schlecht. & Cham. Linnaea 6: 53. 1831.

Plant up to 45 cm. high; leaves densely rosulate, minutely lepidote; sheaths dark castaneous; blades narrowly triangular, 10 mm. wide; scape erect; scape-bracts subfoliaceous, red-brown, massed beneath the inflorescence; inflorescence simple or digitate; primary bracts with short filiform laminae, shorter than the spikes; spikes broad, 7 to 10 cm. long, slightly complanate; floral bracts densely imbricate, broadly ovate, acute, 4 cm. long, carinate; sepals 30 to 35 mm. long, alate; petals violet except for the white apex; stamens exerted.—Epiphytic in forests; Puebla and Veracruz to Costa Rica, Surinam.

BRITISH HONDURAS: Toledo District—Camp 30, British Honduras—Guatemala boundary survey, *Schipp* S-805.

22. *TILLANDSIA FASCICULATA* Sw. Prodr. 56. 1788.

FIG. 9.

Tillandsia fasciculata var. *latispica* Mez in DC. Monog. Phan. 9: 682. 1896.

Plant 2 to 10 dm. high; leaves rosulate; sheaths large, ovate, dark-castaneous; blades narrowly triangular, 2 to 3 cm. wide, finely lepidote; scape erect, stout; scape-bracts imbricate, the lower ones foliaceous; inflorescence simple or digitate; primary bracts shorter than the spikes; spikes sessile or subsessile, erect, bracteate at base, usually over 1 dm. long, strongly complanate; floral bracts imbricate, broad, acute, 2 to 4 cm. long, nearly or quite even, coriaceous, carinate, glabrous or subglabrous; sepals usually shorter than the bracts, posteriorly connate; petals 6 cm. long, white to purple; stamens exerted.—Epiphytic; abundant in forests of the Yucatan Peninsula; Florida, West Indies, Mexico to Colombia and Guiana.

YUCATAN: Merida, *Schott* 435. Izamal, *Gaumer* 422. Chichen Itza, *Lundell & Lundell* 7443, 7559. CAMPECHE: Tuxpeña, *Lundell* 1067. QUINTANA ROO: Coba, *Lundell & Lundell* 7704. BRITISH HONDURAS: Belize District—Maskall, *Gentle* 1301; Belize, *O'Neill* 8511. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2629, 3564.

LOCAL NAMES: *Chuc* (Millsp. Field Mus. Bot. 1: 291. 1896); *xolohbenal* (Millsp. Field Mus. Bot. 1: 356. 1898); *canazihil* (*Gaumer*, ex Standl. Field Mus. Bot. 3: 222. 1930).

22a. *TILLANDSIA FASCICULATA* var. *CONVEXISPICA* Mez in DC. Monog. Phan. 9: 682. 1896.

Plant similar to the typical variety except that the spikes are barely complanate, and the floral bracts up to 5 cm. long.

BRITISH HONDURAS: El Cayo District—Duck Run, *Bartlett 11523*; Mountain Pine Ridge, *Bartlett 11911*; San Agustín, *Lundell 6707*; Vaca, *Gentle 2506*. GUATEMALA: Dept. Peten, La Libertad, *Lundell 2644, 2914*.

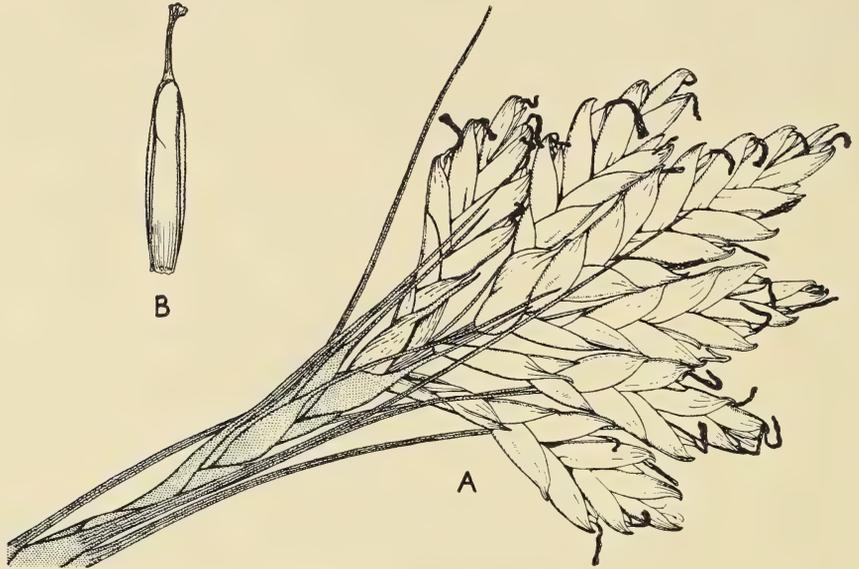


FIG. 9—*Tillandsia fasciculata* Sw.
A, plant, half nat. size; B, posterior sepals, nat. size.

23. *TILLANDSIA CHLOROPHYLLA* L. B. Smith, N. Am. Fl. **19**: 145. 1938.

FIG. 10.

Tillandsia canescens "Sw." L. B. Smith in Lundell, Carnegie Inst. Wash. Publ. No. **478**: 192, 193, 196. 1937.

Leaves rosulate, 5 dm. long, exceeding the inflorescence, obscurely punctulate; sheaths green; blades narrowly triangular, 1 cm. wide; scape erect, slender; scape-bracts imbricate, subfoliaceous, pink; inflorescence few-branched; sheaths of the primary bracts shorter than the spikes; spikes lance-oblong, complanate, 3 to 5 cm. long; floral bracts erect, shorter than the sepals, elliptic, obtuse, ecarinate, nerved, pink; sepals 11 mm. long; petals 25 mm. long, purple; stamens exserted.—Epiphytic in advanced forest; British Honduras and Guatemala.

BRITISH HONDURAS: Toledo District—Camp 30, British Honduras—Guatemala boundary survey, *Schipp S-804*. GUATEMALA: Dept. Peten, Monte Santa Teresa, Subin River, *Lundell 2649* (type in the Gray Herbarium, duplicate in the University of Michigan Herbarium).

24. *TILLANDSIA VALENZUELANA* A. Rich. in Sagra, Hist. Cuba **11**: 267. 1850.

Tillandsia sublaxa Baker, Jour. Bot. **25**: 280. 1887.

Plant 2 to 6 dm. high; leaves rosulate, 4 dm. long, finely lepidote; sheaths large, colored like the blades; blades narrowly triangular, 10 to 25 mm. wide; scape erect, slender; scape-bracts imbricate, inflated, pink or red; inflorescence simple or few-branched; sheaths of the primary bracts shorter than the spikes; spikes oblong, complanate, 5 to 20 cm. long; floral bracts laxly imbricate, usually exposing the rhachis, elliptic-oblong, 2 cm. long, much exceeding the sepals, pink or red, thin, nerved; sepals connate posteriorly; petals 3 cm. long, lilac or violet; stamens exserted.—Epiphytic; abundant in the southern part of the Yucatan

Peninsula; southern Florida, Greater Antilles, southern Mexico to Venezuela and Bolivia.

QUINTANA ROO: Coba, *Lundell & Lundell* 7767, 7825. BRITISH HONDURAS: Orange Walk District—Orange Walk, *Lundell* 86. Belize District—Big Falls, Belize River, *Lundell* 3956. El Cayo District—near Vaca, *Gentle* 2432. Stann Creek District—Mullins River road, *Schipp S-53*. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett* 12147, 12323, 12417. Tikal, *Bartlett* 12586, 12657. La Libertad, *Lundell* 2591. Subin River, *Lundell* 2674, 2793.

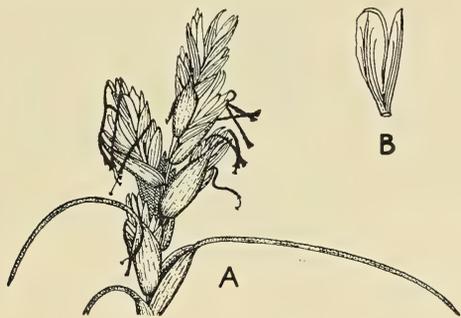


FIG. 10—*Tillandsia chlorophylla* L. B. Smith
A, plant, half nat. size; B, sepals, nat. size.

25. *TILLANDSIA SUBIMBRICATA* Baker, *Jour. Bot.* **25**: 304. 1887.

Plant 1 m. high; leaves rosulate, 8 dm. long, densely punctulate-lepidote; sheaths ovate, large; blades narrowly triangular, 4 cm. wide; scape erect; scape-bracts imbricate, the lower foliaceous; inflorescence laxly compound; primary bracts ovate, apiculate, very short; spikes linear, complanate, 15 cm. long, 12 mm. wide, bracteate at base; floral bracts imbricate but exposing the rhachis, narrowly ovate, 2 cm. long, exceeding the sepals, glabrous, nerved; sepals obtuse, elliptic; petals 25 mm. long, blue or lilac; stamens included.—Epiphytic; infrequent in the state of Yucatan; Yucatan to Colombia, Cuba, Jamaica, Trinidad.

YUCATAN: Merida, *Schott* 556. Mayapan, *Schott* 810. Chichen Itza, *Lundell & Lundell* 7558.

26. *TILLANDSIA BRACHYCAULOS* Schlecht. *Linnaea* **18**: 422. 1844.

FIG. 11.

Leaves subrosulate, numerous, often secund, 26 cm. long, exceeding the inflorescence, finely lepidote; blades acuminate, 2 cm. wide; scape very short; scape-bracts foliaceous, very dense; inflorescence compound or appearing simple by the reduction of the spikes to a single flower each; primary bracts foliaceous, hiding the 1- or 2-flowered spikes; floral bracts lanceolate, thin, equaling the sepals; sepals elliptic, 12 to 17 mm. long; petals 5 to 7 cm. long, violet.—Epiphytic; abundant in the state of Yucatan, apparently infrequent elsewhere in the Yucatan Peninsula; southern Mexico and Central America.

YUCATAN: Merida, *Schott* 557. Izamal, *Greenman* 404; *Gaumer* 742. Chichen Itza, *Lundell & Lundell* 7578; *Steere* 1622. Muna, *Steere* 2166. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett* 12514. La Libertad, *Lundell* 2908, 3753.

LOCAL NAMES: *Mis* (Millsp. *Field Mus. Bot.* **1**: 356. 1898); *chu*, *mexnuxib*, *miz*, *gallitos* (Standl. *Field Mus. Bot.* **3**: 221. 1930).



FIG. 11—*Tillandsia brachycaulos* Schlecht.
Plant, half nat. size.

4. VRIESIA Lindl.¹

Herbs, usually epiphytic; leaves rosulate, entire; inflorescence simple; floral bracts conspicuous; flowers distichous, sometimes turning secund; sepals free; petals free, appendaged; ovary nearly or quite superior; seeds with a long straight basal coma.

Leaf-blades concolorous; floral bracts not secund.

Floral bracts ecarinate, thick, rugulose when dry 1. *V. gladioliflora*

Floral bracts sharply carinate, thin, not rugulose 2. *V. heliconioides*

Leaf-blades with dark cross-bands, floral bracts becoming secund 3. *V. Schippii*

1. VRIESIA GLADIOLIFLORA (Wendl.) Ant. Wiener. Ill. Gart. 5: 97. 1880.

Tillandsia gladioliflora H. Wendl. Hamb. Gartenz. 19: 31. 1863.

Plant up to 1 m. high; leaves 6 dm. long; blades ligulate, apiculate, 6 to 8 cm. wide, concolorous; scape erect, stout; scape-bracts imbricate, elliptic; inflorescence many-flowered, 2 to 4 dm. long; floral bracts imbricate, broadly ovate, obtuse, 45 to 55 mm. long, equaling or exceeding the sepals; pedicels very short, stout; sepals broadly elliptic, obtuse; petals 4 to 7 cm. long, greenish white, bearing 2 subincised scales at base; stamens included.—Epiphytic; rare in the Yucatan Peninsula; British Honduras, Guatemala to Panama.

BRITISH HONDURAS: Belize District—Gracie Rock, Sibun River, *Gentle 1782*. GUATEMALA: Dept. Peten, Yaloch road, *Bartlett 12851*. La Libertad, *Lundell 2631*.

LOCAL NAME: *Wild pine* (*Gentle 1782*).

2. VRIESIA HELICONIOIDES (H. B. K.) Hook.; Walp. Ann. Bot. 3: 623. 1852.

Tillandsia heliconioides H. B. K. Nov. Gen. & Sp. 1: 293. 1816.

Tillandsia disticha Willd.; Schultes in R. & S. Syst. Veg. 7: 1226, as synonym. 1830.

Vriesia disticha Kuntze, Rev. Gen. 3: 304, in part. 1898. (As to material cited.)

Usually not over 4 dm. high; leaves 2 dm. long; blades ligulate, acute or acuminate, 15 to 30 mm. wide, subglabrous; scape erect, short; scape-bracts densely imbricate, broadly

¹ *Vriesia psittacina* var. *decolor* Wawra has been reported from Yucatan by Standley (Field Mus. Bot. 3: 223. 1930), but there is no evidence that this Brazilian species occurs there. The Schott specimen cited doubtless is referable to a Brazilian collection.

ovate; inflorescence oblong, dense, strongly complanate, 20 cm. long, 6 cm. wide; floral bracts broadly ovate, sharply carinate with a sigmoid outline, red toward apex, 45 mm. long; sepals lanceolate, acuminate, 27 mm. long; petals white, 6 cm. long, each bearing 2 obtuse entire scales at base.—Epiphytic, usually on tree trunks in dense shade of high forests; Guatemala, British Honduras to Bolivia and Brazil.

BRITISH HONDURAS: Belize District—Churchyard, Sibun River, *Lundell 6959*; Sibun River—Northern Lagoon road, *Genle 1489*. El Cayo District—Valentin, *Lundell 6303*; Chalillo Crossing, *Lundell 6515*. GUATEMALA: Dept. Peten, Tikal, *Bartlett 12581A*.

3. *VRIESIA SCHIPPII* L. B. Smith, Contr. Gray Herb. n. ser. **98**: 18. 1932.

Flowering plant about 4 dm. tall; leaves 3 dm. long, minutely lepidote, marked with dark cross-bands beneath; blades ligulate, acute, 3 cm. wide; scape slender, erect; scape-bracts imbricate, ovate, acuminate; inflorescence lax, few-flowered; floral bracts secund with the flowers, ovate, ecarinate, the lower ones acuminate, 43 mm. long; pedicels 5 mm. long; sepals broadly elliptic, obtuse, 17 mm. long; capsule slender, 3 cm. long.—Wet mountain forest; British Honduras.

BRITISH HONDURAS: Stann Creek District—Middlesex, *Schipp S-82* (type in Field Museum).

5. *GUZMANIA* R. & P.

Stemless, mostly epiphytic herbs; leaves entire; inflorescence simple; flowers perfect, polystichous; petals connate or agglutinated; stamens included, the filaments adnate to the petals; ovary superior; seeds with a long, basal, straight coma.

Inflorescence corymbiform, abbreviated 1. *G. lingulata*
 Inflorescence elongate, fusiform 2. *G. nicaraguensis*

1. *GUZMANIA LINGULATA* (L.) Mez in DC. Monog. Phan. **9**: 899. 1896.

Tillandsia lingulata L. Sp. Pl. 286. 1753.

Plant about 3 dm. high; leaves 30 to 45 cm. long; sheaths ovate, large; blades ligulate, acute, 3 to 4 cm. wide, obscurely lepidote; scape erect, short and stout; scape-bracts dense, the lower foliaceous, the upper reddish and forming an involucre about the flowers; inflorescence corymbiform, up to 7 cm. broad, 10- to 50-flowered; floral bracts linear, cucullate; flowers erect, 45 mm. long; sepals free, linear, obtuse; petals linear, cucullate, white; coma reddish brown.—Epiphytic in forests; West Indies, British Honduras to Bolivia and Brazil.

BRITISH HONDURAS: Toledo District—Poctun ("Pocktuun") road, *Schipp S-814*.

2. *GUZMANIA NICARAGUENSIS* Mez & C. F. Baker; Mez, Bull. Torrey Bot. Club **30**: 436. 1903.

Leaves 3 to 6 dm. long, usually exceeding the inflorescence, becoming glabrous, often finely red-striped; sheaths large, ovate; blades ligulate, apiculate, 20 to 25 mm. wide; scape short, erect; scape-bracts imbricate, the upper elliptic, apiculate; inflorescence dense, fusiform, 7 to 10 cm. long, glabrous; floral bracts elliptic, obtuse or broadly acute, 5 cm. long, thin; sepals 25 mm. long, 8 mm. wide, obtuse, short-connate; petals yellow, obtuse, over 6 cm. long.—Epiphytic in dense forests; British Honduras, Oaxaca to Costa Rica.

BRITISH HONDURAS: Toledo District—Camp 34, British Honduras—Guatemala boundary survey, *Schipp S-812*.

6. CATOPSIS Griseb.

Stemless, usually epiphytic herbs; leaves densely rosulate, minutely lepidote, green; sheaths large; scape evident; inflorescence usually compound; flowers sessile or subsessile, perfect or dioecious; sepals free, usually asymmetric, glabrous; petals free, naked; stamens included, mostly unequal; ovary superior, style short to none; seeds with coma apical and folded over.

Sepals 10 to 18 mm. long.

Sepals subsymmetric, 15 to 18 mm. long 1. *C. Wawraea*

Sepals asymmetric, 10 to 15 mm. long.

Scape slender, usually decurved; petals longer than the sepals 2. *C. nutans*

Scape stout, erect; petals not more than equaling the sepals 3. *C. Berteroniana*

Sepals 3 to 8 mm. long.

Scape-bracts all shorter than the internodes.

Sepals not more than 4.5 mm. long 4. *C. apicroides*

Sepals 8 mm. long 5. *C. aloides*

Scape-bracts, or most of them, imbricate.

Leaf-blades ligulate, apiculate 6. *C. Morreniana*

Leaf-blades narrowly triangular, acuminate.

Leaf-blades 15 to 30 mm. wide 7. *C. floribunda*

Leaf-blades not over 5 mm. wide 8. *C. Lundelliana*

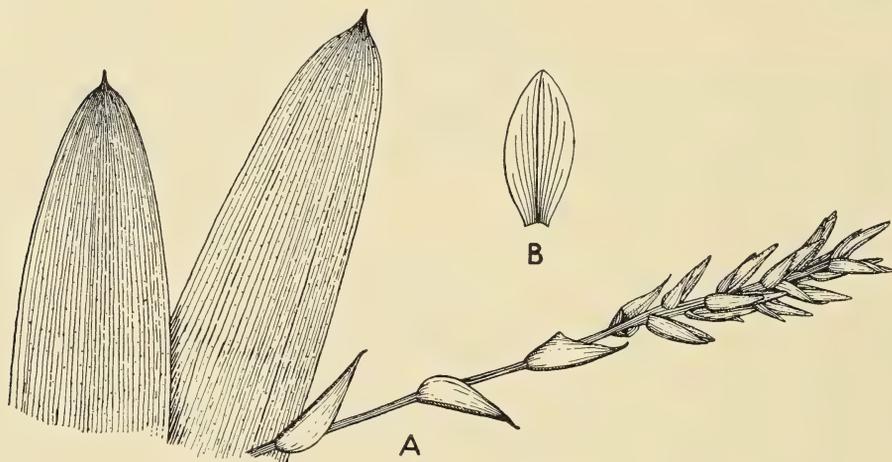


FIG. 12—*Catopsis Wawraea* Mez
A, plant, half nat. size; B, sepal, nat. size.

I. CATOPSIS WAWRAEA Mez in DC. Monog. Phan. 9: 626. 1896.

FIG. 12.

Plant up to 35 cm. high; leaves few, 2 dm. long; blades ligulate, apiculate, 4 cm. wide; scape suberect or decurved; scape-bracts remote; inflorescence few-branched or simple; primary bracts short; floral bracts narrow, thin, nerved, shorter than the sepals; flowers suberect, dioecious; sepals subsymmetric, thin, the staminate lanceolate, acute, 15 mm. long, the pistillate broadly elliptic, subobtuse, 18 mm. long.—Epiphytic in high forests; southern Mexico to Costa Rica.

BRITISH HONDURAS: El Cayo District—Chalillo Crossing, *Lundell 6531*.

2. *CATOPSIS NUTANS* (Sw.) Griseb. Fl. Brit. W. Ind. 599. 1864.*Tillandsia nutans* Sw. Prodr. 56. 1788.*Catopsis fulgens* Griseb. Nachr. Ges. Wiss. Gött. 1864: 21. 1865.

Plant 14 to 40 cm. long; leaves about 10, erect or divergent, up to 24 cm. long, white-cretaeous toward base; sheaths elliptic, large; blades subtriangular, 25 mm. wide; scape slender, usually decurved; scape-bracts erect, remote; inflorescence simple or rarely few-branched; primary bracts very short; spikes lax, up to 2 dm. long; rhachis nearly straight; floral bracts broad, shorter than the sepals; flowers erect to spreading, perfect; sepals strongly asymmetric, nerved, glabrous, 15 mm. long; petals 2 cm. long, bright yellow.—Epiphytic in low woods or brushland; Cuba, Jamaica, Haiti, Veracruz to Ecuador and Venezuela.

YUCATAN: Chichen Itza, *Lundell & Lundell* 7332. BRITISH HONDURAS: Belize District—Gracie Rock, Sibun River, *Gentle* 1796.



FIG. 13.—*Catopsis apicroides* (Schlecht. & Cham.) Baker
Plant, half nat. size.

3. *CATOPSIS BERTERONIANA* (Schultes) Mez in DC. Monog. Phan. 9: 621. 1896.*Tillandsia Berteroniana* Schultes in R. & S. Syst. 7: 1221. 1830.

Plant 4 to 9 dm. high; leaves up to 4 dm. long, white-cretaeous, light green; sheaths elliptic, very large; blades triangular, 4 to 5 cm. wide; scape erect, stout; lower scape-bracts imbricate, foliaceous, upper ovate, often remote; inflorescence compound or rarely simple, up to 3 dm. long; primary bracts short, broadly ovate; spikes suberect, long-stipitate, lax; floral bracts broad, obtuse, 6 to 8 mm. long; flowers perfect, suberect; sepals asymmetric, obovate, 12 mm. long, equaling or exceeding the white petals; stamens unequal; style distinct.—Epiphytic; in savannas, marginal forests, and woods; southern Florida, Greater Antilles, Central America, Trinidad to Brazil.

BRITISH HONDURAS: Corozal District—*Gentle* 514. Belize District—Manatee Lagoon, *Peck* 194; Maskall, *Gentle* 1125. El Cayo District—*Vaquero*, *Lundell* 6881. Stann Creek District—*Sittee* River, *Schipp* S-132. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2909.

4. *CATOPSIS APICROIDES* (Schlecht. & Cham.) Baker, Jour. Bot. 25: 174. 1887. FIG. 13.*Tillandsia apicroides* Schlecht. & Cham. Linnaea 6: 55. 1831.

Plant 12 to 45 cm. long; leaves few, 10 to 15 cm. long, obscurely lepidote; sheaths elliptic; blades ligulate, 10 to 25 mm. wide; scape suberect or decurved, very slender; scape-bracts remote, elliptic; inflorescence laxly compound; primary bracts very short; spikes laxly flowered, 2 to 11 cm. long with naked stipe 1 cm. long; floral bracts ovate, equaling or shorter than the sepals; flowers dioecious, spreading or divergent; sepals asymmetric, thin,

broadly elliptic, 4.5 mm. long; petals elliptic, 6 mm. long, yellow; stamens unequal; style short.—Epiphytic in forests and open woods; southern Mexico to Panama.

BRITISH HONDURAS: Toledo District—*Peck* 528; Punta Gorda, *Schipp* 1042. El Cayo District—San Agustín, *Lundell* 6834.

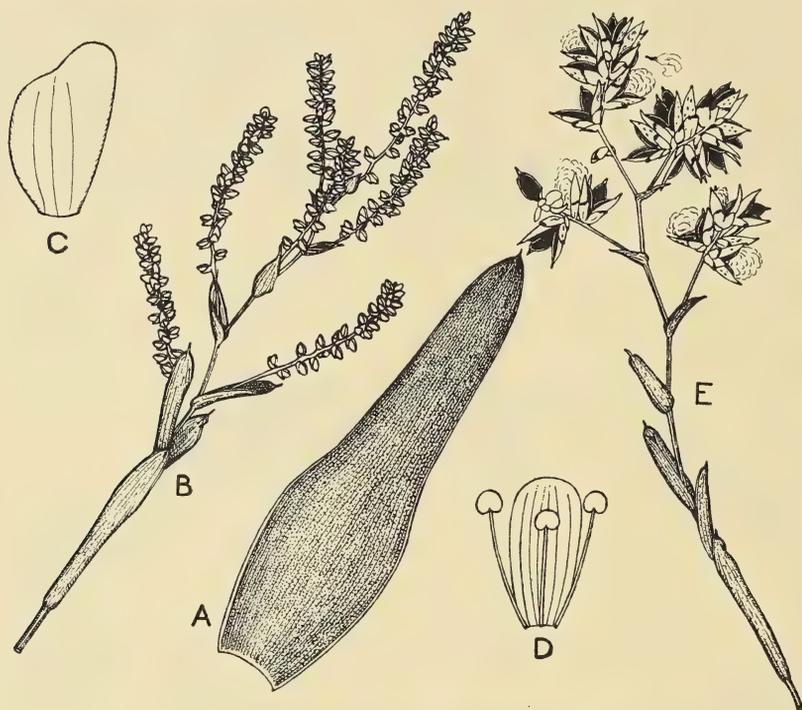


FIG. 14—*Catopsis Morreniana* Mez

A, leaf; B, staminate inflorescence; C, sepal; D, petal and stamens; E, pistillate inflorescence. (A, B, E, half nat. size; C, D, five times nat. size.)

5. *CATOPSIS ALOIDES* (Schlecht. & Cham.) Baker, *Handb. Bromel.* 154. 1889.

Tillandsia aloides Schlecht. & Cham. *Linnaea* 6: 55. 1831.

Plant 14 to 46 cm. high; leaves few, 25 cm. long, obscurely lepidote; blades ligulate, apiculate, 23 mm. broad; scape erect or arching, slender; scape-bracts remote; inflorescence of 1 to 4 spikes, up to 15 cm. long, glabrous; primary bracts short; spikes dense except near base, 3 to 13 cm. long; floral bracts ovate, much shorter than the sepals; flowers spreading, dioecious; sepals asymmetric, broad, 8 mm. long; petals yellow, slightly exserted; capsule ovoid, acute but not beaked, 10 to 15 mm. long.—Epiphytic in low forest; southern Mexico to Guatemala.

BRITISH HONDURAS: Belize District—Big Falls, Belize River, *Lundell* 3961. El Cayo District—Cocquericot, *Bartlett* 12072. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2633.

6. *CATOPSIS MORRENIANA* Mez in DC. *Monog. Phan.* 9: 628. 1896.

FIG. 14.

Catopsis Bakeri Mez, *Bull. Torrey Bot. Club* 30: 435. 1903.

Plant 2 to 4 dm. high; leaves 10 to 18 cm. long, soon glabrous; blades ligulate, apiculate, 15 to 25 mm. wide, narrowly white-margined; scape erect, slender; inflorescence compound,

lax, 6 to 17 cm. long, glabrous, stramineous; primary bracts usually shorter than the spikes; spikes divergent to spreading, stipitate, the staminate many-flowered, up to 7 cm. long, the perfect or pistillate 4 to 5 cm. long, densely few-flowered; floral bracts ovate, shorter than the sepals, nerved; flowers perfect or dioecious, spreading; sepals asymmetric, 3 to 6 mm. long; stamens unequal; style very short.—Epiphytic in forests; Veracruz to Costa Rica.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Bartlett 11915*. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett 12288, 12289*. La Libertad, *Lundell 2627*.

7. *CATOPSIS FLORIBUNDA* (Brongn.) L. B. Smith, Contr. Gray. Herb. n. ser. **117**: 5. 1937.

Pogospermum floribundum Brongn. Ann. Sci. Nat. V. **1**: 329, nomen provisorium. 1864.

Catopsis nutans Griseb. Fl. Brit. W. Ind. 599, excl. syn. 1864.

Plant 4 to 7 dm. high; leaves numerous, strict, 2 to 4 dm. long, obscurely lepidote; sheaths elliptic, large; blades narrowly triangular, 15 to 30 mm. wide; scape erect, slender; scape-bracts imbricate, the lower foliaceous; inflorescence laxly compound, 15 to 40 cm. long, glabrous; primary bracts mostly shorter than the sterile bases of the branches; spikes subdense; floral bracts ovate, shorter than the sepals, nerved; flowers suberect, perfect; sepals asymmetric, 4 to 6 mm. long; petals elliptic, 7 mm. long, white; stamens unequal.—Epiphytic in forests; southern Florida, West Indies, British Honduras to Costa Rica, Venezuela.

BRITISH HONDURAS: El Cayo District—Little Mountain Pine Ridge, *Bartlett 13040*.

8. *CATOPSIS LUNDELLIANA* L. B. Smith, Contr. Gray Herb. n. ser. **117**: 6. 1937.

Plant 25 to 30 cm. high; leaves many, 1 dm. long, obscurely lepidote; sheaths narrow, 15 to 30 mm. long; blades linear, acuminate, 5 mm. wide; scape erect, very slender; scape-bracts imbricate, linear-laminate; inflorescence laxly 3- or 4-branched, 7 to 12 cm. long; primary bracts shorter than the sterile bases of the straight laxly flowered spikes; floral bracts ovate, obtuse, shorter than the sepals; sepals obovate, asymmetric, 5 mm. long, nerved; petals barely exerted; stamens unequal; style short.—Epiphytic in advanced forest; British Honduras, Panama.

BRITISH HONDURAS: El Cayo District—Valentin, *Lundell 6256* (type in Gray Herbarium, duplicate in the University of Michigan Herbarium).

7. *BILLBERGIA* Thunb.

1. *BILLBERGIA VIRIDIFLORA* H. Wendl. Allg. Gart. **22**: 154. 1854.

FIG. 15.

Leaves 12 to 15 in a tubular rosette, green, minutely white-lepidote; sheaths large, narrow, entire; blades ligulate, acuminate, 4 to 9 cm. wide, with teeth 1 to 4 mm. long; scape suberect to arching, slender, about equaling the leaves; scape-bracts imbricate, up to 14 cm. long, thin, red, serrulate; inflorescence simple, lax, 2 to 5 dm. long; floral bracts narrow, the lowest up to 2 cm. long; pedicels spreading, slender, up to 5 cm. long; flowers glabrous; sepals acuminate, 21 mm. long, green; petals acute, 4 to 5 cm. long, green, bearing 2 subentire scales at base; ovary ellipsoid, green.—On rocks and epiphytic in forests; northern Guatemala and British Honduras.

BRITISH HONDURAS: Belize District—Gracie Rock, Sibun River, *Gentle 1633*. El Cayo District—near Camp 6, *Gentle 2419*. Toledo District—*Peck 834*; Machaca, *Schipp S 563*. GUATEMALA: Dept. Peten, Rio Pasion, *Aguilar 503*. Monte Santa Teresa, Subin River, *Lundell 2653*.

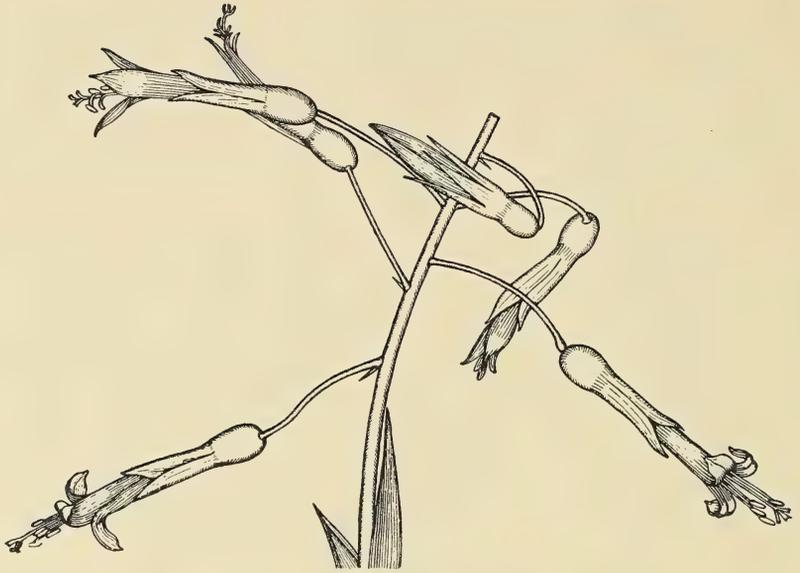


FIG. 15—*Billbergia viridiflora* H. Wendl.
Base of inflorescence, half nat. size. (After Belgique Horticole.)

8. BROMELIA L.

Coarse terrestrial herbs; leaves rosulate; blades narrowly triangular, coarsely spinose-serrate; inflorescence compound, sessile or scapose; petals fleshy, centrally united by the joined filaments but with their margins free, unappendaged; stamens included; ovary passing gradually into the pedicel; berry succulent, large.

Inflorescence elongate, lax, scapose.

Floral bracts and sepals subulate	1. <i>B. Pinguin</i>
Floral bracts and sepals acute or obtuse	2. <i>B. sylvestris</i>
Inflorescence a capitiform panicle sunk in the center of the leaf-rosette	3. <i>B. Karatas</i>

1. BROMELIA PINGUIN L. Sp. Pl. 285. 1753.

FIG. 16.

Plant 1 m. high; leaves numerous, exceeding 2 m.; sheaths broad, tomentose-lepidote; blades 4 cm. wide, deep green above, pale-lepidote beneath, teeth 10 mm. long; scape stout, white-floccose; scape-bracts subfoliaceous, reddish; inflorescence narrow, white-floccose; primary bracts like the scape-bracts; floral bracts linear-subulate, 3 cm. long; flowers 6 cm. long; sepals triangular-subulate, pale; petals narrow, 3 cm. long, rose with white base and margins, densely white-tomentose toward apex; berry yellow, very acidulous, aromatic, edible.—Terrestrial; in fields, thickets, and forests; West Indies and Mexico to Guiana and Panama.

YUCATAN: Valladolid, *Steere 1689*. BRITISH HONDURAS: Belize District—Gracie Rock, Sibun River, *Gentle 1695*. El Cayo District—Duck Run, *Bartlett 13134*.

2. BROMELIA SYLVESTRIS Willd.; Link, Enum. 1: 308. 1821.

FIG. 17.

Plant nearly 1 m. high; leaves many, about 1 m. long; sheaths large, white-lepidote; blades glabrous and lustrous above, densely pale-lepidote beneath, teeth 5 mm. long; scape

stout, white-floccose; scape-bracts subfoliaceous, reddish; inflorescence narrow, white-floccose; primary bracts like the scape-bracts; floral bracts narrowly triangular, flat, thin; flowers 5 cm. long; sepals lance-triangular, acute or obtuse, 15 to 18 mm. long; petals lanceolate, obtuse, 25 mm. long, blue or rose with white margins, glabrous or scantily lepidote at apex, connate for only 3 mm.—Dry arid woodlands; Veracruz to Honduras.

YUCATAN: Merida, *Schott* 893. Aguada Calatcapek, *Schott*. Izamal, *Gaumer* 691. Port Silam, *Gaumer* 1832. La Vega, *Goldman* 633.

LOCAL NAME: *Tsalbay* (Millsp. Field Mus. Bot. **1**: 355. 1898).

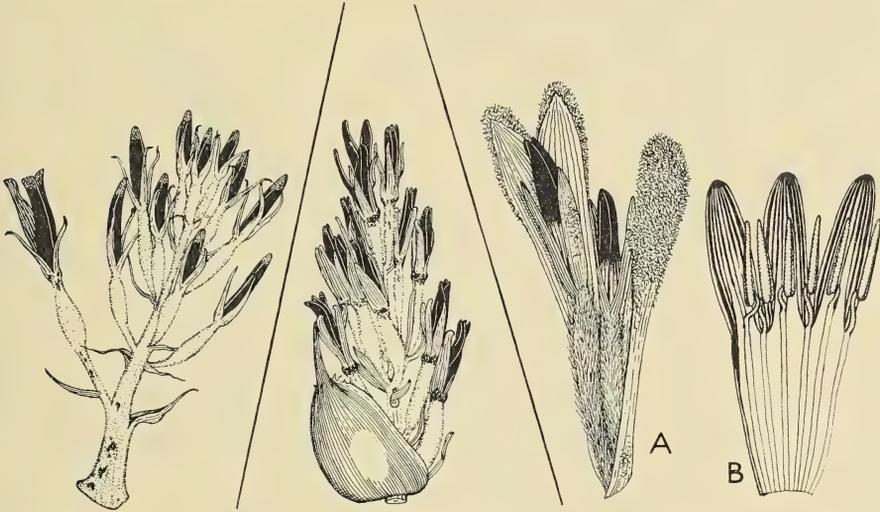


FIG. 16—*Bromelia Pinguin* L.
Branch, half nat. size.

FIG. 17—*Bromelia sylvestris*
Willd. Primary bract and
branch, half nat. size.

FIG. 18—*Bromelia Karatas* L.
A, Floral bracts and flowers,
half nat. size; B, corolla laid
open and stamens, nat. size.

3. *BROMELIA KARATAS* L. Sp. Pl. 285. 1753.

Karatas Plumieri E. Morr. Belg. Hort. **22**: 131. 1872.

Rosette up to 3 m. in diameter; leaf-sheaths large, covered with long coarse dark-brown scales; blades 3 to 5 cm. wide, minutely lepidote beneath, teeth coarse, 5 to 8 mm. long; inflorescence many-flowered, flat-topped, surrounded by the red inner leaves; primary bracts foliaceous; floral bracts narrow, oblanceolate, thin, coarsely lepidote; flowers 6 to 9 cm. long; pedicels short, stout; sepals lanceolate, acute, lepidote; petals 4 cm. long, connate more than 2 cm., glabrous, rose with white base and margins; ovary lepidote; berry fusi-form, 8 cm. long, 2 cm. thick, acid, edible.—In marginal forests bordering savannas and deciduous forests; Mexico and the West Indies to Colombia and Guiana.

YUCATAN: Libre Union, *Lundell & Lundell* 7576; Merida, *Schott* 558. QUINTANA ROO: Chichankanab, *Gaumer* 1460. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 3005.

LOCAL NAMES: *Cham*, *piñuela* (*Lundell* 3005).

Its acid fruits are highly prized and much sought by the natives. According to Standley (Field Mus. Bot. **3**: 221. 1930), a syrup made from the fruit is used as a diuretic and as a remedy for intestinal parasites in children.

FIG. 18.

9. AECHMEA R. & P.

Stemless herbs; scape conspicuous; inflorescence varying widely; flowers sessile or rarely pedicellate; sepals usually asymmetric and mucronate; petals free, each bearing 2 scales; second series of stamens more or less connate with the petals; pollen grains bearing pores or sometimes aborted; berry dry.

- Flowers slenderly pedicellate 1. *Ae. Lüddemanniana*
 Flowers sessile.
 Spikes distichous-flowered.
 Floral bracts imbricate, 10 to 17 mm. long 2. *Ae. Kienastii*
 Floral bracts remote, 5 to 8 mm. long 3. *Ae. bracteata*
 Spikes polystichous-flowered.
 Floral bracts serrate, acute, up to 65 mm. long 4. *Ae. magdalenae*
 Floral bracts entire, truncate, not over 10 mm. long 5. *Ae. bromeliaefolia*

1. AECHMEA LÜDDEMANNIANA (K. Koch) Brongn.; Mez in Engler, Pflanzenreich **4**³²: 120. 1934.

Pironneava Lüddemanniana K. Koch, Wochenschr. Gärtn. **9**: 182. 1866.

Lamprococcus caerulescens Regel, Acta Hort. Petrop. **1**: 93. 1871.

Aechmea caerulescens Baker, Jour. Bot. **17**: 227. 1879.

Plant 25 to 70 cm. high; leaves nearly straight, 3 to 6 dm. long; sheaths large, elliptic; blades ligulate, 45 mm. wide, spines 1 to 2 mm. long; scape erect, slender, scape-bracts imbricate, entire, membranaceous; inflorescence amply compound, cylindrical to slenderly pyramidal, 12 to 30 cm. long, white-farinose; primary bracts narrow, shorter than most of the branches; racemes lax, few-flowered; floral bracts filiform, shorter than the pedicels; pedicels slender, 6 mm. long, divergent; sepals asymmetric, mucronate, 3.5 mm. long; petals 9 mm. long, rose and blue; ovary 6 mm. long; berry 12 mm. long, bluish white.—Epiphytic in deep forests; Veracruz and British Honduras.

BRITISH HONDURAS: Toledo District—Camp 34, British Honduras-Guatemala boundary survey, *Schipp S-807*.

2. AECHMEA KIENASTII E. Morren; Mez in DC. Monog. Phan. **9**: 243. 1896. FIG. 19.

Leaves 5 to 9 dm. long, minutely lepidote; blades 10 to 65 mm. wide, densely serrate with straight brown spines 3 mm. long; scape shorter than the leaves, soon glabrous; scape-bracts remote, lanceolate, thin, serrate, red; inflorescence simple or few-branched, white-floccose when young; primary bracts like the scape-bracts; spikes oblong, 4 to 11 cm. long; rhachis wing-angled; floral bracts imbricate, elliptic, mucronulate, 10 to 17 mm. long, ecarinate, nerved; sepals 7 to 10 mm. long, asymmetric; petals mucronulate, 13 mm. long, dark purple.—Epiphytic in forests; southern Mexico to Colombia.

QUINTANA ROO: Coba, *Lundell & Lundell 7683*. BRITISH HONDURAS: Belize District—Gracie Rock, Sibun River, *Gentle 1581*; Maskall, *O'Neill 8509*. El Cayo District—El Cayo, *Bartlett 12081*; Yaloch to El Cayo, *Bartlett 12860*; near Vaca, *Gentle 2460*; Vaca, *Gentle 2612*. Stann Creek District—Big Creek, *Schipp 98*. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett 12329*. El Paso, *Lundell 1637*.

LOCAL NAME: *Pie de gallo* (*Lundell 1637*).

3. AECHMEA BRACTEATA (Sw.) Griseb. Fl. Brit. W. Ind. 592. 1864.

Bromelia bracteata Sw. Prodr. 56. 1788.

Aechmea laxiflora Benth. Bot. Voy. Sulph. 173. 1846.

Plant 5 to 17 dm. or more high; leaves in an ellipsoid rosette, 3 to 10 dm. long; sheaths elliptic, large, finely brown-lepidote; blades ligulate, 3 to 10 cm. wide, coarsely repand-serrate with lax teeth up to 1 cm. long; scape erect, usually slender; scape-bracts imbricate,

lanceolate, entire, bright red; inflorescence amply paniculate, lax, 10 to 65 cm. long; axes red, white-pubescent; lower primary bracts like the scape-bracts, the upper greatly reduced; spikes spreading, laxly 4- to 17-flowered; rhachis slender, angled, flexuous; floral bracts broadly ovate, acute, 5 to 8 mm. long, entire; flowers sessile, divergent; sepals asymmetric, 3 to 4 mm. long; petals linear, 1 cm. long, yellow; ovary subglobose, enlarged in fruit.—Epiphytic; abundant in forests, forming large clumps in crotches of trees; the most conspicuous epiphyte in the Yucatan Peninsula; Mexico to Colombia.

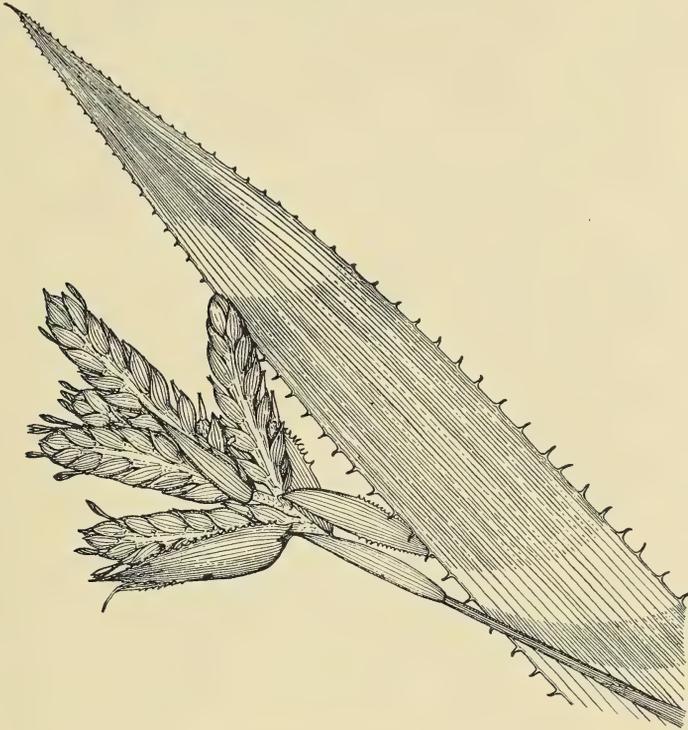


FIG. 19—*Aechmea Kienastii* E. Morren
Plant, half nat. size.

YUCATAN: Progreso, *Schott* 274. Izamal, *Gaumer* 419, 23314. Chichen Itza, *Steere* 1646. Without definite locality, *Gaumer* 24423, 24033. QUINTANA ROO: Chichankanab, *Gaumer* 1267, 1754. BRITISH HONDURAS: Corozal District—*Gentle* 493, 493A. Belize District—Belize, *O'Neill* 8513; Haulover, Belize River, *Lundell* 3962; Maskall, *Gentle* 1242. El Cayo District—Cocquericot, *Bartlett* 12075. Toledo District—Camp 34, British Honduras-Guatemala boundary survey, *Schipp* S-806. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett* 12196 La Libertad, *Lundell* 2549, 2553, 2828.

LOCAL NAMES: *Wild pine* (*Lundell* 3962, *Gentle* 1242); *ixchu, chuek* (*Bartlett* 12196); *ixchu, tinajero* (*Lundell* 2828); *xkeo* (Millsp. Field Mus. Bot. **1**: 355. 1898); *xkeu, chaccanahzihii* (Standl. Field Mus. Bot. **3**: 220. 1930).

According to *Gaumer* 23314, the berries are edible. The leaf rosettes hold water for long periods, and travelers in waterless areas often resort to this supply although it is saturated with decaying vegetation.

4. *AECHMEA MAGDALENÆ* (André) André; Baker, Handb. Bromel. 65. 1889. FIG. 20.
Chevalliera Magdalenæ André, Enum. Bromel. 3. 13 D 1888; Rev. Hort. 60: 563. 16 D 1888.
Bromelia Magdalenæ C. H. Wright, Kew Bull. 1923: 267. 1923.
Ananas magdalenæ Standley; Standley & Cald. Lista Prelim. Pl. S. Salvador 45. 1925.

Plant 10 to 15 dm. high, coarse; leaves several in a lax rosette, 2 m. long; sheaths inconspicuous; blades linear, acuminate, 5 to 10 cm. wide, glabrous above, finely pale-lepidote beneath, laxly serrate with hooked teeth up to 5 mm. long; scape erect, stout, white-flocculose at first; scape-bracts foliaceous, large, the upper massed below the inflorescence and reflexed; inflorescence few-branched or rarely simple; spikes sessile, globose; floral bracts decurved, ovate, triangular-acuminate, 65 mm. long, coriaceous, densely serrate, densely cinereous-lepidote beneath; flowers sessile, 5 cm. long; sepals triangular, unequal, 35 to 38 mm. long, rigid; petals 4 cm. long, flavous when dry, bearing 2 minute scales above the base; ovary elliptic, complanate, enlarged in fruit.—Terrestrial in forests and on wet *aguada* banks; Mexico to Ecuador.

GUATEMALA: Dept. Peten, Tikal, *Cook & Martin 221; Bartlett 12640.*

LOCAL NAMES: *Pita* (*Bartlett 12640*); *silkgrass*, *piñuela*, *pita floja* (Standl. Field Mus. Bot. 12: 90. 1936).

According to Standley (*loc. cit.*), the leaves of this plant furnish one of the best fibers known, remarkable for its fineness, strength, and length. The acid fruits are said to be edible.

5. *AECHMEA BROMELIAEFOLIA* (Rudge) Baker; Benth. & Hook. Gen. Pl. 3: 664. 1883.
Tillandsia bromeliaefolia Rudge, Pl. Guian. 32. 1807.

Plant 7 to 9 dm. high; leaves in a tubular rosette, covered on both sides with a membrane of white coalesced scales; sheaths large; blades ligulate, 4 to 9 cm. wide, green, laxly serrate with antrorse spines 1 cm. long; scape erect, white-lanate; scape-bracts lance-ovate, entire, thin, the upper imbricate; inflorescence simple, strobilate, ellipsoid or cylindrical, 15 cm. long, 3 to 4 cm. thick, densely white-lanate; floral bracts broader than long, truncate, thick, 2-keeled, shorter than the sepals; sepals suborbicular, emarginate, 7 mm. long, equally short-connate; petals oblong, emarginate, 15 mm. long, greenish yellow, turning black, bearing 2 fimbriate scales above the base.—Epiphytic in forests; rare in the Yucatan Peninsula; British Honduras and Guatemala, Venezuela to Argentina.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Bartlett 13053*. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett 12338; 12786*. Yaxha-Remate road, *Lundell 4275*.

10. ANDROLEPIS Brongn.

1. *ANDROLEPIS SKINNERI* (K. Koch) Brongn.; Houlet, Rev. Hort. 42: 12. 1870.
Pothuava Skinneri K. Koch, Wochenschr. Gärtn. 4: 190. 1861.

Leaves rosulate, 6 dm. long; sheaths large, suborbicular; blades ligulate, 5 to 8 cm. wide, finely pale-lepidote beneath, densely serrulate; scape 3 dm. long, stout; scape-bracts imbricate, acute, serrulate, stramineous; inflorescence laxly paniculate, subcylindrical, 2 dm. long; primary bracts narrowly triangular, entire, exceeding the lowest branches; spikes suberect, subglobose, 1- to 5-flowered; floral bracts minute or wanting; flowers sessile, polystichous; sepals free, asymmetric, 5 mm. long; petals elliptic, 1 cm. long, naked, flavous; stamens included, anthers each with 2 foliaceous appendages at apex; ovary stout, much enlarged in fruit.—On rocks or epiphytic in forests, usually forming large masses on trunks or in crotches of trees; British Honduras, Guatemala.

BRITISH HONDURAS: El Cayo District—Vaca, *Gentle 2226*. GUATEMALA: Dept. Peten, La Libertad, *Lundell 2605, 2986*.

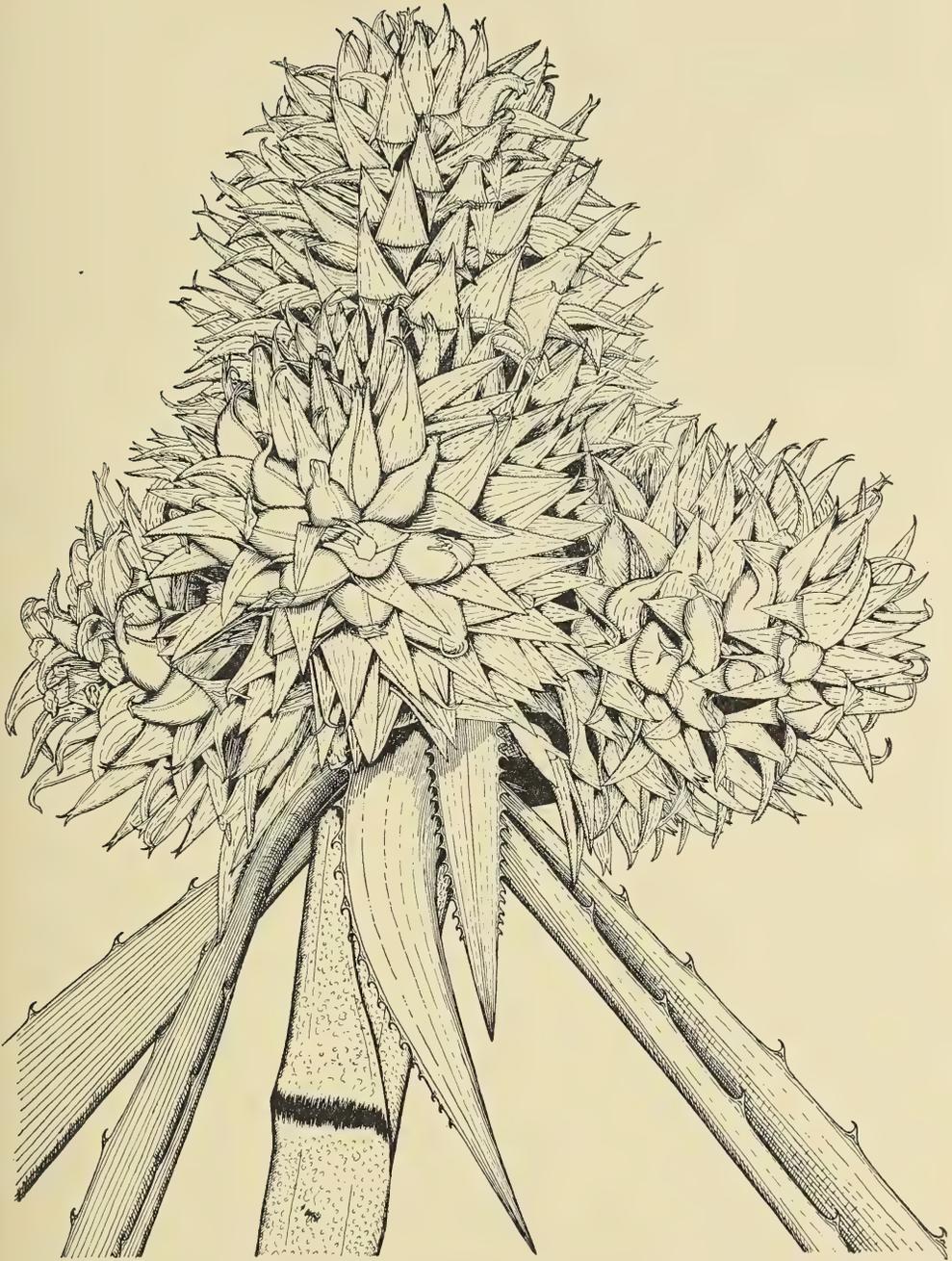


FIG. 20—*Aechmea magdalenae* (André) André
Plant, half nat. size.

II. ANANAS Mill.

I. ANANAS COMOSUS (L.) Merrill, Interpr. Rumph. Amb. 133. 1917.

Bromelia Ananas L. Sp. Pl. 285. 1753.

Bromelia comosa L. Herb. Amboin. 21. 1754.

Ananassa sativa Lindl. Bot. Reg. 13: under *pl.* 1068, nomen nudum. 1827.

Ananas sativus Schultes in R. & S. Syst. Veg. 7: 1283. 1830.

Ananas Ananas Voss in Vilm. Blumeng. ed. 3. 1: 964. 1895.

Leaves densely rosulate, large; sheaths inconspicuous; blades linear, laxly spinose-serrate, acuminate-pungent; scape stout, erect; scape-bracts imbricate, foliaceous; inflorescence simple, densely strobilate, large, crowned with a coma of sterile foliaceous bracts; floral bracts triangular-acute, usually serrulate, exceeding the ovaries; flowers sessile; sepals free, broadly ovate, obtuse, slightly asymmetric; petals free, violet or red, each bearing 2 slenderly infundibuliform scales; stamens included; ovaries fusing with each other and with the bracts and axis to form a fleshy compound fruit; seeds usually wanting.—Terrestrial; native of Brazil, but widely cultivated in warm regions.

GUATEMALA: Dept. Peten, La Libertad, *Lundell* 3214.

LOCAL NAMES: *Piña* (*Lundell* 3214); *pine* (British Honduras).

The pineapple is cultivated throughout the peninsula, chiefly for local consumption. It now ranks as one of the most important fruits. Since there is no recorded Maya name for the plant, it probably was not known to the Maya before the Spanish Conquest.

INDEX TO CITED SPECIMENS

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CHANEK, MERCEDES, 115 (*Tillandsia Schiedeana*); COOK, O. F., & MARTIN, R. D., 221 (*Aechmea magdalenae*); GAUMER, G. F., 419 (*Aechmea bracteata*), 422 (*Tillandsia fasciculata*), 427 (*Tillandsia Schiedeana*), 578 (*Hechtia Schottii*), 651 (*Tillandsia dasyliriifolia*), 659 (*Tillandsia recurvata*), 663 (*Tillandsia usneoides*), 664 (*Tillandsia Schiedeana*), 668 (*Tillandsia streptophylla*), 691 (*Bromelia sylvestris*), 742 (*Tillandsia brachycaulos*), 1267 (*Aechmea bracteata*), 1460 (*Bromelia Karatas*), 1754 (*Aechmea bracteata*), 1767 (*Tillandsia Schiedeana*), 1832 (*Bromelia sylvestris*), 1905 (*Tillandsia dasyliriifolia*), 1912 (*Tillandsia recurvata*), 1913 (*Tillandsia recurvata*), 1914 (*Tillandsia Schiedeana*), 23224 (*Tillandsia dasyliriifolia*), 23314 (*Aechmea bracteata*), 23722 (*Tillandsia bulbosa*), 23723 (*Tillandsia streptophylla*), 23839 (*Hechtia Schottii*), 24033 (*Aechmea bracteata*), 24422 (*Tillandsia Schiedeana*), 24423 (*Aechmea bracteata*), 24449 (*Hechtia Schottii*).

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XVII

The Eriocaulaceae, Verbenaceae, and
Avicenniaceae of the Yucatan Peninsula

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THE ERIOCAULACEAE, VERBENACEAE, AND AVICENNIACEAE OF THE YUCATAN PENINSULA

The purpose of the present paper is to bring together in one place all the known information and data concerning the representatives of these three plant families in the Yucatan Peninsula. Rather full descriptions are given of each species and variety, complete synonymy to enable workers to obtain extralimital information from other publications, and discussions of interesting or puzzling features about each. All herbarium material from the region which has actually been seen and examined by me is herein cited. The abbreviations of the names of herbaria wherein the specimens are deposited are in accordance with the system followed by me in all my previous publications on these families. For quicker reference, however, the explanations are repeated herewith in condensed form.¹ To obtain the full names of the institutions involved, see my monographs in Fedde's Repertorium and in Phytologia and Brittonia.

ERIOCAULACEAE Lindl., Veg. Kingd. 122. 1847.

Perennial or rarely annual aquatic or marsh herbs, mostly short-stemmed, usually monoecious, rarely dioecious; roots tufted, fibrous, knotty or spongy, often septate; leaves mostly basal and tufted, narrow, grass-like, usually crowded, often pellucid and loosely cellular, sometimes membranous; inflorescence capitate, in terminal solitary or umbellately aggregate involucrate heads, borne on long, slender, often scapose peduncles, which are sheathed at base; florets mostly actinomorphic, numerous, small, sessile or short-pedicellate on a variously shaped receptacle, each borne in the axil of a scarious scale-like colored or colorless receptacular bractlet, unisexual, mostly androgynous, the staminate and pistillate mixed together or the staminate in the center and the pistillate on the periphery, the sexes very rarely in separate heads; perianth (perigonium) scarious (chaffy) or membranous, rarely hyaline, its segments 2- or 3-merous, usually in 2 distinct series, the outer (calyx) free or rarely partially connate, the inner (corolla) often united in an infundibular fashion, rarely absent; stamens as many as the outer perianth-segments and alternate with them, or twice as many, inserted on the corolla (when present); filaments distinct; anthers small, 2- or 4-celled, composed of 1 or 2 thecae, opening by longitudinal slits, introrse; staminodes rarely present in pistillate florets; ovary superior, 2- or 3-locular; style terminal, often appendaged; stigmas 2 or 3, simple or lobed; ovules solitary and pendulous in each locule, orthotropous; fruit a 2- or 3-celled, 2- or 3-seeded, membranous capsule, loculicidally dehiscent; seeds solitary, pendulous, with a small embryo borne at the apex of a copious mealy endosperm; cotyledon one.

Stamens 4 or 6, twice as many as the outer perianth-segments (rarely 3) 1. ERIOCAULON

Stamens 2 or 3, as many as the outer perianth-segments.

 Anthers 4-celled, composed of 2 thecae; stems not floating.

 Inner perianth-segments of pistillate florets free 2. PAEPALANTHUS

 Inner perianth-segments of pistillate florets connate at the middle 3. SYNGONANTHUS

 Anthers 2-celled, composed of 1 theca; stems floating 4. TONINA

¹ A, Arnold Arboretum; B, Berlin; Ba, Bailey Hortorium; Bm, British Museum; Br, Brussels; C, Columbia University; Ca, University of California; Cb, Delessert Herbarium; Cp, Copenhagen; D, Philadelphia Academy of Sciences; Dp, DePauw University; E, St. Louis; Ed, Edinburgh; F, Field Museum; G, Gray Herbarium; I, Catholic University; J, Brooklyn Botanic Garden; K, Kew; L, Leningrad; Lu, Lund; M, Meisner Herbarium; Mi, University of Michigan; Mu, Munich; N, Britton Herbarium; P, Paris; S, Stockholm; T, Torrey Herbarium; Us, Uppsala; V, Vienna Museum; W, U. S. National Herbarium; X, Herbarium Boissier; Y, Yale School of Forestry; and Z, H. N. Moldenke Herbarium.

1. **ERIOCAULON** L., Sp. Pl., ed. 1, 87 (1753); Gen. Pl., ed. 5, 38. 1754.

Cespa Hill, Herb. Brit. 1: pl. 66 [some copies]. 1769.

Nasmythia Huds., Fl. Ang., ed. 2, 414. 1778.

Randalia Petiv. ex Desv., Ann. Sci. Nat. Paris, sér. 1, 13: 47, pl. 5, fig. 2. 1828.

Symphachne P. Beauv. ex Desv., Ann. Sci. Nat. Paris, sér. 1, 13: 47, pl. 5, fig. 3. 1828.

Sphaerochloa P. Beauv. ex Desv., Ann. Sci. Nat. Paris, sér. 1, 13: 47. 1828.—*Spherochloa* P. Beauv., op. cit., pl. 5, fig. 1. 1828.

Leucocephala Roxb., Fl. Ind. 3: 612. 1832.

Electrosperma F. Muell., Trans. Phil. Soc. Victor. 1: 23. 1855.

Dichrolepis Welw., Apont. Phyt.-geogr. 542. 1859.

Lasiolepis Böck., Flora 56: 90. 1873.

Stems mostly very short, rarely elongate and equally covered with leaves throughout; leaves mostly tufted, membranous or very thin and pellucid, more or less linear or linear-lanceolate and grass-like, sessile and clasping at base, very often fenestrate; florets dimerous or trimerous, the staminate mixed with the pistillate or segregated on separate heads or (rarely) on separate plants; perigonium almost always double; staminate florets with the sepals free at base or often more or less connate into a split spathe, the 2 or 3 petals united below into a tube, free at apex, the lobes usually bearing a small black gland on the inner surface near the apex; stamens twice as many as the sepals (or rarely 3) and exerted; anthers 4-celled, mostly black, composed of 2 thecae; pistillate florets with free or (rarely) spathaceous-connate sepals; petals free or rarely none, usually each bearing a small black gland slightly below the apex within; style-appendages none; stigmas 2 or 3, simple.

A genus of about 360 species, widely distributed in marshy places in tropical and subtropical regions, the greatest number in tropical America; numerous also in tropical Asia and Africa; one species in northwestern Europe and northeastern North America.

Type species: *E. decangulare* L.

Both staminate and pistillate florets dimerous; stamens 4; stigmas 2; ovary 2-ovulate.

Mature heads white-villose at the summit, 4.5 to 7 mm. in diameter 1. *E. Kinlochii*

Mature heads blackish, glabrous, 1.5 to 3 mm. in diameter 2. *E. fuliginosum*

Both staminate and pistillate florets trimerous; stamens 6; stigmas 3; ovary 3-ovulate.

Stems abbreviated, not floating 3. *E. Williamsii*

Stems elongate, floating 4. *E. Schippii*

1. **ERIOCAULON KINLOCHII** Moldenke, N. Am. Fl. 19: 23-24. 1937.

Plants monoecious; stems very short; leaves tufted, spreading or recurved, light green, pellucid, broadly linear, 3 to 8 cm. long, about 1 mm. wide at the middle, plane (or the lower ones ensiform at base), long-attenuate and filiform at apex, fenestrately 6- or 7-nerved (the fenestrations conspicuous), glabrous; peduncles mostly solitary on each plant, slender, 5.5 to 14 cm. long, 3-costate, very slightly twisted, glabrous; sheaths loose, 1 to 3 cm. long, striate, not twisted, obliquely split and spathaceous at apex, the blade blunt; heads hemispheric or globose, 4.5 to 7 mm. in diameter, white-villous, compressed in drying; involucrel bractlets pale-stramineous, broadly elliptic-obovate, acute or obtuse at apex, glabrous; receptacle glabrous; receptacular bractlets hyaline, spatulate, concave-cucullate, acute at apex, densely short-pilose toward apex; staminate florets: short-pedicellate; sepals 2, hyaline, obovate, navicular, cucullate, tufted-pilose at apex on the back; petal-tube whitish, its lobes 2, slightly unequal, brown-glanduliferous at apex, short-pilose with unicellular hairs on both surfaces and on the rim of the tube; anthers 4, black, elliptic; pistillate florets: very short-pedicellate; sepals 2, hyaline, obovate, navicular, acute at apex, shortly winged-carinate on the upper half, short-pilose toward apex; petals 2, obovate, subacute, entire, short-pilose toward apex, glanduliferous at apex, sparingly pilose within; ovary long-stalked, 2-celled;

style about the same length as the ovary; stigmas 2, twice as long as the style or longer.—Tops of grass tussocks in pine forest ponds; endemic.

BRITISH HONDURAS: Stann Creek District—Stann Creek Valley, *J. B. Kinloch* 213 (F, type; N, photo of type; Z, photo of type).

This species has been confused with *E. Benthami* Kunth, a species apparently limited to northern and central Mexico, from which it differs in many respects, notably in its dimerous florets, long-attenuate and filiform-tipped leaves, 3-costate peduncles, and many floral characters.

2. *ERIOCAULON FULIGINOSUM* C. Wright ex Griseb., *Cat. Pl. Cub.* 226. 1866.

Eriocaulon scirpoides Griseb., *Cat. Pl. Cub.* 226. 1866.

Eriocaulon trichosepalum C. Wright ex Sauv., *Anal. Acad. Ci. Habana* 7: 715. 1871.

Eriocaulon sphaerospermum C. Wright ex. Sauv., *Anal. Acad. Ci. Habana* 7: 716. 1871.

Stems very short; leaves membranous, spreading or recurved, narrowly or rather broadly linear, often ensiform, narrowed from base to apex, attenuate and acute or subulate at apex, fenestrately 5- to 9-nerved (the fenestrations conspicuous beneath), glabrous; peduncles numerous on each plant, congested, up to 40 per plant, usually 3 or more times as long as the leaves, 2.5 to 18 cm. long, scarcely or not at all twisted, 5- to 7-costate, glabrous; sheaths shorter than the leaves, 0.6 to 3.5 cm. long, glabrous; heads very small, hemispheric, blackish, 1.5 to 3 mm. in diameter, glabrous; involucre bractlets membranous, yellowish hyaline or grayish brown, dull, broadly ovate or ovate-elliptic, subacute or rather obtuse at apex, glabrous throughout; receptacle glabrous; receptacular bractlets grayish or olivaceous toward apex, stramineous below, obovate or spatulate, acute at apex, glabrous; staminate florets: sepals 2, grayish or brownish toward apex, hyaline or whitish below, cuneiform-spatulate or obovate, concave, glabrous, slightly connate at base; petal-tube white, its lobes 2, minute, rather acute at apex, nonglanduliferous; anthers 4, rounded, black; pistillate florets: sepals 2, dark olivaceous or fuscous, obovate, navicular-concave, falcate, acute at apex, conspicuously winged-carinate or crested with a variable gray wing, glabrous; petals 2, sooty and lighter at base or else almost hyaline, oblong-spatulate or obovate, unequal, rather acute and notched at apex, nonglanduliferous, glabrous; style short; stigmas 2, longer than the style.—Savannas, pinelands, and the edges of ponds, brooks, and lagoons, Cuba and British Honduras.

BRITISH HONDURAS: Without locality, *R. S. Pelly* 73 (F). Belize District—Maskall, *P. H. Gentle* 993 (F; I; Mi, 2; N).

This species has been confused by some with *E. Schiedeana* Körn., a species limited to central Mexico and differing notably in its trimerous florets.

3. *ERIOCAULON WILLIAMSII* Moldenke, *N. Am. Fl.* 19: 36. 1937.

Dwarf plants; leaves tufted, erect or spreading, thin-membranous or pellucid, light green, linear, 1 to 4.5 cm. long, 1 to 2 mm. wide at the middle, subulate at apex, often slightly revolute on old leaves, fenestrately many-nerved (the fenestrations especially conspicuous beneath), glabrous; peduncles 3 or 4, slender, 1.2 to 6.5 (–10) cm. long, usually rather obscurely 3-costate or -striate, subglabrate; heads hemispheric or ovate-conic, dark gray, 2.5 to 4 mm. in diameter, compressed in drying; involucre bractlets rather few, light stramineous, ovate, blunt at apex, glabrous; receptacle glabrous; receptacular bractlets hyaline, with a grayish median line at the middle on the back, obovate, acute at apex, glabrous; staminate florets: long-pedicellate; sepals 3, nigrescent, spathaceous, the lobes short, often incurved and acute at apex, glabrous; petal-tube pale stramineous, its lobes very

minute, glabrous; anthers 6, white, rotund; pistillate florets: pedicellate; sepals 3, hyaline (or grayish toward apex), narrowly linear, glabrous; petals hyaline, narrowly linear, glabrous; style elongate, longer than the long-stalked ovary; stigmas 3, longer than the ovary.—Clay soil in dried-up ponds, British Honduras to Panama.

BRITISH HONDURAS: Orange Walk District—*W. C. Meyer* 134 (F).

4. *ERIOCAULON SCHIPPII* Standl. in Standl. & Record, Field Mus. Publ. Bot. **12**: 90, hyponym (1936); Moldenke, N. Am. Fl. **19**: 34. 1937.

Stems elongate, floating, very densely leafy throughout; leaves very narrowly linear, capillaceous toward apex, plane, lax, 4 to 8 cm. long, about 0.4 mm. wide at the middle, glabrous; peduncles numerous on each plant, umbellate-congested in groups of 6 to 16 at apex of stems, erect, compressed in drying, faintly 5- to 7-striate, very slightly twisted, glabrate; sheaths rather close-fitting, 1.5 to 2 cm. long, rather conspicuously striate, not twisted, glabrous, bilobed at apex, the blades short, acute at apex; heads nigrescent, hemispheric, 2 to 3.5 mm. in diameter, compressed in drying; involucre bractlets nigrescent, ovate, blunt at apex, glabrous; receptacle glabrous; receptacular bractlets grayish, obovate, acute and cucullate at apex, tufted-pilose on the back at apex; staminate florets: sepals 3, grayish, spatheaceous for about half their length, subacute at apex, glabrous; petal-tube white, its lobes very small, hyaline, black-glanduliferous, glabrous; anthers 6, black; pistillate florets: sepals 3, nigrescent, connate at base, obovate, blunt at apex, navicular-concave, not keeled nor alate, sparsely pilose on the back; petals 3, hyaline, narrowly spatulate, black-glanduliferous, glabrous; ovary 3-celled; style shorter than the ovary; stigmas 3, about as long as the ovary.—Shallow pools in brackish swamps; endemic.

BRITISH HONDURAS: Stann Creek District—All Pines, *W. A. Schipp* 647 (F, isotype; Mi, isotype; N, type).

This very distinctive species is said to be a very graceful little aquatic, common at low elevations. It is related to *E. melanocephalum* Kunth, a South American species, which, along with its variety *longipes* Griseb., is found also in Cuba, unless (as Mr. E. P. Killip maintains) the Cuban form should prove specifically distinct, and to the endemic Cuban *E. lacustre* Ruhl. These 3 species, with their greatly elongated, leafy, floating stems, form a very distinct group in the North American representatives of this large and complex genus, perhaps, with their few Old World relatives, worthy of generic segregation.

2. *PAEPALANTHUS* Mart., Nov. Act. Physico-med. Acad. Caes. Leopold.-Carol. Nat. Cur. **17**¹: 13. 1835 [nom. conserv.].

Dupatya Vell., Fl. Flum. 35. 1825 [nom. rejic.].

Stephanophyllum Guill. in Deless., Icon. Sel. **3**: 61, pl. 98, in obs. 1837.

Cladocaulon G. Gardn. in Hook., Icon. Pl. pl. 528. 1843.

Limnoxeranthemum Salzm. ex Steud., Syn. Pl. Cyp. **2**: 281, in syn. 1855.

Stems and branches very variable; leaves thin-membranous to thick-coriaceous, usually not fenestrate; heads villous; receptacular bractlets present; florets mostly polygamous, 2- or 3-merous; perianth (perigonium) double and involute; staminate florets with the sepals more or less connate toward the base, the petals connate into a membranous, hollow, glabrous (or rarely pilose within), slightly 2- or 3-lobed, eglandular, infundibular tube, which is finally almost always involute; stamens of the same number as the petals (2 or 3) and opposite them, exserted; anthers 4-celled (composed of 2 thecae); and in the center a double or triple papillose rudimentary pistil; pistillate florets with the sepals usually connate at the

very base and becoming rigid in age; petals free and eglandular; ovary 2- or 3-celled, the style-appendages mostly 2 or 3, papillose at apex, inserted at about the same height as the stigmas and placed between them; the stigma simple or more often bifid; hairs of the receptacular bractlets and perigonium granulose within, almost always clavate-obtuse, often tuberculate.

A genus of about 450 species of tropical America, most numerous in Brazil.

Type species: *Eriocaulon corymbosum* Bong. [= *Paepalanthus corymbosus* (Bong.) Kunth].

Heads dark brown, globose 1. *P. Lamarckii*
Heads gray, cylindrical-elongate 2. *P. Gentlei*

I. PAEPALANTHUS LAMARCKII Kunth, Enum. Pl. 3: 506. 1841.

Eriocaulon fasciculatum Lam., Encycl. Méth. 3: 276. 1789 [not *E. fasciculatum* Rottb., 1778].

Paepalanthus Ottonis Klotzsch in Schomb., Reise in Br. Guian. 3: 1115. 1848.

Eriocaulon Lamarckii (Kunth) Steud., Syn. Pl. Cyp. 276. 1855.

Lasiolipsis pilosa Böck., Flora 56: 90. 1873.

Dupatya Lamarckii (Kunth) Kuntze, Rev. Gen. Pl. 2: 746. 1891.

Stems simple, 2 to 8 cm. long; leaves dull- or grayish-green, the older ones olivaceous, plane, linear-lanceolate or broadly linear, 1.3 to 3 cm. long, 0.5 to 2.3 mm. wide at the middle, ampliate-clasping at base, narrowed to a rather acute or obtuse apex, many-striate, sparsely puberulent or pilose, soon glabrescent; peduncles fasciculate at apex of stem, 2 to 20 per plant, usually numerous, 1.5 to 7 cm. long, irregularly and more or less densely spreading-pilose; sheaths rather loose, 9 to 13 mm. long, long-pilose, the blade rather rigid, often lobed or bifid, attenuate and sharply acute at apex, often somewhat spreading, long-ciliate, at first puberulent, eventually calvescent; heads dark brown, globose, 2 to 3 mm. in diameter, villous; involucrel bractlets gray-brown, with a lighter midrib, obovate, subacute and densely pilose at apex; receptacle pilose; receptacular bractlets brown, with a white midrib, spatulate, acute at apex, densely long-pilose above the middle on the back; staminate florets: sepals 3, stramineous at base, dark brown at apex (except for a broad white central band), spatulate, obtuse and ciliate at apex; petal-tube stramineous; stamens 3; pistillate florets: sepals similar in color and texture to those of the staminate florets, obovate, pilose along the margins and at apex, spreading; petals 3, tiny, white or hyaline, linear, blunt and sparsely ciliate at apex; ovary 3-celled; style-appendages long and hyaline; stigmas 3, brown, shorter than the style-appendages; seeds slightly curved, cancellate.—Roadsides, pinelands, swampy places, and savannas from Hispaniola, Cuba, and British Honduras to Panama, Trinidad, Venezuela, the Guianas, and Brazil.

BRITISH HONDURAS: Belize District—*H. H. Bartlett 11263* (Mi, 2; N). Maskall, *P. H. Gentle 992a* (Mi, N). Stann Creek District—All Pines, *W. A. Schipp S-130* (F, N).

This species apparently grows in company with the next and with *Syngonanthus Bartlettii*, for it was intimately mixed with these species on sheets of *Gentle 992* and *Bartlett 11263*. The latter collection also has several other contaminations, mostly xyridaceous, cyperaceous, and juncaceous. The *Paepalanthus Lamarckii* material is here considered to be the true *Bartlett 11263*, but in the case of the Gentle collection it is being assigned the number *992a*. The species is said to be confined to regions near sea level and Schipp describes it as "very rare" in British Honduras. It occurs rather abundantly, however, in Venezuela and the Guianas. This rather peculiar distribution brings to mind that of *Eriocaulon melanocephalum* Kunth [Cuba, French Guiana, and Brazil], *Tonina fluviatilis* [Cuba, British Honduras, Costa Rica, Colombia to French Guiana, and Trinidad], and *Ghinia spicata* (Aubl.) Mol-

denke [British Honduras, French Guiana, and Brazil]. It may very well be due to our still very incomplete and fragmentary knowledge of the flora of the intervening areas. More intensive collecting may reveal these species more commonly through the intervening regions, in suitable situations.

2. *PAEPALANTHUS GENTLEI* Moldenke, N. Am. Fl. **19**: 40-41. 1937.

Stems simple, 3 to 4 cm. long, leafy; leaves dull green, thin, plane, broadly linear, 2 to 4.5 cm. long, 3 to 4 mm. wide at the middle, attenuate to the sharply acute apex, amplate-clasping and thin-membranous at base, fenestrate with prominent lines or dots, very sparsely strigillose or pilose-ciliolate, soon glabrescent; peduncles fasciculate at apex of stems, 4 to 10 per plant, 3 to 8.5 cm. long, 3-costulate, slightly twisted, glabrate; sheaths rather loose, 10 to 15 mm. long, striatulate, very minutely strigillose, soon glabrescent, the blades attenuate-acuminate and sparingly pilose-ciliate; heads gray, cylindrical-elongate, 3 to 7 mm. long, about 3 mm. in diameter; outer involucre bractlets stramineous, elliptic-obovate, acuminate at apex, ciliolate, the inner ones similar, but darker brown; receptacles pilose; receptacular bractlets light brown, narrowly obovate, acute at apex, pilose on the back; florets minute; staminate florets: about $\frac{2}{3}$ as long as the receptacular bractlets; sepals 3, light brown, narrowly spatulate, acute at apex, ciliate; petal-tube hyaline; filaments elongate; anthers 3, white, roundish; staminate florets: sepals 3, free, gray-hyaline, oblong, blunt at apex, glabrous; petals 3, hyaline, narrowly oblong, rounded and ciliolate above; seeds light yellow, cancellate, the striae minutely puberulent.—Swampy places, British Honduras; endemic.

BRITISH HONDURAS: Belize District—Boomtown, *H. O'Neill* 8547 (I, Mi). Maskall, *P. H. Gentle* 992 (F, isotype; I, isotype; Mi, 2 isotypes; N, type). El Cayo District—Little Mountain Pine Ridge, *H. H. Bartlett* 11874 (Mi).

This very distinct species seems often to grow in company with *P. Lamarckii*, for both species are intimately mixed on some sheets of the type collection. The *P. Lamarckii* material, however, is here regarded as *Gentle* 992a, and the *P. Gentlei* material as the true number 992.

3. *SYNGONANTHUS* Ruhl. in Urb., Symb. Ant. **1**: 487. 1900.

Stems very short or elongate, sterile or fertile, simple or branched; roots rather thick or incrassate, porous, whitish; heads pilose or subglabrate, the hairs always acute and smooth; receptacular bractlets almost always none; florets trimerous; sepals mostly free or almost so; staminate florets with the petals connate into an infundibular, 3-lobed, glabrous, finally almost always involute (rarely 3-parted) tube and the anthers 4-celled, composed of 2 thecae; pistillate florets with the petals connate by their margins at or above the middle, the base and apex free, the apex finally mostly involute; style terete, its appendages non-papillose, sometimes obsolete; stigmas simple, inserted at the same height on the style as its appendages.

A genus of about 160 species, mostly of tropical America; a few in tropical Africa.

Type species: *Eriocaulon umbellatum* Lam. [= *Syngonanthus umbellatus* (Lam.) Ruhl.].

- | | |
|---|---------------------------|
| Peduncles glabrous or practically so | 1. <i>S. Oneillii</i> |
| Peduncles conspicuously pubescent. | |
| Involucre bractlets hyaline, completely colorless | 2. <i>S. Bartlettii</i> |
| Involucre bractlets more or less olivaceous. | |
| Sheaths shorter than the leaves, densely short-pubescent; pubescence on peduncles mostly appressed; bractlets to 2.5 mm. long, glabrous | 3. <i>S. hondurensis</i> |
| Sheaths longer than the leaves, loosely long-pilose; pubescence on peduncles spreading; bractlets to 8 mm. long, villous | 4. <i>S. Lundellianus</i> |

1. SYNGONANTHUS ONEILLII Moldenke, *Phytologia* 1: 346-347. 1939.

Small herb, 6 to 10 cm. tall; leaves caespitose, linear, olivaceous, spreading and more or less recurved, 1 to 2.5 cm. long, 0.5 to 1 mm. wide, abruptly acute at apex, glabrate on both surfaces or somewhat loosely pilose; sheaths closely appressed, equaling or shorter than the leaves, very sparsely and loosely pilose or glabrate, sharply acute or acuminate at apex; peduncles numerous, very slender, sulcate, twisted, glabrous or subglabrous throughout; heads solitary, 3 to 5 mm. wide; involucrel bractlets oblanceolate-elliptic, rather light olivaceous or brownish throughout, lighter along the margins, very abruptly acute or obtuse at apex, glabrous; staminate florets: pedicels about 0.875 mm. long, glabrous except for a few long hirsute white hairs at the base surpassing the pedicels; sepals 3, 1 to 1.125 mm. long, oblanceolate, about 0.375 mm. wide at the widest part, glabrous, plainly cellular, hyaline, short-acuminate or sinuate-tridentate at apex, cuneate-narrowed to the base, free; petals united at the middle, free at apex and base, slightly shorter than the sepals, olivaceous in a median band from apex to base, incurved and pilose at the very apex on the outer surface with a few black hairs; pistillate florets: pedicels about 0.75 mm. long, long-hirsute at base; sepals about 1.25 mm. long, lanceolate-ovate, acute at apex, long-ciliate on the margins toward apex; petals narrow-oblong, connate by their margins.—Pinelands, British Honduras; endemic.

BRITISH HONDURAS: Belize District—Boomtown, *H. O'Neill* 8548 (I, isotype; Mi, type), 8549 (I, Mi, N). Three miles west of Boomtown, *H. O'Neill* 8543a (I, Mi).

The type of this species was collected by my good friend, Rev. Hugh O'Neill (*no.* 8548)—in whose honor it is named—in a tropical pineland, Boomtown, British Honduras, September 14, 1936, and is deposited in the herbarium of the University of Michigan. The species apparently grows in association with *S. hondurensis*, since the two were originally mixed by the collector under his number 8543—the *S. Oneillii* material here being regarded as number 8543a.

2. SYNGONANTHUS BARTLETTII Moldenke, *Phytologia* 1: 335-336. 1938.

Very small herb, 2 to 7 cm. tall; leaves caespitose, linear, dark-olivaceous, conspicuously recurved and appressed to the ground, 3 to 12 mm. long, about 0.5 mm. wide, blunt at apex, glabrate or very obscurely puberulent on both surfaces; sheaths closely appressed, conspicuously surpassing the leaves, conspicuously pilose with long wide-spreading (hirsute) hairs, sharply acute or acuminate at apex; peduncles solitary or few per plant, very slender, obscurely sulcate, slightly twisted, conspicuously pilose throughout with elongate hirsute wide-spreading hairs like on the sheaths; heads solitary, 2 to 5 mm. wide; involucrel bractlets hyaline, completely colorless throughout, elliptic-lanceolate, sharply acute or acuminate at apex, glabrous; staminate florets: pedicels about 0.5 mm. long, very densely long-tomentose at base; sepals 3, elliptic-obovate, 1 to 1.125 mm. long, free, hyaline, acute at apex, cuneate-narrowed at base; petals very hyaline, closely connate, forming a very narrow tube; pistillate florets: pedicels about 0.5 mm. long; sepals free, lanceolate-ovate, about 1.5 mm. long, acuminate at apex, not ciliate on the margins; petals linear-oblanceolate, very narrow, about half as wide as the sepals, connate by their margins.—Flat wet uplands and pine ridges, British Honduras; endemic.

BRITISH HONDURAS: Belize District—North of aviation field, Belize, *H. H. Bartlett* 11263a (Mi, 2; N, 2). El Cayo District—Mountain Pine Ridge, *H. H. Bartlett* 11670 (Mi, type & isotype; N, fragment of isotype).

The species apparently grows in company with *Paepalanthus Lamarckii*, since Bartlett's

number 11263 originally contained a mixture of these two species—the *Syngonanthus* material being here regarded as number 11263a.

3. *SYNGONANTHUS HONDURENSIS* Moldenke, *Phytologia* 1: 344-345. 1939.

Small herb, 6 to 7 cm. tall; leaves caespitose, linear, olivaceous, spreading, not noticeably recurved or appressed, 1 to 1.6 cm. long, about 1 mm. wide, rather blunt at apex, glabrate on both surfaces; sheaths closely appressed, shorter than the leaves, densely short-pubescent, acuminate at apex; peduncles 4 or 5 per plant, very slender, obscurely sulcate, slightly twisted, conspicuously white-pilose throughout with usually closely appressed hairs or sometimes also a few spreading ones toward the apex; heads solitary, 2 to 6 mm. wide; involucre bractlets elliptic, membranous, olivaceous in a median band from apex to base, gray and scarious at the margins, 1.6 to 2.5 mm. long, about 0.875 mm. wide, regularly narrowed from the middle to the sharply acute or acuminate apex, glabrous, not ciliate; staminate florets: pedicels about 1.25 mm. long, glabrous; sepals 3, free, membranous, with an olivaceous median band, elliptic, about 1.125 mm. long, sharply acute at apex, glabrous, not ciliate; petals united to form a tube about as long as the sepals, olivaceous throughout to about the middle, olivaceous only along the midribs above the middle, glabrous; pistillate florets: pedicels about 1 mm. long, densely long-villous at base with white hairs longer than the pedicel; sepals 3, free, membranous, with an olivaceous median band, lanceolate, about 1.875 mm. long, sharply acute at apex, long-ciliate along the margins, glabrous; petals loosely connate along the margins, narrow-oblong, slightly shorter than the sepals, densely long-villous on the outer surface with white ascending hairs.—Pinelands, British Honduras; endemic.

BRITISH HONDURAS: Belize District—Three miles west of Boomtown, *H. O'Neill* 8543 (I, isotype; Mi, type; N, isotype).

The type of this species was collected by Rev. Hugh O'Neill (*no.* 8543) in a tropical pineland, 3 miles west of Boomtown, British Honduras, August 23, 1936, and is deposited in the herbarium of the University of Michigan. It was apparently growing in close association with *S. Oneillii*, since the two were originally mixed under the same number by the collector. The *S. Oneillii* material is here being called number 8543a.

4. *SYNGONANTHUS LUNDELIANUS* Moldenke, *Phytologia* 1: 345-346. 1939.

Small herb, 6.5 to 8.5 cm. tall; leaves caespitose, linear, olivaceous, 1 to 1.5 cm. long, spreading, not noticeably recurved or appressed, rather blunt at apex, appressed-puberulent on both surfaces; sheaths closely appressed, conspicuously surpassing the leaves, loosely long-pilose, acute or subacuminate at apex; peduncles numerous on each plant, very slender, few-sulcate, straight (not twisted), conspicuously pilose throughout with loosely spreading (hirsute) elongate hairs; heads solitary, 2 to 15 mm. wide; involucre bractlets linear-oblong, often elongate to 8 mm. (!), the outer ones much shorter or all much shorter, the short ones olivaceous in a median band from base to apex, the elongated ones olivaceous in several parallel bands from base to apex, acute at apex, conspicuously villous on the outer surface with long loose hirsute capitate hairs, glabrous within; staminate florets: pedicels about 0.75 mm. long, densely long-villous-tomentose at base with white hairs longer than the pedicels; sepals 3, free, hyaline, elliptic, about 1 mm. long, acuminate at both ends, glabrous, not ciliate; petals united into a narrow hyaline glabrous tube almost as long as the sepals; pistillate florets: pedicels about 0.5 mm. long, densely long-villous with white hairs longer than the pedicels; sepals 3, free, hyaline, elliptic, about 1.625 mm. long, regularly

narrowed to the acute or acuminate apex, glabrous, not ciliate; petals narrow-oblong and strap-shaped, shorter than the sepals, hyaline, appressed-villous on the back, loosely connate by their margins.—Oak ridges, British Honduras; endemic.

BRITISH HONDURAS: Belize District—Broken Ridge, 8 miles northeast of Boomtown, *H. O'Neill* 8546 (I, isotype; Mi, type; N, isotype).

The type of this species was collected by Rev. Hugh O'Neill (*no.* 8546) under *Quercus oleoides* var. *australis* Trelease in broken ridge, 8 miles northeast of Boomtown, British Honduras, September 17, 1936, and is deposited in the herbarium of the University of Michigan. It is named in honor of my very good friend and colleague, Dr. Cyrus Longworth Lundell, to whose indefatigable zeal and energy we owe so much of our present knowledge of the Mexican and Central American flora and whose name will always be indelibly associated with the flora of the Yucatan Peninsula. *S. Lundellianus* is remarkable for its very pronounced vivipary—in fact, this character is so pronounced that young plants are actually matured and in flower (!) while still borne in the heads of the old parent plants on the Catholic University isotype!

4. **TONINA** Aubl., *Hist. Pl. Guian. Fr.* **2**: 856. 1775.

Hyphadra Schreb., *Gen.* 666. 1791.

Stems elongate, slender, floating, equally foliose throughout; peduncles apparently supra-axillary; florets trimerous, pedicellate; receptacle pilose; staminate florets with the sepals connate to the middle, the 3 petals connate into a short membranous shortly 3-lobed tube, which is concave above, 3 stamens, and 2-celled anthers (composed of 1 theca); pistillate florets with 3 rather thick and somewhat porous sepals, which are connate at the base, very small free long-pilose petals, 3 nonpapilose style-appendages, and 3 bifid stigmas which are shorter than the style-appendages.

A monotypic genus of tropical portions of the New World.

Type species: *T. fluviatilis* Aubl.

1. **TONINA FLUVIATILIS** Aubl., *Hist. Pl. Guian. Fr.* **2**: 857, *pl.* 330. 1775.

Hyphadra amplexicaulis Vahl, *Symb. Bot.* **3**: 99. 1794.—*H. amplexicaulis* Schreb. apud Ruhl. in Engl., *Pflanzenreich* 4³⁰: 240, in syn. 1903.

Eriocaulon amplexicaule (Vahl) Rottb., *Descr. Pl. Surinam.* 7, *pl.* 1, *fig.* 1. 1798.

Stems greatly elongate, slender, lax, 20 to 80 or more cm. long, often branched, about 1 mm. in diameter, equally and persistently foliose; leaves rather dense, spreading, lanceolate or oblong, 0.8 to 1.5 cm. long, 1 to 2.5 mm. wide at the middle, sessile and more or less clasping at base, acute and often recurved at apex, long-ciliate along the margins throughout or sparsely ciliate at base only and otherwise glabrous on both surfaces; peduncles dispersed over the stem and branches, 2 to 13 mm. long (mostly about 1 cm. long when mature), glabrous; heads echinulate-globose, 4 to 8 mm. in diameter, subglabrate; involucre bractlets ovate or obovate, long-cuspidate, glabrous except for the pilose-ciliate base and apex, the outer ones broader; receptacular bractlets narrowly oblong-obovate, cuspidate-acuminate, ciliate below the apex; staminate florets: sepals 3, fuscous, broadly obovate, connate to the middle, involute above, abruptly acute at apex, very concave ventrally; pistillate florets: sepals ovate, concave ventrally, long-cuspidate, ciliate; petals linear.—Quiet water of marshes, swamps, ponds, and streams, from Cuba and British Honduras to Colombia, Trinidad, and Brazil.

BRITISH HONDURAS: Stann Creek District—All Pines, *W. A. Schipp 693* (Mi, N).

The plant is described by Schipp as a medium-sized aquatic herb, occasional in shallow swampy places.

VERBENACEAE J. St. Hil., *Expos. Fam. 1: 245. 1805.*

Herbs, shrubs, woody vines, or trees, not inhabiting lagoons; growth in diameter of trunks and stems normal, not brought about by concentric layers of mestome rings; branches, branchlets, and twigs mostly tetragonal, not prominently nodose or articulate, often annulate; leaves mostly opposite, sometimes whorled, alternate, or scattered, thick- or thin-textured, deciduous, exstipulate, sessile or petiolate, simple or sometimes palmately compound or 1-foliolate; blades entire or variously dentate, incised, or cleft; inflorescence axillary or terminal, determinate and centrifugal (cymose) or indeterminate and centripetal (racemose), in the form of cymes, racemes, spikes, panicles, thyrsi, heads, or false-umbels, sometimes involucrate, the axillary ones mostly solitary; flowers sessile or pedicellate, perfect or imperfect, hypogynous, sometimes declinuous or polygamous, large or small, mostly irregular, the individual ones not involucrate; calyx gamosepalous, campanulate, tubular, or salver-shaped, persistent, usually accrescent, mostly 4- (more rarely 2- or 5- or 7-) lobed or toothed or sometimes the rim subentire; corolla regular or irregular, gamopetalous, funnel- or salver-shaped, usually with a well-developed tube, its limb 4 or 5 (rarely 7 to many) -parted, often somewhat 2-lipped; stamens mostly 4 and didynamous or reduced by abortion to 2, sometimes 4 or 5 and equal, inserted on the corolla-tube; staminodes present; gynoecium composed of 2 (rarely 4 or 5) united carpels, 1 sometimes aborted; ovary mostly compound, sessile, mostly somewhat 4-lobed, at first 2- to 5-celled, but almost invariably soon becoming 4- to 10-celled through formation of false partitions, never with a free central placenta or columella; the axile placentae-lobes bearing each one ovule, so that cells not subsequently divided by cross-walls contain each 2 ovules, while cells later divided by partitions contain each 1 ovule; ovules anatropous and basal or hemianatropous and lateral; fruit usually a dry schizocarp or drupaceous, with a thin and dry or fleshy exocarp and more or less hard endocarp, 2- to 4-celled and indehiscent when ripe or dehiscent into 2 (or rarely 4 to 10) 1- or 2-celled pyrenes; seeds plainly testate; embryo never viviparous; radicle short and inferior; cotyledons 2, flat, more or less thickened and parallel.

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| Leaves palmately compound | 16. VITEX |
| Leaves simple. | |
| Inflorescence racemose and centripetal (indeterminate). | |
| Fertile stamens 2 | 7. STACHYTARPHETA |
| Fertile stamens 4. | |
| Fruiting-calyx winged, its elongated lobes becoming scarios and spreading, acting as floats; calicinal crest present | 9. PETREA |
| Fruiting-calyx not winged; no calicinal crest present. | |
| Fruit composed of four 1-seeded pyrenes. | |
| Calyx tubular; fruit dry, schizocarpous, composed of 4 separate cocci | 1. VERBENA |
| Calyx broadly campanulate; fruit with a fleshy exocarp, drupaceous | 2. GHINIA |
| Fruit not composed of four 1-seeded pyrenes. | |
| Fruit composed of one or two 1-celled and 1-seeded pyrenes. | |
| Fruit with a fleshy exocarp | 3. LANTANA |
| Fruit with a thin dry exocarp. | |
| Calyx elongated, conspicuous, herbaceous, often half as long as the corolla-tube or longer; fruit (cocci) beaked | 6. BOUCHEA |
| Calyx very small and inconspicuous, membranous; fruit not beaked. | |

- Mostly herbaceous with trailing or ascending stems, sometimes somewhat woody; spikes greatly elongating in fruit; bractlets cuneate-obovate, not 4-ranked 5. PHYLIA
- Erect bushes, shrubs, or subshrubs; spikes not usually elongating in fruit; bractlets ovate or lanceolate, often more or less 4-ranked 4. LIPPIA
- Fruit composed of two or four 2-celled and 2-seeded pyrenes.
- Fruiting-calyx patelliform or cupliform, not inflated or enclosing the fruit or rostrate at apex.
- Fruit fleshy, drupaceous; leaves not plinerved; fruiting-calyx persistent 10. CITHAREXYLUM
- Fruit dry, schizocarpous; leaves plinerved; fruiting-calyx fugacious 11. REHDERA
- Fruiting-calyx flask-shaped, completely enclosing the mature fruit, usually rostrate at apex.
- Herbaceous; fruit dry, composed of 2 pyrenes 8. PRIVA
- Woody; fruit fleshy, composed of 4 pyrenes 12. DURANTA
- Inflorescence cymose and centrifugal (determinate).
- Flowers regular; stamens equal.
- Stigma capitate 13. CALLICARPA
- Stigma deeply bifid 14. AEGIPHILA
- Flowers irregular; stamens didynamous.
- Fertile stamens 4; staminodes none 17. CLERODENDRUM
- Fertile stamens 2; staminodes 2 15. CORNUTIA

1. **VERBENA** L., Sp. Pl., ed. 1, 18 (1753); Gen. Pl., ed. 5, 12. 1754.

Obletia Rozier, Obs. Phys. 1: 367. 1773.

Glandularia J. F. Gmel., Syst. Veg. 920. 1791.

Billardiera Moench, Meth. 369. 1794.

Shuttleworthia Meisn., Pl. Vasc. Gen. 1: 290 & 2: 198. 1839.—*Schuttleworthia* Meisn. apud Schau. in A. DC. Prodr. 11: 535, in syn. 1847.

Uwarowia Bunge, Bull. Sci. Acad. S. Pétersb. 7: 278. 1840.

Herbs; stems and branches procumbent, ascending, or erect, glabrous or variously pubescent; leaves mostly opposite, dentate (very rarely entire) or variously lobed, incised, or pinnatifid; inflorescence spicate; spikes terminal, usually densely many-flowered, often flat-topped and pseudo-umbellate, sometimes greatly elongate with scattered flowers, very rarely also axillary; flowers small or medium-sized, each solitary in the axil of a usually narrow bractlet; calyx usually tubular, 5-angled, 5-ribbed, unequally 5-toothed, not at all or but slightly changed in fruit; corolla salver-form or funnel-form, its tube straight or curvate, often slightly ampliate at apex, its limb flat, weakly 2-lipped, the lobes 5, usually rather elongate, obtuse, rounded, or emarginate at apex, the 2 posterior outermost and the anterior one inmost in prefloration; stamens 4, didynamous, inserted in the upper half of the corolla-tube, included; anthers ovate, with parallel or slightly divergent thecae, the connective unappendaged or provided with a glandular appendage; style single, usually short, shortly 2-lobed at apex, the posterior lobes smooth and nonstigmatiferous, the anterior lobe broader, papillose, and stigmatic; ovary 2-carpellary, 4-lobed, completely 4-celled even at time of anthesis, with 1 ovule in each cell; fruit mostly enclosed by the mature calyx, dry, schizocarpous, at length separating into four 1-seeded linear or linear-oblong crustaceous cocci.

A complex genus of 125 or more species of temperate and tropical America; 1 or 2 species native to the Mediterranean region and introduced elsewhere in the Old World.

Type species: *V. officinalis* L.

1. *VERBENA TENUISECTA* Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 294-296. 1904.

Verbena dissecta Morong apud Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 294, in syn. 1904 [not *V. dissecta* Willd., 1825].

Verbena crinoides Lam. apud Chod., Bull. Herb. Boiss. sér. 2, 2: 818. 1902.—*V. erinoides* Chod. apud Chod. & Hassler, Bull. Herb. Boiss. sér. 2, 4: 1059, in syn. 1904 [not *V. erinoides* Lam., 1791].

Glandularia tenuisecta (Briq.) Small, Man. Southeast. Fl. 1139. 1933.

Perennial herb, 10 to 30 cm. tall; stems decumbent; branches divergent, ascending, tetragonal, sparsely pilose with antrorse hairs, becoming glabrescent in age; principal internodes 1.5 to 3 cm. long; leaves triangular in outline, 2 to 3.5 cm. long, 2 to 3 cm. wide, tripartite-pinnatifid, the lacinations linear, 1 to 3 mm. long, entire or dentate, obtuse (especially on lower leaves) or sharply acute (especially on upper leaves) at apex, flat except for the revolute margins, green, substrigose above with appressed antrorse hairs, more densely so along the venation beneath, becoming glabrescent; spikes terminal, pedunculate, solitary, fastigiate, during anthesis dense and short, about 1.5 cm. long, ovate-capitate, later elongating to 3 or 4 cm.; flowers sessile, at first dense and ascending, later spreading and lax; bractlets subovate-lanceolate, 2 to 3 mm. long, usually about $\frac{1}{4}$ as long as the calyx, canescent-puberulent outside; calyx long-tubular, 8 to 9 mm. long, densely substrigose-canescant throughout, with a few scattered black glands, its tube about 7 mm. long, its teeth ovate, 1 to 2 mm. long, filiform-setulose at apex; corolla blue, showy, its tube glabrous, exerted 3 to 5 mm. from the mouth of the calyx, its limb about 1 cm. in diameter, its lobes broadly obcordate, spreading, 3 to 4 mm. long, 3 to 4 mm. wide above the middle, emarginate to 1 to 1.5 mm. at apex, ciliate-pilose at base; stamens included; anthers bearing a glandular appendage, which is scarcely exerted; style included, exceeding the calyx, 1 to 1.3 cm. long, lasting one day; schizocarp oblong-linear, yellowish, about 3 mm. long, prominently reticulate-nervose.—Roadsides, fields, and waste places; introduced from South America.

YUCATAN: *E. C. Stewart* 683 (Mi).

This species is native and widely distributed in Brazil, Uruguay, Paraguay, Argentina, Bolivia, and Peru, and has been introduced into many other portions of the world, including such unexpected places as near Bagdad in Iraq. Because of its showy flowers it is widely cultivated in the United States. It has escaped and become extensively naturalized in Georgia, Alabama, and Florida. My esteemed colleague, Miss Lily M. Perry, who has done such noteworthy work in monographing the genus *Verbena* as it occurs in North America, lists this species in Ann. Mo. Bot. Gard. 20: 341-342 (1933) under the name "*Verbena erinoides* Lam." in quotation marks, and says of it: "This species has established itself in several places. It belongs to a South American species-complex needing critical study to determine accurately its real identity." These comments are quite justified, for it has been deplorably confused by collectors, herbarium workers, botanical writers, and horticulturists with the closely related *V. tenera* Spreng. [e.g., vid. Mohr, Contrib. U. S. Nat. Herb. 6: 694. 1901], *V. erinoides* Lam., *V. laciniata* (L.) Briq., and *V. dissecta* Willd. Means for distinguishing it from all these species are provided by Briquet in his original description. Kellogg, observing cultivated specimens at the Missouri Botanical Garden, thought it to be a hybrid, which he designated "*V. tenera* x *lanceolata*." Common names are "moss verbena" and "margarita morada."

2. **GHINIA** Schreb., Gen. Pl. 19. 1789.

Tamonea Aubl., Pl. Guian. Fr. 2: 659, pl. 268. 1775 [not *Tamonea* Aubl., op. cit. 1: 441, pl. 175. 1775].

Kaempferia Houst., Reliq. 3: pl. 2. 1781 [not *Kaempferia* L., 1753 & 1754].

Leptocarpus Willd. ex Link, Jahrb. Gew. 1³: 51. 1820.

Ischnia P. DC. ex Meisn., Pl. Vasc. Gen. 1: 298. 1839.—*Ischnia* P. DC. apud Walp., Repert. 6: 520. 1847.—*Ischnia* Walp. apud Pfeiffer, Syn. Bot. 227, in syn. 1870.

Maceria P. DC. ex Meisn., Pl. Vasc. Gen. 2: 206, in syn. 1839.

Guinia Schreb. apud Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4^{3a}: 148, in syn. 1895.

Erect herbs or suffrutescent, with slender rigid divaricate branches; leaves small, opposite, subsessile or short-petiolate, dentate or incised-pinnatifid or the uppermost entire; inflorescence spicate or racemiform, axillary and terminal, few-flowered, slender; flowers small, sessile or short-pedicellate, solitary in the axils of very small bractlets, borne alternately along a slender rachis; calyx during anthesis tubular, finally campanulate, subtruncate, 5-costate with elevated ribs which are prolonged into short tooth-like apiculations at the rim; corolla-tube cylindrical, slightly ampliate above, its limb oblique, spreading, 5-fid, the 2 posterior lobes slightly smaller, the anterior lobe more enlarged; stamens 4, didynamous, inserted at about the middle of the corolla-tube, included; anthers ovate, with parallel thecae; connective of the 2 anterior stamens prolonged into a short or club-shaped glanduliferous appendage; pistil bicarpellary; ovary almost completely 4-celled, the cells 1-ovulate; style included; stigma oblong, rather thickened, oblique; ovules laterally attached near the base of the cell; fruit drupaceous, globose or turbinate, scarcely exerted from the accrescent fruiting-calyx, obtuse or shortly 4-lobed at apex, the exocarp fleshy, the endocarp hard, 4-celled, with a single central lumen; seeds solitary in each cell, erect, without endosperm.

About 6 species of tropical America, from Mexico and the West Indies to Brazil.

Type species: *Tamonea spicata* Aubl. [= *Ghinia spicata* (Aubl.) Moldenke].

Fruit spinose, with spreading spines several mm. long; leaf-blades

minutely puberulent beneath 2. *G. curassavica* var. *yucatanensis*

Fruit not spinose; leaf-blades hirsute beneath 1. *G. spicata*

1. **GHINIA SPICATA** (Aubl.) Moldenke, Phytologia 1: 169. 1935.

Tamonea spicata Aubl., Pl. Guian. Fr. 2: 660, pl. 268. 1775.

Tamonea mutica Sw., Prodr. Veg. Ind. Occ. 94. 1788.—*T. mutica* Pers., Syn. Pl. 2: 139. 1806.

Ghinia mutica (Sw.) Sw., Fl. Ind. Occ. 1090. 1800.

Leptocarpus chamaedrifolius Willd. ex Link, Jahrb. Gew. 1³: 51. 1820.

Slender; branches and branchlets more or less minutely pilose with uncinat hairs, acutely tetragonal and more or less margined, the leaf-bearing sides 2-costate and 3-sulcate; petioles very slender, 3 to 6 mm. long, rather densely hirsute; leaf-blades thin-chartaceous, ovate, 7 to 16 mm. long, 3 to 12 mm. wide, rather coarsely incised-serrate with sharply acute teeth, ciliate-margined, obtuse (in outline) at apex, truncate at base, rather sparsely hirsute with scattered hairs above, more densely hirsute (especially along the venation) beneath; inflorescence racemiform, axillary, 2.5 to 8 cm. long, 2- to 8-flowered, ascending; pedicels about 2 mm. long, uncinat-pilose; calyx in anthesis about 4 mm. long and 1 to 1.5 mm. wide; corolla blue or bluish, about 7 mm. long; fruiting-calyx spreading-campanulate, about 4 mm. long and wide, conspicuously 5-costate, the ribs prominent and projecting about 1 mm. at the rim, thin and translucent between the ribs, sparsely uncinat-pilose (especially on the ribs); drupes small, black, muticous, about 3 mm. long and wide, glabrous, not spinose, the spines represented by several small bumps at the rounded or subtruncate apex.—In open places, scrubland, and pine ridges, often weedy, from the West Indies and British Honduras, through Venezuela and the Guianas, to tropical Brazil.

BRITISH HONDURAS: Belize District—near Manatee Lagoon, *M. E. Peck* 168 (G). Maskall, *P. H. Gentle* 1181 (Mi, 2; N). El Cayo District—Vaquero, *E. B. Mains* 4118 (Mi). Stann Creek District—All Pines, *W. A. Schipp* 612 (F, G, Mi, N).

Schipp describes the species as a "small shrub," growing in open places, of weedy growth, "occasional" at low altitudes. He states that it attains a height of 4 feet and a stem-diameter of $\frac{1}{2}$ inch. It has been collected in anthesis and fruit in our region in March and from August to October. Mains' collection was confused with *G. curassavica*, which, however, is very easily distinguished, along with its Yucatan variety, by its prominently horned or spinose fruits and the shorter and sparser pubescence on its leaf-blades.

In spite of the argument advanced by Miss Green in *Kew Bull.* 1935: 508–509 (1935), it is the opinion of the present writer that the generic name *Tamonea* for the group under discussion should be rejected. *Tamonea* comes clearly under the heading of a *nomen ambiguum*, defined in Article 62 as a name which owing to its use with different meanings, becomes a permanent source of confusion [vid. Briq., *Internat. Rules Bot. Nom.*, ed. 3, 19. 1935]. Although, as Miss Green has pointed out, the *Tamonea* Aubl. of the Melastomaceae is now included in the list of *nomina rejicienda* in favor of *Miconia* Ruiz & Pav., the fact remains that the two names are not strictly synonymous. If the tremendously large genus *Miconia* is ever segregated into smaller genera, as is very possible, *Tamonea* may very well again be given generic status. Already at least eight authors have published fully 33 names in the melastomaceous *Tamonea*—Aublet (1775), De Candolle & Triana (1871), Krasser (1893), Voss (1894), Cook & Collins (1907), Jennings (1917), and Britton (1920). Krasser, in fact, holds up this name as the accepted name for *Miconia* in Engler & Prantl, *Nat. Pflanzenfam.* 3⁷: 141–142, 182, 183, & 187–188 (1893). An example of the confusion which this situation causes is seen in the fact that in the *Index Kewensis*, Supplement 6 (1926), 5 of the new binomials of Jennings and Britton in the melastomaceous *Tamonea* are listed under the verbenaceous *Tamonea*! In view of these facts and for numerous other reasons which will be discussed in full in my forthcoming monograph of the genus, I am rejecting *Tamonea* and maintaining *Ghinia* for the verbenaceous genus.

2. *GHINIA CURASSAVICA* var. *yucatanensis* Moldenke, var. nov.

Haec varietas a forma typica speciei differt laminis foliorum ad apicem obtusis, ad basin truncatis vel subtruncatis, dentibus obtusiusculis.

Perennial herb, slightly woody at base, to 65 cm. tall; stems erect, rather much-branched; branches erect or ascending, acutely tetragonal, minutely puberulent or pilosulous; leaves petiolate; petioles very slender, 3 to 10 mm. long, sparsely or densely short-pilose with whitish hairs; blades thin-chartaceous, ovate, 5 to 25 mm. long, 4 to 17 mm. wide, rounded or obtuse (in outline) at apex, truncate or subtruncate at base, rather coarsely dentate from the widest part to the apex with numerous antrorse rather bluntish teeth, very sparsely short-strigillose above with rather scattered whitish hairs, obscurely and very minutely puberulent beneath with brownish hairs (especially along the larger venation), the larger venation mostly impressed above and prominent beneath; flowers subsessile or short-pedicellate, remote, small; corolla white or blue; fruiting-calyx broadly campanulate, to 4.5 mm. long and 6 mm. wide, membranous, 5-ribbed, the ribs projecting at the rim as 5 aristate-subulate apiculations 0.5 to 1 mm. long; drupes fleshy, turbinate-tetragonal, bearing 3 or 4 stiff, wide-spreading, horn-like spines 1 to 3 mm. long.—In low forests, around pools, in clearings, and along paths; endemic.

YUCATAN: *G. F. Gaumer* 24097 (F), 24228 (F). Chobenche, *G. F. Gaumer & sons* 23384 (F). Uxmal, *W. C. Steere* 2010 (Mi). Izamal, *G. F. Gaumer* 834 (F, Mi), 834b (G, isotype; N, type). San Anselmo, *G. F. Gaumer* 1988 (F). Chankon, *J. C. C. Bequaert* 81 (F, G). Chichen Itza, *J. C. C. Bequaert* 46 (F); *W. C. Steere* 1221 (Mi), 1376 (Mi). South of Muna, *C. L. & A. A. Lundell* 8176 (Mi, N). QUINTANA ROO: Chichankanab, *G. F. Gaumer* 1989 (F, Mi).

The type of this variety was collected by George Franklin Gaumer (*no.* 834b) on waste lands about Izamal, Yucatan, Mexico, in 1895, and is deposited in the Britton Herbarium at the New York Botanical Garden. It is recorded by Millspaugh in *Field Mus. Publ. Bot.* **1**: 317 (1896) as *Tamonea scabra* Cham. & Schlecht., and the type collection was distributed under that name. The type collection is described by Gaumer as an "herb 2 feet high, abundant on waste lands." Bequaert found the variety among rocks along paths, and records the vernacular name "chanxnuk." Steere found it in low forests and in clearings, and records the name "chan-ko-xnuk." Gaumer says regarding the Chobenche specimen, "This plant grows around the pools of water where the water is very shallow; it is not abundant in any locality." It has been collected in anthesis and fruit in June and July. The typical form of *G. curassavica* (L.) Millsp. seems to be limited to Cuba and northern and central Mexico, and differs in its much more acute or acuminate leaf-apex, acute or cuneate-attenuate leaf-base, and sharply acute or acuminate teeth.

3. LANTANA L., *Sp. Pl.*, ed. 1, 626 (1753); *Gen. Pl.*, ed. 5, 275. 1754.

Myrobatindum Vaill. ex L., *Gen. Pl.*, ed. 5, 275, in syn. 1754.

Camara Plum. ex L., *Gen. Pl.*, ed. 5, 275, in syn. (1754); Adans., *Fam. Pl.* **2**: 199. 1763.

Riedelia Cham., *Linnaea* **7**: 240. 1832.

Tamonopsis Griseb., *Abh. Ges. Wiss. Gött.* **19**: 246. 1874.

Erect herbs or shrubs, sometimes subscaudent, usually more or less scabrous and hirtous-pubescent or tomentose with simple hairs; leaves opposite, dentate, often rugose; inflorescence in the form of dense cylindrical spikes or contracted to form heads, usually axillary, pedunculate; flowers red, yellow, blue, or white, often fading to various other shades, sessile, borne in the axils of solitary bractlets, which are oblong, lanceolate, or ovate, acuminate, and spreading or subimbricate; calyx small, membranous, truncate and entire or sinuate-dentate; corolla-tube cylindrical, slender, equal in diameter throughout or slightly ampliate above, its limb spreading, regular or obscurely 2-lipped, 4- or 5-fid, the lobes broadly obtuse or retuse at apex; stamens 4, didynamous, inserted at about the middle of the corolla-tube, included; anthers ovate, with parallel thecae; ovary 1-carpellary, 2-celled, each cell 1-ovulate; style usually short; stigma rather thick, oblique or sublateral; ovules basal and erect or attached laterally near the base of each cell; fruit drupaceous, the exocarp more or less fleshy, the endocarp hard, 2-celled or splitting into two 1-celled pyrenes; seeds without endosperm.

A genus of about 75 species and varieties, mostly natives of tropical and subtropical America; a few also in tropical Asia and Africa.

Type species: *L. Camara* L.

Leaves mostly ternate; inflorescence elongate-cylindric in age 1. *L. trifolia*

Leaves always opposite; inflorescence capitate or subcapitate in age.

Bractlets broadly ovate, pronouncedly imbricate.

Leaf-blades densely tomentose or velutinous beneath 2. *L. velutina*

Leaf-blades strigose, strigillose, puberulent, or short-pilose beneath,
not tomentose or velutinous, varying to glabrate.

- Leaf-blades mostly obtuse or rounded at apex 3. *L. involucrata*
 Leaf-blades acute or acuminate at apex.
 Leaf-blades conspicuously rugose-bullate above; pubescence not
 at all canescent-strigose 4. *L. reticulata*
 Leaf-blades not rugose-bullate above; pubescence conspicuously
 canescent-strigose 5. *L. citrosa*
 Bractlets narrow, lanceolate or oblong, usually not pronouncedly imbricate.
 Twigs and peduncles densely glandular-pubescent, often also spread-
 ing-hirsute; leaf-blades densely velutinous or tomentose beneath.
 Pubescence on bractlets appressed-strigose, often glandular; teeth
 on leaf-blades mostly small and appressed 6. *L. glandulosissima*
 Pubescence on bractlets either long-hirsute or hispid, or, if short
 and appressed, then the twigs more or less prickly with
 stout often recurved prickles; teeth on leaf-blades either
 small and appressed or large and spreading 7. *L. scorta*
 Twigs and peduncles glabrate, puberulent, or pilose, not conspicu-
 ously glandular or hirsute; leaf-blades glabrate, puberulent, or
 pilose-pubescent beneath, not velutinous or tomentose.
 Branches and branchlets conspicuously prickly 8a. *L. Camara* var. *aculeata*
 Branches and branchlets usually not prickly, or not conspicuously
 so 8. *L. Camara*

1. *LANTANA TRIFOLIA* L., Sp. Pl., ed. 1, 626. 1753.

Lantana pilosa H. B. K., Nov. Gen. & Sp. Pl. 2: 260. 1818.

Lantana celtidifolia H. B. K., Nov. Gen. & Sp. Pl. 2: 259. 1818.

Lantana albo-purpurea Desf., Cat. Hort. Par., ed. 3, 392. 1829.

Lantana dubia Wall., Numer. List 50, hyponym, in part. 1829.

Lantana trifolia Cham. apud Schau. in A. DC., Prodr. 11: 607, in syn. 1847.

Lantana indica Wall. apud C. B. Clarke in Hook. f., Fl. Ind. 4: 563, in syn. 1885 [not *L. indica* Roxb., 1814 & 1832].

Camara trifolia (L.) Kuntze, Rev. Gen. Pl. 1: 504. 1891.

Camara trifolia var. *normalis* Kuntze, Rev. Gen. Pl. 1: 504. 1891.

Camara trifolia var. *indica* Kuntze, Rev. Gen. Pl. 1: 504. 1891.

Camara trifolia var. *indica* f. *rosea* Kuntze, Rev. Gen. Pl. 1: 504. 1891.

Camara trifolia var. *grandifolia* Kuntze, Rev. Gen. Pl. 1: 504. 1891.

Lantana trifolia var. *vulgata* Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 303. 1904.

Perennial herb with woody underground stem or subshrub to 2.5 m. tall, rough-pilose, at least above; leaves mostly ternate, sometimes opposite or in 4's, usually membranous, oblong-lanceolate to elliptic-lanceolate or ovate, petiolate, 5 to 12 cm. long, acute or acuminate at apex, crenate-serrate along the margins, attenuate at base and decurrent into the petiole, often reticulate-rugose above and very scabrous or more or less strigose-pubescent, rather densely resinous-punctate and puberulent or pubescent beneath with canescent or brownish hairs; inflorescence spicate, subcapitate when young, later cylindrical and elongating to 4.5 cm., densely many-flowered; peduncles slender, usually shorter than or equaling the leaves, 2 to 10.5 cm. long, rather densely strigose-pubescent, solitary in each leaf-axil; spikes at first subglobose, 1 to 1.5 cm. in diameter; bractlets herbaceous, green, lanceolate or ovate, the lowest to 10 mm. long and 3 mm. wide, cuspidate-acuminate at apex, 5-nerved, strigose above, loosely imbricate, the upper ones with the cusp about equaling the corolla-tube; corolla pink, lavender, lilac, or purple, its tube 5 to 6 mm. long; drupes purple or lavender, 2 to 3 mm. in diameter.—In hedges, thickets, and well-drained grasslands; widely distributed throughout tropical America from Mexico and Cuba to Argentina, Bolivia, and Peru; polymorphic and variable.

BRITISH HONDURAS: El Cayo District—El Cayo, *H. H. Bartlett* 12018, in part (F), 12927 (F, Mi, N). GUATEMALA: Dept. Peten, La Libertad and vicinity, *J. M. Aguilar Hidalgo* 117 (Mi); *C. L. Lundell* 3493 (F, Mi).

Lundell, in Carnegie Inst. Wash. Publ. 478: 103 & 183 (1937), records the vernacular name "oregano" for this species—a name which is applied promiscuously to many species of this and related genera in Mexico and Central America. He states that it is "a rare shrub of the well-drained grasslands" in the central Peten savanna country; in other places it is a perennial herb with underground woody stems. The statement about the flowers being "red and yellow" on the label of *Bartlett 12018* at Chicago undoubtedly applies to the other portion of this number, which represents *L. glandulosissima*. It has been collected in anthesis in our area from March to May and August to November and probably blooms and fruits continuously through the year, as do most members of this group in tropical regions.

2. *LANTANA VELUTINA* Mart. & Gal., Bull. Acad. Brux. 11²: 325. 1844.

Camara velutina (Mart. & Gal.) Kuntze, Rev. Gen. Pl. 2: 504. 1891.

Lantana involucrata var. *velutina* (Mart. & Gal.) Standl., Field Mus. Publ. Bot. 11: 172. 1936.

Small diffusely branched shrub, to 2 m. tall, with an odor like rhubarb; stems unarmed, smooth; branches and branchlets slender, more or less densely short-pubescent or tomentose with spreading or subappressed hairs, less so in age; petioles slender, 1 to 9 mm. long, densely cano-tomentose, often alate; leaf-blades chartaceous, ovate or elliptic-ovate, 1 to 4 cm. long, 0.7 to 2.8 cm. wide, mostly acute or subacute at apex, rarely short-acuminate or rounded, cuneately narrowed into the petiole at base, regularly crenate along the margins (except at the very base) with small obtuse and antrorse teeth, mostly reticulate-rugose or bullate and densely pubescent or velutinous above, usually very densely and softly canescent-tomentose or velutinous beneath; peduncles slender, elongate, equaling or surpassing the subtending leaves, 1 to 7.5 cm. long, more or less densely short-pubescent with spreading or more rarely subappressed hairs; heads hemispheric or slightly ovate-elongate in age; bractlets large, conspicuous, membranous, closely imbricate, broadly ovate, the lowermost to 12 mm. long and 8 mm. wide, subacute or obtuse at apex, broadly rounded and sessile at base, venose, densely appressed-pubescent or velutinous, shorter than the corolla or the lowermost equaling or surpassing the corolla; corolla white, lavender or pinkish in age, yellow in the throat, fragrant, its tube about 6 mm. long, densely strigose-pubescent outside, its lobes densely strigose-pubescent outside, glabrate or minutely appressed-puberulent within; fruit edible.—Open woods and thickets, especially in dry soil on hills, mesas, and cliffs, Mexico to Panama.

YUCATAN: Izamal, *G. F. Gaumer s.n.* [1888] (F). Chichen Itza, *C. L. & A. A. Lundell 7348* (Mi, N); *W. C. Steere 1380* (F, Mi). Uxmal, *W. C. Steere 2027* (Mi).

This common and very variable Mexican and Central American species has been widely confused with *L. involucrata* and *L. reticulata*. The two latter are typically West Indian species, occurring only rather sparingly on the continent, while *L. velutina* is very abundant and widely distributed in Mexico and Central America and does not occur elsewhere. I am unable to follow my good friend and colleague, Paul C. Standley, in his reduction of *L. velutina* to synonymy under *L. involucrata* [vid. Contrib. U. S. Nat. Herb. 23: 1249. 1924] or considering it even a variety of *L. involucrata* [vid. Field Mus. Publ. Bot. 11: 172–173. 1936]. Examination of a series of about 300 specimens leads me to affirm that the two species are very distinct and certainly not conspecific. However, most of the continental material erroneously labeled "*L. involucrata*" in herbaria is actually *L. velutina*—a fact which may have misled Standley. *L. velutina* resembles *L. reticulata* much more than it does the true *L. involucrata*, especially in leaf-size and -shape, but may be readily distin-

guished by its decidedly tomentose or velutinous pubescence on the lower leaf-surfaces and the thinner texture of its leaf-blades.

Rusby reports that in Guerrero the fruit of *L. velutina* is "the best edible berry in the region." Lundell records the vernacular name "oregano xiu." It has been collected in anthesis in our area in June and July.

3. *LANTANA INVOLUCRATA* L., Cent. Pl. **2**: 22. 1756.

Lantana odorata L., Syst. Nat., ed. 12, 418. 1767.—*L. odorata* Ait. apud Schau. in A. DC., Prodr. **11**: 603, in syn. 1847.

Lantana lanuginosa Mill., Dict., ed. 8, no. 3. 1768.

Lantana recta Soland. in Ait., Hort. Kew., ed. 1, **2**: 351. 1789.—*L. recta* Ait. apud Schau. in A. DC., Prodr. **11**: 603, in syn. 1847.

Lantana incana Otto & Dietr., Allg. Gartenzeit. **9**: 371. 1841.

Lantana involucrata Sessé & Moc., Fl. Mex., ed. 2, 142. 1894.—*L. involucrata* Sessé & Moc., op. cit., ed. 1, 155. 1895.

Lantana reticulata Eggers apud Britton & P. Wils., Scient. Surv. P. R. **6**: 140, in syn. 1925 [not *L. reticulata* Pers., 1806].

Pubescent much-branched shrub, 6 to 15 dm. tall, or occasionally a small tree to 4 m. tall; branches stiff, spreading, tetragonal or nearly terete, the bark commonly fissured; leaves elliptic or ovate, varying to oblong, lanceolate, obovate, or even rhomboid-subrotund, petiolate, 1 to 4 cm. long, 0.4 to 2.5 cm. wide, blunt, obtuse, or rounded at apex, narrowed or obtuse at base or cuneately prolonged into the petiole, uniformly crenulate with rounded appressed teeth from apex almost to base, reticulate-rugose and more or less scabrous above, short-pubescent beneath; peduncles usually surpassing the leaves, 1 to 5 cm. long, slender, strigose, usually canescent; heads globose, dense, several- to many-flowered, conspicuously involucrate; outer bractlets broadly ovate or ovate-lanceolate, 3 to 6 mm. long, 2 to 5 mm. wide, sericeous-strigose, acute at apex, equaling the flowers; inner bractlets much smaller, ovate-subrotund, subacuminate at apex, reflexed, half as long as the flowers; corolla lilac, pink, violet, mauve, or white, its throat yellowish, its tube 2 to 8 mm. long; drupes blue, 3 to 4 mm. in diameter.—Open places, sandy plains, and beaches; widely distributed through subtropical and tropical America from Florida, Cuba, and Mexico, through the West Indies and Central America, to northern South America and Peru.

YUCATAN: *G. F. Gaumer* 24357 (F). Tel Chac, *E. C. Stewart* 769 (Mi). Progreso, *G. F. Gaumer* 23161 (F); *C. L. & A. A. Lundell* 7946 (Mi, 2; N); *C. F. Millspaugh* 1716 (F); *W. C. Steere* 3099 (F, Mi). QUINTANA ROO: Tancah, *W. C. Steere* 2515 (Mi). Puerto Morelos, *E. A. Goldman* 618 (F). North Point, Mugeris Island, *C. F. Millspaugh* 10 (F). East shore, Cozumel Island, *C. F. Millspaugh*, *Plantae Utowanae* 1597 (F). BRITISH HONDURAS: Corozal District—*P. H. Genile* 296 (F; Mi; N, 2); *P. H. Genile* 4944 (N); *s.n.* [*C. L. Lundell* 4944] (F). Stann Creek District—All Pines, *W. A. Schipp* 564 (F, G, Mi, N).

This widely dispersed tropical and subtropical shrub has in some parts of its range an altitudinal range of from sea level to about 1200 m. [cf. Goldman, Contrib. U. S. Nat. Herb. **16**: 362. 1916], but in our area it is reported only from the actual seashores, on beaches or in open sandy plains just back of the beaches. Millspaugh in Field Mus. Publ. Bot. **1**: 41 (1895) cites additional unnumbered Gaumer specimens, collected in 1885, from Holbox, Mugeris, and Cozumel Islands. Genile (*no.* 296) records the vernacular name "sage," Stewart records "te de la playa," and Gaumer records "zicilhaxiu" [cf. Standl., Field Mus. Publ. Bot. **3**: 401. 1930]. In other parts of its range it has many additional common names. The flowers are fragrant and the entire plant is said to have a strong aromatic odor. In some

parts of Mexico pieces of the leaves or stems are placed in the ears as a remedy for deafness. As stated under *L. velutina*, I am unable to follow Standley in considering *L. velutina* Mart. & Gal. either synonymous with *L. involucreta* or as a continental variety of it. The two species are abundantly distinct.

There is some reasonable doubt as to the typification of the name *L. involucreta*. Some students of the group would, therefore, adopt the later name, *L. odorata*, for this species. In the opinion of the present writer, *L. involucreta* is not typified by the rather puzzling specimen preserved in the Linnean Herbarium [genus 783, sheet 3], which, according to B. D. Jackson's "Index to the Linnean Herbarium," p. 94 (1912), did not appear in Linnaeus' herbarium until his third enumeration (1767), but, rather, is typified by the excellent figure in Plukenet's "Phytographia," pl. 115, fig. 5 (1691) and by his description there and in his "Almagestum," p. 386 (1696): "Viburnum Americanum odoratum, folio parvo orbiculato, floribus & baccis foliolis interceptis," cited by Linnaeus in his original description (as variety β under *Lantana annua*) in the "Species Plantarum," ed. 1, p. 626 (1753). Plukenet's figure leaves no doubt whatever as to the identity of the plant and its conspecificity with the species under discussion here. *L. odorata*, on the other hand, is typified by the unquestionable specimen [genus 783, sheet 5] in the Linnean Herbarium, which also appeared there in 1767, the same year when Linnaeus published the name. Linnaeus' citation of the unillustrated "Idem [Viburnum] Salviae foliis obtusis floribus albis" from Hermann's "Paradisi Batavi Prodrromus," p. 384 (1689) as representing *L. odorata*, does not militate against the Linnean specimen being regarded as the actual type specimen.

Millspaugh reports that on Mugeser Island the plants of this species are shrubby, "but kept closely cropped by herbivorous animals."

4. LANTANA RETICULATA Pers., Syn. Pl. 2: 141. 1806.

Erect shrub, to about 1 m. tall, densely glandular-punctate beneath the pubescence throughout; branches slender, tetragonal, spreading or sometimes procumbent, pilose-hirsutulous; leaves small, opposite; petioles very slender and abbreviated, 1 to 5 mm. long, densely pilose-hirsutulous; blades firmly chartaceous, often rather thick, ovate, 5 to 30 mm. long, 4 to 15 mm. wide, acute at apex (rarely obtuse when immature), cuneately prolonged into the petiole at base, regularly crenate along the margins (except at the very base) with fine and very small rounded or subacute teeth, pronouncedly reticulate and bullate-rugose above and densely hirtellous-scabrous, more or less densely canescent-pubescent with spreading hairs beneath; peduncles slender, 0.3 to 11 cm. long, more or less pilose-hirsutulous, mostly surpassing the subtending leaves; heads small, hemispheric or slightly ovate in fruit, not elongate; bractlets pronouncedly imbricate, membranous, broadly ovate, sessile, the outermost to about 6 mm. long and wide, often cordate at base, acute at apex, mostly about equaling the corolla, the outermost forming a rather inconspicuous pseudo-involucre; corolla purple, lavender, lilac, or white, mostly about equal to or but slightly longer than the outermost bractlets.—Sandy places, thickets, and roadsides; sparingly naturalized from the West Indies, where it is a common plant in dry soil.

YUCATAN: *G. F. Gaumer 24156* (F, N).

This common West Indian species seems to occur only very sparingly in Yucatan, being known thus far from only one collection, which was distributed under the name *Lantana canescens* H. B. K., a very distinct South American species related to the next following.

L. reticulata has in the West Indies apparently hybridized extensively with the commonly cultivated and introduced South American ornamental, *L. montevidensis* (Spreng.) Briq. A great many collections from the West Indies, identified and distributed as *L. reticulata*, are actually *L. montevidensis*, as will be brought out in my forthcoming monograph of this genus.

L. reticulata is obviously closely related to *L. involucrata*—and the two species have been widely confused with each other—but can be distinguished at once by its mostly acute and pronouncedly bullate leaf-blades.

5. ***Lantana citrosa*** (Small) Moldenke, comb. nov.

Goniostachyum citrosom Small, Fl. Southeast. U. S., ed. 1, 1012. 1903.

Lippia geminata Millsp. apud Standl., Field Mus. Publ. Bot. 3: 401 & 402, in syn. 1930 [not *L. geminata* H. B. K., 1818].

Slender unarmed shrub, to 2.5 m. tall; stems pale gray or whitish; branches and branchlets slender, obtusely tetragonal, rather densely appressed-strigose with short and canescent antrorse hairs, less so in age; leaves opposite, often with clusters of small ones on very abbreviated twigs in their axils; petioles slender, 2 to 8 mm. long, densely appressed-strigose with short and canescent distinctly antrorse hairs, mostly margined or winged; leaf-blades thin-chartaceous, lanceolate or ovate, sometimes elliptic-ovate or broadly ovate, 0.9 to 6 cm. long, 0.4 to 2.5 cm. wide, acute or acuminate at apex, long-acuminate at base and attenuate into the petiole, rather regularly and finely crenate along the margins (except at the base) with blunt and antrorse teeth or subentire, densely and regularly strigose above with short distinct more or less antrorse canescent hairs, much more densely and irregularly strigose-pubescent and canescent beneath, not bullate, but the venation sometimes more or less impressed above and prominulous beneath; peduncles slender, shorter than or surpassing the subtending leaves, 0.9 to 5 cm. long, densely appressed-strigose like the branchlets; heads globose or oblong, 4 to 12 mm. long, 6 to 13 mm. wide; bractlets pronouncedly imbricate, 4-ranked, ovate or broadly ovate, the lowermost to 6 mm. long and 3 mm. wide, sessile, usually acuminate at apex, broadly rounded at base, densely appressed-strigose with very canescent antrorse hairs, keeled; calyx flattened, about 1 mm. long, 2-lobed; corolla white, lemon yellow in the throat, slightly surpassing the bractlets, about 4.5 mm. long, its limb about 3 mm. wide, 2-lipped, its tube strigose-puberulent outside, glabrous within, much longer than the calyx; drupes about 1.5 mm. in diameter.—Common in hammocks, forests, brushlands, and along roadsides, from southern Florida and Texas to Cuba, Mexico, and Guatemala.

YUCATAN: *E. C. Stewart* 74 (Mi). Near Izamal, *G. F. Gaumer* 478 (N), 503 (F), 830 (F, G, N), *s.n.* [1888] (F, 2); *G. F. Gaumer & sons* 478 (F, G, Mi), 23401 (F, N); *J. M. Greenman* 389 (F). Chichen Itza, *C. F. Millspaugh*, *Plantae Utowanae* 1626 (F); *W. C. Steere* 1128 (F, Mi). Valladolid, Chichen Itza, *W. C. Steere* 1657 (Mi). Uxmal, *W. C. Steere* 2025 (Mi), 2026 (Mi), 2051 (F, Mi). Km. 40, Merida-Uxmal road, *C. L. & A. A. Lundell* 8087 (Mi, 2; N). Tizimin, *J. R. Swallen* 2549 (Mi). Between Ticul and Tabi, *C. & G. E. Seler* 3916 (F; G, 2). QUINTANA ROO: Chichankanab, *G. F. Gaumer* 1983 (F, Mi, N).

This plant has been widely confused with the northern South American *L. canescens* H. B. K., to which it is obviously very closely related, but from which it differs in the noticeably smaller size of its flowers and in other characters. The late Dr. J. K. Small, whose painstaking and careful life-long work on the flora of the southern United States will always remain classic, was the first to notice this specific difference between the South American

and North American plants. Yucatan material of *L. citrosa* has also been widely confused with *Lippia alba* (Mill.) N. E. Br. [*L. geminata* H. B. K.] by Millspaugh and other workers both in the herbarium and in literature [cited as "*Lippia geminata*" in Field Mus. Publ. Bot. **1**: 317. 1896; **2**: 91. 1900; Engl., Bot. Jahrb. **36**: Beibl. 80: 25. 1905]. Drs. Greenman, Robinson, and Standley, in all their work on the region, have confused it with *Lantana canescens* [cf. Field Mus. Publ. Bot. **3**: 401. 1930; Contrib. U. S. Nat. Herb. **23**: 1250. 1924; etc.].

Steere records the vernacular name "sac-chili" (*no. 2051*), and Stewart reports "oregano xiu" and "hiervade javillas." Gaumer & sons report (*no. 23401*) that the plant contains an aromatic essential oil with medicinal properties, and this is verified by Standley in Field Mus. Publ. Bot. **3**: 401 (1930). Millspaugh, in Field Mus. Publ. Bot. **1**: 317 (1896), states that *Gaumer 503* was taken from shrubby plants "12 feet high, very abundant in old fields" and *Gaumer 830* from plants "20 feet high." No other record of the species attaining such heights is known to the writer—most collectors record it as from 3 to 8 feet in height. *Swallen 2549*, *Steere 2051*, and *Gaumer & sons 478* are noteworthy in having the leaves decidedly larger than is usually seen in this species. It has been collected in anthesis in our area from February to August. The Lundells report it as "abundant along roadsides"; Gaumer & sons found it "common on brush-lands" and Steere in "forests" and "low forests."

6. *LANTANA GLANDULOSISSIMA* Hayek in Fedde, Repert. **2**: 161. 1906.

Suffrutescent, 1 to 3.5 m. tall; stems to 2.5 cm. in diameter, unarmed, smooth; branches and branchlets tetragonal, medullose, unarmed or with very few, small, weak, scattered, and inconspicuous prickles, more or less densely pilose or hirsute with long or short, wide-spreading, often canescent, rather stiff and mostly gland-tipped hairs, usually most densely hirsute with the longest, stiffest, and most conspicuously glandulose hairs at the apex of the twigs; leaves opposite; petioles slender, 4 to 22 mm. long, varying from densely or sparsely spreading-hirsute or pilose to more or less densely short-pubescent or puberulent, often glandular; leaf-blades chartaceous, ovate, with a faint watermelon odor when fresh, 2.3 to 14.5 cm. long, 1 to 7.5 cm. wide, acute or subacuminate at apex, acute or abruptly acuminate at base and cuneately prolonged into the apex of the petiole, regularly crenate-serrate from almost the very base to the apex with acute mostly small and rather appressed antrorse teeth, mostly slightly rugose-bullate above, scabrous and densely pilose-pubescent above (the hairs sometimes all short and more or less antrorsely appressed, sometimes long and spreading, the longer ones mostly bulbous-based), mostly velutinous or tomentose beneath with appressed canescent hairs, sometimes merely short-pubescent or strigose-pubescent (densest along the larger venation), often glandular; peduncles slender, firm, ascending, often more incrassate toward the apex (especially in fruit), mostly subequaling or surpassing the subtending leaves, sometimes shorter, 2 to 14.5 cm. long, varying from very densely spreading-hirsute with gland-tipped canescent hairs to much more sparsely pilose or even puberulent, mostly glandulose; heads hemispheric, not at all elongating after anthesis, 1.5 to 2 cm. wide; bractlets not noticeably imbricate, narrow, linear-lanceolate, lanceolate, or oblong, 3 to 7 mm. long, 0.8 to 2 mm. wide, rather obtuse or acute at apex, densely short-pubescent or strigose, the hairs mostly canescent, appressed, and glandulose, sometimes spreading; corolla varying from yellow or orange to red or vermilion, reddening in age and in drying, surpassing the bractlets, about 10 mm. long, its tube very short-pubescent outside; drupes varying from bluish to dark purple or black, edible.—Common on

savannas and pine ridges, in forests, and along roadsides, from northern Mexico to Panama.

YUCATAN: *G. F. Gaumer* 24021 (F). Progreso, *C. F. Millspaugh, Plantae Utowanae* 1673 (F). Xnocac, *G. F. Gaumer & sons* 23483 (F). Chichen Itza, *W. C. Steere* 1102 (Mi), 1115 (Mi, 2), 1317 (Mi), 1607 (F, Mi), 1608 (Mi). Valladolid, Chichen Itza, *W. C. Steere* 1659 (Mi). Vicinity of Izamal, *G. F. Gaumer* 807 (F, G), 808, in part (F, G), 860 (F; G; N, 2), 1656 (F), *s.n.* [1888] (F); *G. F. Gaumer & sons* 808 (Mi); *P. Valdez* 60 (F, Mi). Tecal, Izamal, *G. F. Gaumer & sons* 23819 (F). Merida, *P. Valdez s.n.* (Mi). Uxmal, *W. C. Steere* 2021 (Mi), 2073 (Mi). Temax, *G. F. Gaumer* 1972 (F). Tel Chac, *E. C. Stewart* 523 (Mi, 2). CAMPECHE: *E. P. Johnson s.n.* (C).² Champoton, *W. C. Steere* 1967 (Mi). QUINTANA ROO: Chichankanab, *G. F. Gaumer* 1973 (F), 2003 (F, Mi). San Miguel, Cozumel Island, *C. F. Millspaugh, Plantae Utowanae* 1496 (F). BRITISH HONDURAS: Corozal District—*P. H. Gentle* 166 (F, Mi, N). El Cayo District—El Cayo and vicinity, *H. H. Bartlett* 12018, in part (Mi); *M. Chanek* 31 (F, Mi). Stann Creek District—Tipparary Road to Silk Grass, *N. S. Stevenson* 4 [Mus. Yale School of Forestry 10686] (F). Toledo District—Pine Ridge, Monkey River, *M. E. Peck* 589 (G). GUATEMALA: Dept. Peten, Sabana San Francisco, La Libertad, *C. L. Lundell* 2292 (F), 2384 (F), 2473 (F).

It is very probable that the *Gaumer s.n.* [1885], from Cozumel Island, cited by Millspaugh in *Field Mus. Publ. Bot.* 1: 41 (1895) under *L. Camara*, and the *Stone* 213 from Tekanto, cited by him under the same species on page 386 (1898), are also *L. glandulosissima*, but the present writer has not yet had the opportunity to examine these collections. On page 316 of the same work (1896), Millspaugh cites *Gaumer* 807 as *L. involucrata*—herbarium specimens of this collection, distributed as *L. involucrata* by Millspaugh, were later corrected to *L. glandulosissima* by Dr. B. L. Robinson. This collection is rather anomalous, since its bractlets are decidedly hirsute, and it may be that it should rather be considered a form of *L. scorta*. *Bartlett* 12018 is a mixture of *L. glandulosissima* and *L. trifolia*, and has been distributed by Standley under the latter name. *Millspaugh* 1496 is cited in *Field Mus. Publ. Bot.* 2: 91 (1900) as *L. aculeata*, while *no.* 1673 is cited on the same page as *L. horrida*!

This species has been widely confused with *L. Camara*, to which it is certainly closely related, but from which its mostly conspicuously glandular and hirsute pubescence at once distinguishes it. *Peck* 589 was considered by Robinson to represent *L. hirsuta* Mart. & Gal., a species abundant in Veracruz and perhaps occurring also elsewhere. Millspaugh's number 1496 was considered by Millspaugh to be *L. aculeata*, by Standley as *L. Camara*, and finally identified as *L. glandulosissima* by Greenman, while his number 1673 was first considered by Millspaugh to be *L. horrida* H. B. K., later redetermined by Standley and Greenman in the same way as number 1496. *Gaumer's* no. 1972 was considered to be *L. hirsuta* by Greenman and *L. Camara* by Macbride. These examples will serve to illustrate how complex and difficult this group of the genus is and how much confusion and difference of opinion exist as to specific limits in it. More will be said about this under the following species. The "*Lantana camara*" cited by Lundell in *Carnegie Inst. Wash. Publ.* 478: 103 & 183 (1937) is actually *L. glandulosissima*. He describes it as a "perennial with woody underground stem" and "occasional subshrub of the well-drained grasslands."

Stewart records the vernacular name "oregano xiu," Valdez "oregano silvestre," and Millspaugh "xo-hexnuc." *Valdez* 60 has many of the heads galled by some parasitic insect. Steere describes the species as growing along trails, in forests, and in low forests. It has been collected in our area in flower from December to July, and is said by Gaumer to be "abundant in wild state" and "common in brushlands." Valdez reports that it is used in a

² This specimen is inscribed "Yucatan & Tabasco," so may possibly not have been collected in our area.

mixture in the treatment of irritations of the larynx, while Gaumer in his "Catalogo con la Terapia y Lista de Precios de los Productos de The Izamal Chemical Company" (1907) describes it [as *L. Camara*] as an aromatic tonic, corroborative, and carminative, stating that it has stimulating and often pronounced tonic properties, useful in the treatment of weakening or atony of the intestines and of weakening diseases with nervous symptoms. He says that literary people and all who lead sedentary lives find it useful in the treatment of slow or difficult digestion and intestinal gases. The dosage he prescribes is only 1 to 5 drops of the liquid extract!

7. *Lantana scorta* Moldenke, sp. nov.

Frutex valde variabilis, *L. glandulosissima*, *L. horridae*, et *L. hirsutae* affinis; ramis ramulisque plerumque armatis, dense hirsutis; foliis ovatis, supra plus minus hirsutis vel substrigosis scabris, subtus hirsutis vel velutinis vel densissime tomentosis canescentibus; pedunculis elongatis hirsutis; bracteolis angustis linearibus vel lanceolatis, vel oblongis, longe hirsuto-hispidis vel breviter adpresso-strigosis; floribus magnis.

Shrub, to 2 m. tall, extremely variable in all its characters; stems often gray or whitish; branches and branchlets tetragonal, often very conspicuously armed with few or many strong recurved prickles, or unarmed, usually (especially on younger parts) densely hirsute or hirsute-hispid with canescent wide-spreading hairs 1 to 2.5 mm. long, often glandular; leaves opposite, very variable; petioles slender, 4 to 17 mm. long, usually very densely hirsute with shorter spreading and canescent hairs, sometimes more sparsely so, often glandular; leaf-blades varying from firmly chartaceous to submembranous, ovate or broadly ovate, 1.5 to 7.5 cm. long, 1.2 to 5.5 cm. wide, acute or subacuminate at apex, more rarely obtuse or rounded, regularly crenate-serrate from almost the very base to the apex with either small, fine, appressed, antrorse teeth or large, coarse, spreading teeth, varying from truncate or subcordate to acute at base and cuneately prolonged into the apex of the petiole, scabrous and more or less densely hirsute or antrorsely substrigose-pilose above, varying from pilose-pubescent merely along the larger venation to hirsute, velutinous, or very densely canescent-tomentose throughout beneath; peduncles slender, elongate, usually far surpassing the subtending leaves, 3.5 to 8.5 cm. long, incrassate toward the apex in fruit, usually densely hirsute or hirsute-hispid with canescent wide-spreading often glandular hairs 1 to 2.5 mm. long or densely glandular short-pubescent; heads hemispheric, 1 to 2.5 cm. wide, not at all elongated in fruit; bractlets numerous, not pronouncedly imbricate, narrow, linear, oblong, or lanceolate, to 12 mm. long, 1 to 3.5 mm. wide, varying from densely hirsute or hirsute-hispid to short- and appressed-strigose, canescent; corolla surpassing the bractlets, red or orange, its tube 10 to 16 mm. long, densely short-pubescent outside.—Common in thickets and on prairies, banks, and roadsides; known only from Mexico.

YUCATAN: Progreso, *C. L. & A. A. Lundell* 8205 (Mi, N); *W. C. Steere* 3025 (F, Mi). San Anselmo, *G. F. Gaumer* 1971 (F). Vicinity of Izamal, *G. F. Gaumer* 808, in part (N). Km. 60, Merida-Chichen Itza road, *C. L. & A. A. Lundell* 7401 (Mi, N). CAMPECHE: *E. P. Johnson s.n.* (C).³ QUINTANA ROO: Along Dzitnup trail, Coba, *C. L. & A. A. Lundell* 7672 (Mi, N). Chichankanab, *G. F. Gaumer* 2004 (F). San Miguel, Cozumel Island, *W. C. Steere* 2941 (Mi).

The type of this extremely perplexing species was collected by Joseph Nelson Rose, Joseph Hannum Painter, and Joseph Sims Rose (*no.* 9520) near San Juan de Rio, Queretaro, Mexico, August 17, 1905, and is deposited in the Britton Herbarium at the New York Botanical Garden. The exact status of *L. scorta* is very questionable. It obviously belongs to the very

³ This specimen is merely inscribed "Yucatan & Tabasco," so may not have been actually collected in our area.

disconcerting and puzzling species-complex of *L. Camara* L., *L. horrida* H. B. K., *L. glandulosissima* Hayek, *L. hirsuta* Mart. & Gal., and possibly some other species, and is without doubt closely related to all of these forms. Its characters are, in fact, in many respects intermediate between those of *L. horrida*, *L. glandulosissima*, and *L. hirsuta*, and these characters occur in such varying combinations as to lead one strongly to suspect that *L. scorta* is a hybrid, probably between *L. horrida* and *L. glandulosissima*, with *L. hirsuta* perhaps also involved. The true *L. Camara* is probably not involved in its immediate ancestry, because of its relative scarcity in Mexico. Study of a large series of specimens, as will be brought out in my forthcoming monograph, shows that in general the northernmost specimens in Mexico are typical *L. horrida*, those from the West Indies are typical *L. Camara* and its several named varieties, those from around Mount Orizaba in Veracruz are typical *L. hirsuta*, and those from central and southern Central America are typical *L. glandulosissima*. In central Mexico and the Yucatan Peninsula, however, plants occur very abundantly which do not fit well into any of these species, or, rather, show combinations in various strength of the characters of at least three of these species. It seems to the present writer, therefore, that we do not have here one extremely widespread and polymorphic species, named *L. Camara* and including all the forms here designated as *L. horrida*, *L. glandulosissima*, *L. hirsuta*, and *L. scorta*, as some might be led to suppose on the basis of superficial examination of a small amount of material, but, rather, that we have at least 4 distinct but closely related species, which are more or less fertile to each other's pollen and have therefore, because of this fact and their overlapping geographic range and very showy entomophilous flowers, freely crossed and hybridized. For convenience in reference it seems to the present writer that a binomial, like *L. scorta*, to designate such hybrid populations, is highly desirable, even though the characters of such a "species" will of necessity be extremely elastic and merge completely on the one hand into one parent and on the other hand into the other parent form. It is certainly preferable to such a long and cumbersome designation as, for instance, *L. glandulosissima* x *horrida* x *hirsuta*, as some of my colleagues might propose, for the latter would imply certain knowledge of the plant's hybrid nature, and, further, of the parentage of the plant. In the present case we do not yet have any such definite knowledge, although our strong suspicions as to the ancestry of the plant have led us to the selection of the specific name here proposed.

Most of the material cited here for *L. scorta* was originally identified and distributed as *L. Camara* by Millspaugh and Standley and as *L. glandulosissima* by Greenman. It has been collected in anthesis in our area from June to August. The Lundells' number 8205 and Steere's number 3025 represent a very small-leaved form. The corolla is described as orange, orange-red, and red, and from farther north in Mexico Hinton records the common names "yerba des tres colores" and "frutilla parar comer." Steere found it in moist open places and old clearings, and Lundell along trail-sides, in low second growth, and in cactus thickets.

8. LANTANA CAMARA L., Sp. Pl., ed. 1, 627. 1753.

Lantana mutabilis Weigel, Physiogr. Sallsk. Handl. 1: 46. 1776.—*L. mutabilis* Salisb., Prodr. 107. 1796.

Lantana scabrida Soland. in Ait., Hort. Kew., ed. 1, 2: 352. 1789.—*L. scabrida* Ait. apud Schau. in A. DC., Prodr. 11: 598, in syn. 1847.

Lantana antillana Raf., Sylv. Tellur. 82. 1838.

Camara aculeata var. *subinermis* Kuntze, Rev. Gen. Pl. 1: 503. 1891.

A branching shrub, to 2 m. tall, the stems and branches unarmed and rigid-pubescent or very slightly prickly; leaves always opposite, petiolate; leaf-blades chartaceous, ovate to

oblong-ovate, 2 to 12 cm. long, acute or short-acuminate at apex (rarely obtuse), crenate-serrate along the margins, acutely narrowed or abruptly rounded to a subcuneate acumination at base, more or less reticulate-rugose and decidedly scabrous above, more or less densely short-pubescent beneath (mostly only on the venation) with canescent or brownish hairs; inflorescence always capitate, hemispheric, to 2 cm. long and 3 cm. wide, densely many-flowered, shorter than, equaling, or surpassing the subtending leaves, 2 to 8 cm. long, more or less appressed puberulent-pilose; bractlets oblong or lanceolate, 4 to 7 mm. long, equal, 1 to 1.5 mm. wide, subulate or acute at apex (rarely a few larger ones also present), appressed strigose-pubescent, usually about half as long as the corolla-tube; calyx very thin, about 3 mm. long; corolla orange-yellow or orange, changing to red or scarlet in age, its tube about 10 mm. long, barely enlarged above the middle, slightly curved, puberulent, its limb 6 to 8 mm. wide; drupes black, about 3 mm. in diameter.—Hillsides, woods, thickets, and waste places; widely distributed in subtropical and tropical America from Florida through the West Indies and South America to Argentina, Bolivia, and Peru; less common in its pure form in Central America; introduced and naturalized in the tropics and subtropics of the Old World; widely cultivated.

CAMPECHE: Tuxpeña, *C. L. Lundell 901* (F, G, Mi). QUINTANA ROO: Laguna Chankabab, Lake Chichankanab, *W. C. Steere 2395* (F, Mi).

This very widely distributed and polymorphic species does not appear to be so common in Mexico and Central America as it is in the West Indies and South America, being largely replaced in Mexico and Central America by the closely related *L. horrida*, *L. scorta*, *L. hirsuta*, and *L. glandulosissima*. Lundell's no. 901, however, is typical *L. Camara*, and he describes it as "very common, large weed." Steere reports the flowers as yellow and found the species in forests. It has been collected in anthesis in our region in July and November. The "*Lantana camara*" cited by Lundell in Carnegie Inst. Wash. Publ. 478: 103 & 183 (1937) is *L. glandulosissima*, and that of Millspaugh in Field Mus. Publ. Bot. 1: 41 (1895), 316 (1896), and 386 (1898) is in part *L. glandulosissima* and in part *L. scorta*, as has been brought out in my discussions of these species.

L. Camara is an extremely variable and polymorphic species. Races differ in the size and shape of the leaves, the presence or absence of prickles, the amount of pubescence, and the size and color of the flowers. The smaller-leaved forms are mostly found in dry districts. Numerous varieties have been named; only the following one, however, has been noted thus far from our region.

8a. LANTANA CAMARA VAR. ACULEATA (L.) Moldenke, Torreya 34: 9. 1934.

Lantana aculeata L., Sp. Pl., ed. 1, 627. 1753.

Camara aculeata (L.) Kuntze, Rev. Gen. Pl. 1: 503. 1891.

Camara aculeata var. *normalis* Kuntze, Rev. Gen. Pl. 1: 503. 1891.

This variety differs from the typical form of the species chiefly in having its stems, branches, and branchlets usually conspicuously armed with rather stout and recurved prickles. It is said also to be more generally half-climbing in habit, rather than erect, and to have its corollas opening yellow to orange and changing to pink or rose, rather than opening orange and changing to red.—Distributed along with the typical form of the species throughout its range.

QUINTANA ROO: Cozumel Island, *E. A. Goldman 658* (F).

This variety closely approaches *L. horrida* H. B. K. of the southwestern United States and northern Mexico, which, however, differs in its habit, its usually much smaller leaves and

much coarser teeth, and in other characters. The Goldman specimen cited above was determined as *L. horrida* by Greenman. Britton & Wilson [cf. *Scient. Surv. P. R.* 6: 139. 1925] maintain *L. aculeata* as a distinct species from *L. Camara*, and their opinion cannot be dismissed lightly, since they have had so much actual field experience with the two plants in the West Indies, where they are most abundant. It seems to the present writer, however, that varietal status is the most that can with any degree of justification be claimed for *L. aculeata*, and even at that the variety is not well marked or constant, unless it should have characters not observable in herbarium material.

4. **LIPPIA** Houst. ex L., *Sp. Pl.*, ed. 1, 633 (1753); *Gen. Pl.*, ed. 5, 282. 1754.

Lippia L. ex Kunth, *Syn. Pl.* 2: 52. 1823.

Dipterocalyx Cham., *Linnaea* 7: 241. 1832.

Goniostachyum (Schau.) Small, *Fl. Southeast. U. S.*, ed. 1, 1012 & 1337. 1903.

Erect bushes, shrubs, or subshrubs, glabrous or variously pubescent with simple hairs or often hirsute or tomentose; leaves opposite or ternate, rarely alternate, entire, toothed, or lobed, flat or rugose above; inflorescence spicate, solitary, and axillary, or aggregate into terminal corymbs or panicles, the spikes mostly contracted into heads or cylindrical, not usually conspicuously elongated in fruit, very dense-flowered; flowers small, sessile, borne singly in the axils of rather large ovate or lanceolate bractlets, often more or less 4-ranked; calyx small, membranous, ovoid-campanulate or compressed and 2-carinate or 2-alate, its rim 2- or 4-fid or 4-dentate; corolla-tube cylindrical, straight or incurved, very slender, slightly exerted from the calyx or rarely elongate, equal in diameter throughout or ampliate above; corolla-limb oblique, spreading, somewhat 2-lipped, 4-parted, the lobes broad, often retuse at apex, the posterior one entire, emarginate, or bifid to about the middle, the lateral ones exterior, the anterior one often larger; stamens 4, didynamous, inserted at about the middle of the corolla-tube, included or slightly exerted; anthers ovate, unappendaged, the cells parallel; ovary 2-celled, each cell 1-ovulate; style often short; stigma rather incrassate, oblique or recurved; ovules basal and erect or affixed laterally near the base; fruit small, dry, included by the calyx and sometimes adnate to it, dividing into 2 pyrenes at maturity, the pericarp papery and hard, the exocarp membranous and rarely distinct from the pyrenes; seeds without endosperm.

A genus of about 100 species and varieties, widely distributed in subtropical and tropical America; a very few also in tropical portions of the Old World.

Type species: *L. americana* L.

Peduncles mostly solitary in the leaf-axils 1. *L. alba*

Peduncles mostly several or many in each leaf-axil.

Heads oblong; bractlets conduplicate-carinate, conspicuously 4-ranked, narrow-lanceolate, attenuate and widely divergent at apex, not venose 2. *L. graveolens*

Heads conglobate, bractlets not conduplicate or carinate, many-ranked, broadly ovate, subrotund, or subreniform, not attenuate or widely divergent at apex.

Leaf-blades rather sparsely puberulent or hirtellous beneath, mostly blunt at apex; stems and branches white 3. *L. yucatanica*

Leaf-blades (at least when young) mostly densely velutinous beneath, mostly long-attenuate at apex; stems and branches not white 4. *L. hypoleia*

1. *LIPPIA ALBA* (Mill.) N. E. Br. in Britton & P. Wils., *Scient. Surv. P. R.* **6**: 141. 1925.*Lantana alba* Mill., *Gard. Dict.*, ed. 8, no. 8. 1768.*Verbena globiflora* L'Her., *Stirp.* Nov. 23, pl. 12. 1786.*Zappania odoratissima* Scop., *Delic. Fl. & Faun. Insub.* **1**: 34, pl. 15. 1786.*Zappania lantanoides* Lam., *Tabl. Encycl. Méth. Bot.* **1**: 58. 1791.—*Z. lantanodes* Lam. ex Kuntze, *Rev. Gen. Pl.* **3**²: 251, in syn. 1898.*Zappania globiflora* (L'Her.) Willd., *Sp. Pl.* **1**: 116. 1797.—*Z. globiflora* A. L. Juss., *Ann. Mus. Hist. Nat. Paris* **7**: 72. 1806.—*Z. globiflora* Poir. apud Schau. in *Mart., Fl. Bras.* **9**: 235. 1851.*Verbena capensis* Thunb., *Prod. Pl. Cap.* 96. 1800.*Lantana lavandulacea* Willd., *Sp. Pl.* **3**: 319. 1800.*Lippia asperifolia* A. Rich. ex Marthe, *Cat. Pl. Jard. Méd. Paris* 67. 1801.—*L. asperifolia* Poepp. ex Cham., *Linnaea* **7**: 215, in syn. 1832.—*L. asperifolia* L. C. Rich. ex Pulle, *Enum. Pl. Surinam* 401. 1906.*Zappania odorata* Pers., *Syn. Pl.* **2**: 140. 1806.*Lippia geminata* H. B. K., *Nov. Gen. & Sp. Pl.* **2**: 266. 1818.*Lantana geminata* (H. B. K.) Spreng., *Syst. Veg.* **2**: 763. 1825.*Verbena lantanoides* Willd. ex Spreng., *Syst. Veg.* **2**: 763, in syn. 1825.*Lippia capensis* (L.) Spreng., *Syst. Veg.* **2**: 751. 1825.*Lantana mollissima* Desf., *Cat. Hort. Par.*, ed. 3, 393. 1829.*Lippia citrata* Cham., *Linnaea* **7**: 214. 1832.—*L. citrata* Willd. ex Cham., *Linnaea* **7**: 215, in syn. 1832.*Lantana odorata* Weigelt ex Cham., *Linnaea* **7**: 215, in syn. 1832 [not *L. odorata* L., 1767, or Ait., 1847].*Lantana lippoides* Hook. & Arn., *Bot. Beech. Voy.* 305. 1837.*Lippia scabra* Hochst., *Flora* **28**: 68. 1845.*Lippia geminata* var. *microphylla* Griseb., *Fl. Brit. W. I.* 495. 1861.*Zappania geminata* (H. B. K.) Gibert, *Enum. Pl. Montev.* 44. 1873.*Lippia lantanoides* Coult., *Contrib. U. S. Nat. Herb.* **2**: 328. 1892.*Lippia crenata* Sessé & Moc., *Fl. Mex.*, ed. 2, 140. 1894.*Lippia globiflora* (L'Her.) Kuntze, *Rev. Gen. Pl.* **3**²: 251. 1898.*Lippia globiflora* var. *normalis* Kuntze, *Rev. Gen. Pl.* **3**²: 251. 1898.*Lippia globiflora* var. *normalis* f. *lilacina* Kuntze, *Rev. Gen. Pl.* **3**²: 251. 1898.*Lippia globiflora* var. *geminata* (H. B. K.) Kuntze, *Rev. Gen. Pl.* **3**²: 251. 1898.*Lippia globiflora* var. *geminata* f. *glabriuscula* Kuntze, *Rev. Gen. Pl.* **3**²: 251. 1898.*Lippia globiflora* var. *lanceolata* Griseb. ex Kuntze, *Rev. Gen. Pl.* **3**²: 252. 1898.*Lippia globiflora* var. *lanceolata* f. *incana* Kuntze, *Rev. Gen. Pl.* **3**²: 252. 1898.

An aromatic densely puberulent shrub, to 1.5 m. tall, usually much branched and with long rooting suckers at base; branches elongate, slender, ascending, more or less pubescent; leaves opposite or ternate; petioles 3 to 8 mm. long, cinereous-pubescent; leaf-blades ovate or oblong, 2 to 7 cm. long, usually 1.2 to 2.3 cm. wide, acute or obtuse at apex, serrate or serrulate along the margins (except at very base), cuneate or narrowed into the petiole at base, strigose-hirtellous or puberulent and more or less rugose (when mature) above, densely short-pubescent or tomentose with cinereous hairs beneath; inflorescence axillary, capitate, mostly much shorter than the leaves or only subequaling the petiole, solitary or rarely paired in all the upper leaf-axils; heads subglobose or shortly oblong, 8 to 12 mm. long; bractlets ovate, 3 to 5 mm. long, the lowermost 3 to 3.5 mm. wide, nearly as long as the corollas; calyx 2-toothed; corolla purple, violet, pink, or white, its tube 4 to 5 mm. long, about 3 times as long as the calyx.—Secondary forests, clearings, and roadsides; widely distributed through the West Indies, Mexico, Central America, and tropical and subtropical South America to Argentina; introduced elsewhere; often cultivated.

CAMPECHE: *E. P. Johnson* 50 (C), *s.n.* (C).⁴ BRITISH HONDURAS: Toledo District—Toledo, *M. E. Peck* 798 (G, N). Stann Creek District—All Pines, *W. A. Schipp* 755 (F, G, Mi, N). El Cayo District—Little Cocquericot, Belize River, *C. L. Lundell* 4188 (F, Mi). Jones Bank,

⁴ These specimens are merely inscribed "Yucatan & Tabasco," so may not have actually been collected in our area.

C. L. Lundell 4232 (F, Mi). Belize District—cultivated, Belize, *C. L. Lundell 1819* (F, Mi).

Schipp describes the species as a rare shrub in secondary forests, to 4 feet tall, with a stem-diameter of $\frac{1}{2}$ inch, pendulous branches, and heliotrope flowers. It has been collected in anthesis and fruit in our area from March to May. The plant has a strong mint odor. Johnson reports that it is an aromatic sudorific used by the natives in an infusion. He states that the natives call it tea, "palisado." The "*Lippia alba*" cited by Lundell in Carnegie Inst. Wash. Publ. 478: 109 & 183 (1937) is actually *L. graveolens*.

2. LIPPIA GRAVEOLENS H. B. K., Nov. Gen. & Sp. Pl. 2: 266–267. 1818.

Lantana origanoides Mart. & Gal., Bull. Acad. Brux. 11²: 327. 1844 [not *Lippia origanoides* H. B. K., 1818].

Lippia Berlandieri Schau. in A. DC., Prodr. 11: 575–576. 1847.—*L. Berlandieri* Millsp. apud Standl., Field Mus. Publ. Bot. 3: 402, in syn. 1930.

Goniostachyum graveolens (H. B. K.) Small, Fl. Southeast. U. S., ed. 1, 1012. 1903.

Small, slender, aromatic shrub, to 2.5 m. tall, or rarely a small tree to 9 m. tall (Standley); branchlets slender, tetragonal or subterete, strict, appressed-pubescent or villosulous, densely glandular-punctate, the pubescence sometimes spreading-pilose; petioles very slender, 2 to 20 mm. long, rather densely appressed-pubescent with mostly canescent hairs; leaf-blades chartaceous, oblong, ovate-oblong, or elliptic, 1 to 6.5 cm. long, 0.5 to 3 cm. wide, usually obtuse or rounded (sometimes acute) at apex, rounded or subcordate at base, sometimes abruptly acute and slightly prolonged into the petiole, regularly crenate from base to apex with closely set blunt teeth, reticulate-rugose or subbulate above and rather densely strigose-hirsutulous with mostly appressed antrorse hairs, varying from puberulent and very conspicuously glandular beneath to subvillous or tomentose with canescent hairs; peduncles axillary, 4 to 6 per node, spreading, usually equaling or slightly longer than the petioles, appressed-pubescent or strigose; spikes oblong, 4 to 12 mm. long; bractlets conspicuously 4-ranked, conduplicate-carinate, narrow-lanceolate, connate at base and imbricate, usually wide-spreading or reflexed at apex in fruit, acute at apex, not venose, glandulose, more or less densely hirsute-tomentose, the margins and keel usually more densely white-villous, about equaling the corolla-tube; calyx to 2 mm. long, 4-dentate, pubescent or subvillous; corolla white, its tube 3 to 6 mm. long, canescent-strigose outside.—Rocky soil and slopes of hills and mesas, southern United States to Nicaragua.

YUCATAN: *G. F. Gaumer 24308* (G, N). Merida, *E. Gutierrez Rivas 32* (F). Near Ticul, *C. F. Millspaugh 41* (F). CAMPECHE: *E. P. Johnson 81* (C).⁵ Campeche, *A. J. A. Bonpland s.n.* (type coll.); *H. Perrine s.n.* (T). QUINTANA ROO: *G. F. Gaumer 1527* (F). GUATEMALA: Dept. Peten, La Libertad and vicinity, *J. M. Aguilar Hidalgo 40* (Mi, N).

Gutierrez Rivas reports that the main stem becomes quite woody, to 5 mm. in diameter, with the bark peeling off in long longitudinal shreds. Standley [Field Mus. Publ. Bot. 3: 402. 1930; 18: 1008–1009. 1938; Contrib. U. S. Nat. Herb. 23: 1245. 1924] records the vernacular names "orégano," "té del país," and "xakilche" from our area, while Millspaugh in Field Mus. Publ. Bot. 1: 316 (1896) records "tarbay." Standley, however, in the first reference cited above, says, "The names 'tabay' and 'tarbay' have been reported for this species, but their application is doubtful."

The species has been widely misidentified—Millspaugh in Field Mus. Publ. Bot. 1: 42 (1895) cites it as *L. origanoides* and Lundell in Carnegie Inst. Wash. Publ. 478: 109 & 183

⁵ The label on this specimen merely states "Yucatan & Tabasco," so the collection may not have been actually made in our area, although Millspaugh in Field Mus. Publ. Bot. 1: 42 (1895) cites it as from "Yucatan."

(1937) cites it as *L. alba*. Perrine's specimen was originally determined as a species of *Satureja*. Standley in Field Mus. Publ. Bot. **3**: 402 (1930) is in error in stating that the "*L. geminata*" of Millspaugh in Field Mus. Publ. Bot. **2**: 91 (1900) and of Millspaugh & Loesener in Engler, Bot. Jahrb. **36**: Beibl. 80: 25 (1905) is *L. graveolens*. Actually, the specimens cited in both those references are *Lantana citrosa*! His comment, however, in Contrib. U. S. Nat. Herb. **23**: 1245-1246 (1924) to the effect that it is very doubtful whether *L. Berlandieri* differs in any important characters from *L. graveolens*, is quite true. Following Schauer, Standley distinguishes the two species in his key (p. 1244) by the size of the leaves—3.5 to 5 cm. long in *L. graveolens* and 1.5 to 3.5 cm. long in *L. Berlandieri*. Examination of a large series of specimens from the southernmost United States, through all of Mexico, to Guatemala and Nicaragua, has convinced the present writer that the two are conspecific.

Gaumer in Cat. Terap. List. Prec. Prod. Izamal Chem. Co. (1907) claims that *L. graveolens* is a stimulant, expectorant, and tonic. He says that the fluid extract is a diffusible stimulant, which is employed with excellent carminative effect in the treatment of flatulency and nervous meteorism. It is also used in the treatment of primitive fevers, certain pernicious fevers, the nonfebrile state of cholera morbus, and all kinds of excessive fluxes. An extract is used, according to Gaumer, with much good effect in the treatment of debility and atony of the cerebral and spinal nerves, paralysis of the voluntary muscles and sense organs, muscular debility and stupor of the senses consequent upon serious illnesses and the weakness which appears during convalescence, headaches of debilitated, delicate, and nervous persons, eye-ache, vertigos observed in people dedicated to intellectual pursuits, and essential hypochondria. It has expectorant properties and effects changes in the bronchial mucous membranes, and is said to be an excellent remedy for chronic bronchitis and for some catarrhal affections of the respiratory system. Standley affirms that the species is used in domestic medicine in Yucatan as a stimulant, tonic, expectorant, emmenagogue, and demulcent, especially in the treatment of cholera morbus, fevers, bronchitis, and catarrh, and that the aromatic leaves are used for flavoring food [Contrib. U. S. Nat. Herb. **23**: 1246. 1924; Field Mus. Publ. Bot. **3**: 402. 1930]. Gaumer also says, "Extensively used as a condiment; also used as an anodyne." It has been collected in anthesis in our area from August to November.

3. *LIPPIA YUCATANA* Loes. in Fedde, Repert. **9**: 364. 1911.

Lippia albicaulis Greenm., Field Mus. Publ. Bot. **2**: 340. 1912.

Shrub or tree, to 3 m. tall; trunk silvery white; older branches terete, covered with white bark, abundantly longitudinally fissured in age; young branchlets tetragonal, appressed-puberulent and minutely setose-aculeolate toward apex, becoming glabrescent; petioles 4 to 8 mm. long, appressed short-puberulent; leaf-blades chartaceous, varying from oblong or ovate-oblong to ovate-elliptic or elliptic-lanceolate or even obovate, 2.5 to 10 cm. long, 1 to 4 cm. wide, obtuse or rounded and short-apiculate at apex or subacute, entire or densely crenulate-serrulate toward apex with appressed teeth, cuneate at base and rather conspicuously long-attenuate into the petiole, shortly and very densely hispidulous throughout above with bulbous-based hairs (the bases persistent), more or less densely appressed-puberulent or hirtellous beneath, especially on the venation; peduncles axillary, 2 to 5 in each axil (rarely solitary), slender, often nutant, 0.8 to 3 cm. long, appressed-puberulent or substrigillose; heads subglobose, about 5 mm. long, 6 to 10 mm. in diameter; bractlets laxly

imbricate, membranous, broadly ovate or subreniform, 4 to 7 mm. long, 4 to 9 mm. wide, acute or shortly subacuminate at apex, cordate at base, reticulate-veined, hirtellous-puberulent and glandular on the back, ciliate along the margins; calyx 1 to 2.5 mm. long, about 1.5 mm. wide, subvillous, its lobes obtuse and ciliolate; corolla small, its tube about 3 mm. long, ampliate toward the apex, sparsely pubescent and glandulose outside, pulverulent in the throat, 4-lobed, the lobes unequal, subrotund, the anterior one largest and about 2 mm. long.—Brushlands; endemic.

YUCATAN: *G. F. Gaumer 24176* (F, N), *24411* (F). South Kancabdzonot, *G. F. Gaumer 23627* (F, N); *G. F. Gaumer & sons 23627 bis* (F). Chichen Itza, *G. E. & C. Selers 4918* [Macbride photos 17554] (B, type; F, isotype; G, isotype; N, fragment of isotype; N, 2 photos of type & isotype; S, photo of type; Z, 2 photos of type & isotype). Calotmul, *G. F. Gaumer 2109* (F, G, N). Near Izamal, *G. F. Gaumer 871* (F, G), *971* (F; G; Mi; N; N, photo; S, photo; Z, photo; type collection of *L. albicaulis*). QUINTANA ROO: Chichankanab, *G. F. Gaumer 1475* (F).

This little-known species is said by Gaumer to be "shrubby, 10 feet high, uncommon, found only on the ancient mounds southwest of Izamal" and again "a shrub, 8 feet high, on brushlands, not common." The Selers describe it as a tree with silvery-white stems. It has been confused with the much-misunderstood *L. umbellata* Cav., under which name material of almost a dozen species and varieties has been distributed, as will be brought out in my forthcoming monograph of the genus. The more striking characters distinguishing *L. yucatanana* from *L. umbellata* and the several other species of this immediate group are its smooth ashy-white stems and branches, puberulent branchlets, and dark green elliptic-lanceolate mostly obtuse leaf-blades, which are only short-pubescent on both surfaces and often only very slightly so. It has been collected in anthesis in January and in fruit in March. Gaumer's numbers 23627 and 24411 have the younger leaves more densely velutinous beneath than is seen on any of the other collections. Standley erroneously reduced this species to synonymy under *L. umbellata* [Contrib. U. S. Nat. Herb. **23**: 1246. 1924; Field Mus. Publ. Bot. **3**: 402. 1930] and records the vernacular names "xoltenuuc" and "salvia poblana."

4. *LIPPIA HYPOLEIA* Briq., Ann. Conserv. Jard. Bot. Genève **4**: 236-237. 1900.

Lippia myriocephaloides Briq., Ann. Conserv. Jard. Bot. Genève **4**: 235-236. 1900.

Shrub or tree, to 6 m. tall; branches and branchlets tetragonal, often sharply angled and the angles shortly aculeate, densely hirsute-tomentose when young, less so in age; twigs slender, subterete or more obtusely tetragonal, unarmed or with only few scattered and minute aculeations, densely short-pubescent or hirsute-tomentose with cinereous or sub-fuscous hairs; petioles 4 to 10 mm. long, appressed-pubescent or strigose; leaf-blades chartaceous or submembranous, dark green and somewhat shiny above, elliptic, ovate-elliptic, or oblong-lanceolate, 8 to 15 cm. long, 3 to 5 cm. wide, acuminate at apex or more rarely abruptly acute, regularly but rather obscurely crenulate along the slightly revolute margins (except at base) with greatly appressed teeth, cuneately contracted into the petiole at base, subscabridous above with short rigid hairs, varying from appressed short-pubescent along the venation beneath to densely and uniformly softly cinereous-tomentose; peduncles very slender, 3 to 8 or more in each axil, 1 to 3 cm. long, densely short-pubescent or hirsutulous-tomentose, often a much more elongate one among them with a secondary umbel of 4 to 8 pedunculate heads or a twig with several abbreviated bract-like pairs of leaves and clusters of short-pedunculate heads; heads small, subspherical, 2 to 3 mm. in diameter, to 5 mm. long; bractlets membranous, broadly ovate, subreniform in age, nervose, short-acuminate at apex, finally more or less reflexed, short-ciliate, the lowermost also

densely short-pubescent on the back, equaling or exceeding the corollas; calyx small, about 0.5 mm. long, shortly 2-lobed, villous; corolla very small, white or yellow, its tube several times longer than the calyx, hirtellous outside.—Marginal scrub forests around savannas and in second growth, northern Mexico to Guatemala.

BRITISH HONDURAS: El Cayo District—El Cayo, *H. H. Bartlett 13008* (F, Mi). Between El Cayo and Benque Viejo, *H. H. Bartlett 11503* (F, Mi). GUATEMALA: Dept. Peten, La Libertad and vicinity, *J. M. Aguilar Hidalgo 394* (Mi, N); *C. L. Lundell 2119* (Mi), 2599 (Mi, 2). Sabana Kantetel, *C. L. Lundell 3171* (F, Mi). Santa Teresa, Subin River, *C. L. Lundell 2780* (Mi).

This species has been almost uniformly confused with *L. myriocephala* Schlecht. & Cham., which is not known definitely from the Yucatan Peninsula. Lundell cites it as *L. myriocephala* in Carnegie Inst. Wash. Publ. 478: 45, 75, 135, 137, 183, 194, & 203 (1937) and records the vernacular names “tah” and “maste” from our area. The two species are obviously very closely related and apparently hybridize where their ranges overlap. It has been collected in flower and fruit in our area from February to May. Lundell describes the species as “common around savannas in marginal scrub forest,” as a prominent tree in the scrub forests overrunning savannas, and a common small tree in young secondary upland forests. It is possible that *L. myriocephaloides*—the type from San Luis Potosi—may be worthy of varietal rank.

5. **PHYLA** Lour., Fl. Cochinch., ed. 1, 66. 1790.

- Zapania* Scop. ex A. L. Juss., Ann. Mus. Hist. Nat. Paris 7: 72. 1806 [not *Zapania* Lam., 1791 & 1797].
- Platonia* Raf., Med. Repos. N. Y. 5: 352. 1808.
- Bertolonia* Raf., Am. Month. Mag. 2: 267. 1818.
- Piarimula* Raf., Fl. Tellur. 2: 102. 1836.
- Panope* Raf., Fl. Tellur. 2: 103. 1836.
- Cryptocalyx* Benth., Ann. Nat. Hist., ser. 1, 2: 446. 1839.
- Blairia* Gaertn. ex Schau. in A. DC., Prodr. 11: 580, in syn. 1847 [not *Blairia* Houst., 1788].

Perennial procumbent or creeping herbs, with trailing or ascending stems, sometimes somewhat woody at base or even shrubby, subglabrate or appressed-strigose with more or less cinereous hairs; leaves opposite, variously dentate (except at base), flat or pinnately plicatulate above; inflorescence spicate, axillary; spikes cylindric, very densely many-flowered, usually greatly elongate in fruit, solitary, paired, or in 3's in the leaf-axils, never aggregate into corymbs or panicles; flowers small, sessile, borne singly in the axils of small cuneate-obovate or flabelliform bractlets, not at all 4-ranked; otherwise with characters as in *Lippia*.

A genus of about 15 species and varieties, widely distributed in subtropical and tropical America; 1 or 2 in the warmer parts of the Old World.

Type species: *P. chinensis* Lour. [= *P. nodiflora* (L.) Greene].

- Peduncles mostly much shorter than the flower-spikes; spikes often 4 or more at each node 1. *P. betulaeifolia*
- Peduncles much longer than the flower-spikes; spikes 1 or 2 at a node.
- Leaf-blades ovate.
- Stems woody at base; hairs on upper leaf-surface bulbous-based; leaf-blades often very scabrous above, mostly acute or acuminate at apex 2. *P. scaberrima*
- Stems herbaceous, trailing; hairs on upper leaf-surface appressed-strigose, not bulbous-based; leaf-blades not scabrous above, mostly obtuse or blunt at apex 3a. *P. nodiflora* var. *reptans*
- Leaf-blades not ovate.
- Leaf-blades linear-oblong, coarsely dentate throughout, stems woody, erect 4. *P. stoechadiifolia*

Leaf-blades cuneate-obovate, spatulate, or narrowly oblanceolate, usually dentate only from the widest part to the apex; stems herbaceous, trailing.

Leaf-blades thick-textured, the venation practically indistinguishable on both surfaces

3. *P. nodiflora*

Leaf-blades thin-textured, the venation prominent beneath and impressed above

3a. *P. nodiflora* var. *reptans*

I. PHYLIA BETULAEFOLIA (H. B. K.) Greene, Pittonia 4: 48. 1899.

Lippia betulaefolia H. B. K., Nov. Gen. & Sp. Pl. 2: 264. 1818.—*L. betulifolia* Kunth ex Griseb., Fl. Brit. W. I. 494. 1861.

Cryptocalyx nepetaefolia Benth., Ann. Nat. Hist., ser. 1, 2: 446. 1839.

Spreading herb, with procumbent stems, rooting at the nodes, and ascending branches; stems and branches tetragonal when fresh, more or less appressed-strigose or strigillose with elongate whitish eglandular hairs; petioles slender, 4 to 30 mm. long, strigose like the branches or sometimes more densely villous with spreading elongate whitish hairs; leaf-blades thin-chartaceous or submembranous, rhomboid-ovate or ovate, 1.5 to 8 cm. long, 1.5 to 4.7 cm. wide, acute at apex, cuneately attenuate into the petiole at base, coarsely serrate-dentate along the margins (except at the cuneate base) with sharply acute or sub-acuminate teeth, densely or sparsely appressed-strigose with elongate whitish hairs on both surfaces like the branches; midrib and secondaries impressed above, prominent beneath; peduncles varying from solitary in the leaf-axils to paired or in 3's, 2 to 6 or more per node, mostly greatly abbreviated, 1 to 4 mm. long, and shorter than the flower-spikes and shorter than the subtending petioles, rarely elongate to 2.8 cm.; spikes very densely many-flowered at first ovate-capitate, later elongate-oblong, to 1.5 cm. long; bractlets membranous, ciliate, cuneate from the dilated apex, abruptly cuspidate at apex, the cusp slightly surpassing the corollas; flowers very numerous, tiny, closely imbricate in many ranks; calyx less than 1 mm. long; corolla pale pink, about 1 mm. long.—Low wet ground, from Cuba, British Honduras, Guatemala, and Honduras to Brazil and Paraguay.

BRITISH HONDURAS: Belize District—Near Manatee River, *M. E. Peck* 423 (G, N).

This species is known from our area only by a single collection, which was obtained in flower and fruit in May. Standley in Contrib. U. S. Nat. Herb. 27: 324 (1928) describes the flowers as greenish, but most collectors describe them as pink. He also describes the stems as hollow. Most of the specimens examined of this species show extremely abbreviated peduncles, even when the spikes are in fruit. All the Cuban and Central American material thus far examined showed these short peduncles, shorter in every case than the flower-spike at its apex; but some of the South American material is curious in exhibiting greatly elongated peduncles (to 2.8 cm. long), many times the length of the flower-spike. It is, therefore, possible that the peduncle character is not a reliable one even in our area and that long-pedunculate specimens may be found in the Yucatan Peninsula, although none have as yet been deposited in the herbaria whose material has been examined in the preparation of this work.

2. PHYLIA SCABERRIMA (A. L. Juss.) Moldenke in Fedde, Repert. 41: 64. 1936.

Zapania scaberrima A. L. Juss. ex Pers., Syn. Pl. 2: 140. 1806.

Lippia dulcis Trev., Nov. Act. Physico-med. Acad. Caes. Leopold.-Carol. Nat. Cur. 13¹: 187. 1826.

Lippia asperifolia Reichenb. apud Schau. in A. DC., Prodr. 11: 583, in-syn. 1847 [not *L. asperifolia* A. Rich., 1801, or Poepp., 1832, or L. C. Rich., 1906].

Phyla dulcis (Trev.) Moldenke, Torreya 34: 9. 1934.

Plants usually shrubby or suffrutescent and erect, sometimes herbaceous and procumbent, perennial, usually less than 60 cm. tall, decidedly aromatic; stems mostly woody and erect

or diffuse; branches mostly procumbent or ascending, often rooting at the nodes, subterete, often purplish, strigose-puberulent or strigillose with canescent hairs; leaves opposite; petioles slender, 5 to 18 mm. long, strigillose; leaf-blades membranous, rhombic, deltoid, broadly ovate, or oblong-ovate, 2 to 5 cm. long, 7 to 30 mm. wide, mostly acute or acuminate (rarely obtuse) at apex, very abruptly and shortly cuneate-narrowed into the petiole at base, rather coarsely crenate-serrate along the margins, substrigose above with stiff bulbous-based hairs which soon break off, the bulbous bases persistent and making the leaf-surface decidedly scabrous, sparsely or rather densely strigillose or substrigose-pubescent with very short hairs beneath and glandular-pulverulent; peduncles solitary in the axils, not more than 2 at a node, elongate, 1.5 to 4 cm. long, densely short-pubescent or strigillose, much longer than the flower-spikes; spikes ovate-globose when young, later cylindrical and greatly elongating, 5 to 6 mm. in diameter at all times, eventually to 3.1 cm. long, very densely many-flowered, mostly equaling or shorter than the subtending leaves, often flexuous when elongate; bractlets membranous, closely imbricate, cuneate-obovate, very obtuse and abruptly acuminate at apex, strigose-hirtellous, ciliate along the margins, equaling the corollas; calyx very small, bifid, villous; corolla white, 1 to 1.5 mm. long, its limb exiguous, the lobes erect.—Fields, clearings, and waste places, from Cuba and Mexico, through Central America, to southern Panama.

YUCATAN: cultivated, Izamal, *G. F. Gaumer 510* (F). BRITISH HONDURAS: El Cayo District—El Cayo, *H. H. Bartlett 12006* (F, Mi), *12940* (Mi), *12964* (F, Mi, N). GUATEMALA: Dept. Peten, La Libertad, *C. L. Lundell 2180* (Mi), *3537* (F, Mi), *3688* (F, Mi, N). Lake Totz, *C. L. Lundell 3302* (F, Mi).

Lundell in *Carnegie Inst. Wash. Publ.* **478**: 42, 75, 109, & 183 (1937) cites, in addition, *Cook & Martin 204* from Peten, Guatemala—a collection not seen by the present writer—and records the vernacular names “malba” and “orozus” from our area. He states that it is “a common perennial of inhabited clearings.” Millspaugh in *Field Mus. Publ. Bot.* **1**: 316 (1896) also records the name “orozus” and describes the plant as “trailing 4 feet, rarely cultivated at Izamal, Jan. to Dec.” Specimens have been collected in our area in flower and fruit from March to June. Standley [*Field Mus. Publ. Bot.* **3**: 402. 1930; **18**: 1009. 1938; *Contrib. U. S. Nat. Herb.* **23**: 1248. 1924] records the vernacular names “xtuhuexiu,” “orozuz,” and “orozuz del país” and states that when chewed the plant has the flavor of licorice, and that a decoction or tea made from it is a popular local remedy for coughs, colds, catarrh, bronchitis, asthma, and colic.

3. PHYLIA NODIFLORA (L.) Greene, *Pittonia* **4**: 46. 1899.

Verbena nodiflora L., *Sp. Pl.*, ed. 1, 20. 1753.—*V. nudiflora* L. apud Raf., *Med. Repos. N. Y.* **5**: 352, in syn. 1808.—*V. nodiflora* C. Bauh. ex Spreng., *Syst. Veg.* **2**: 752, in syn. 1825.

Verbena capitata Forsk., *Fl. Aegypt.-arab.* 10. 1775.—*V. capitata* Blanco, *Fl. Filip.*, ed. 1, **1**: 26. 1877. *Blairia nodiflora* (L.) Gaertn., *Fruct. & Sem. Pl.* **1**: 266, *pl. 56*. 1788.

Phyla chinensis Lour., *Fl. Cochinch.*, ed. 1, 66. 1790.

Zapania nodiflora (L.) Lam., *Tabl. Encycl. Méth. Bot.* **1**: 59, *pl. 17, fig. 3*. 1791.—*Z. nudiflora* A. L. Juss. ex Spreng., *Pl. Min. Cog. Pugill.* **2**: 70, *sphalm.* 1813.

Lippia nodiflora (L.) Michx., *Fl. Bor. Am.* **2**: 15. 1803.—*L. nodiflora* A. Rich. apud Spreng., *Syst. Veg.* **2**: 751. 1825.

Verbena repens Bertol., *Rar. Ital. Pl. Dec.* **2**: 27. 1806.—*V. repens* Savi ex Spreng., *Syst. Veg.* **2**: 752, in syn. 1825.

Platonia nudiflora Raf., *Med. Repos. N. Y.* **5**: 352. 1808.

Verbena sarmentosa Willd., *Enum. Hort. Berol.* 632. 1809.

Zapania repens (Bertol.) Bertol., *Rar. Ital. Pl. Dec.* **3**: 27. 1810.

Verbena cuneata Willd. ex Spreng., *Syst. Veg.* **2**: 752, in syn. 1825.

Lippia sarmentosa (Willd.) Spreng., Syst. Veg. 2: 752. 1825.

Lippia repens Spreng., Syst. Veg. 2: 752. 1825.

Piarimula chinensis Raf., Fl. Tellur. 2: 102. 1836.

Lippia nodiflora var. *sarmentosa* (Willd.) Schau. in A. DC., Prodr. 11: 585. 1847.

Lippia nodiflora var. *repens* (Bertol.) Schau. in A. DC., Prodr. 11: 586. 1847.

Perennial herb, creeping, usually 30 to 90 cm. long; stems prostrate, mostly rooting at the nodes; branches slender, procumbent or ascending, varying from rather densely appressed-strigillose to minutely puberulent or glabrate; petioles 2 to 8 mm. long or obsolete, often so broadly cuneate-winged as to appear as though a part of the blade; leaf-blades thick-textured, spatulate, oblanceolate, or obovate, sometimes elliptic or cuneiform, 1 to 7.2 cm. long, 0.6 to 2.5 cm. wide, rounded or obtuse (more rarely subacute) at apex, narrowed into a long or short cuneate base, rather regularly sharply serrate above the middle with sharply acute or acuminate teeth, entire at base, minutely or rather densely strigillose-puberulent on both surfaces or glabrous, the venation usually practically indiscernible on both surfaces, or, at least, inconspicuous; peduncles solitary in each axil, slender, often much elongate, usually much longer than the subtending leaves, 1 to 11.5 cm. long, densely or sparsely appressed-puberulent or strigose with antrorse canescent hairs or glabrous; spikes at first globose, elongate and cylindric in age, 1 to 2.5 cm. long when mature and 6 to 9 mm. thick, very densely many-flowered; bractlets closely imbricate, obovate or subrhomboid-cuneate, subequaling the corolla-tube, often rather broadly membranous-margined toward apex, mucronate-acuminate or muticous at apex, glabrous or finely ciliate; calyx hyaline-membranous, flattened, about equaling the corolla-tube, deeply 2-cleft, slightly 2-carinate, the keels puberulent, the lobes lanceolate; corolla purple or white, 2 to 2.5 mm. long, slightly surpassing the bractlets, its limb exiguous, slightly strigillose outside.—In wet or moist soil, fields, hillsides, clearings, savannas, beaches, and thickets, widely distributed throughout subtropical and tropical portions of the Old World and New World.

YUCATAN: Between Sisal and Hunucma, *A. Dampf s.n.* (F). Silam, *G. F. Gaumer 621*, in part (F, G). Progreso, *C. F. Millspaugh 1722* (F); *W. C. Steere 3078* (F, Mi). Mina de Oro, *G. F. Gaumer & sons 23348* (F, G, N). QUINTANA ROO: Lake Coba, *C. L. & A. A. Lundell 7792* (Mi, N). Tancah, *W. C. Steere 2523* (F, Mi). Lake Chichankanab, *G. F. Gaumer 1876* (F); *G. F. Gaumer & sons 23711* (F); *W. C. Steere 2410* (F, Mi). East shore, Cozumel Island, *C. F. Millspaugh, Plantae Utowanæ 1595* (F). San Miguel, Cozumel Island, *W. C. Steere 2818* (F, Mi). Cozumel Island, *G. F. Gaumer 17* (F). BRITISH HONDURAS: Stann Creek District—All Pines, *W. A. Schipp 576* (F, G, Mi, N). Belize District—Three miles north of Sibun River, 9 miles south of Belize, *H. O'Neill 8737* (Mi). Maskall, *H. O'Neill 8738* (Mi). Belize, *C. L. Lundell 1892* (Mi), *1914* (F, Mi), *1920* (F, Mi). Corozal District—Corozal-Paraiso road, *P. H. Gentle 4771* (N); *C. L. Lundell 4771* (F; Mi; N, 2). Orange Walk District—Honey Camp, *C. L. Lundell 607* (F). GUATEMALA: Dept. Peten, Ixlu, Lake Peten, *A. Dampf s.n.* (F, N). Nictun, Lake Peten, *C. L. Lundell 3149* (F, Mi).

This species is almost cosmopolitan in subtropical and tropical regions, both in America and in the Old World, being especially pernicious in moist sandy soil. As is to be expected in the case of a species with such a wide distribution and weedy habit, it is extremely variable and polymorphic. A number of forms have been segregated and named, and, indeed, many specimens, representing the extremes in variation, certainly give every indication of being worthy of nomenclatural segregation. Examination of a large series of specimens, however, shows that these forms overlap and intergrade so completely, even in the same locality and often on the same plant, that it hardly seems desirable to give them nomen-

clatural recognition. The following variety and perhaps one or two other varieties which will be discussed in my monograph, are the only ones that seem worthy of being maintained.

Millspaugh in *Field Mus. Publ. Bot.* **1**: 42 (1895) records his collections from Lagoon Colombia and from the road to Cedral on Cozumel Island and a Gaumer collection from Holbox Island. These have not yet been seen by the present writer. Lundell in *Carnegie Inst. Wash. Publ.* **478**: 21, 24, & 75 (1937) records the common name "orozus" from our area and describes the species as "a small creeping perennial herb; common on the shore of Lake Peten in periodically flooded areas." It has been collected in flower and fruit in our area in practically every month of the year, and Gaumer states definitely (*no.* 23348) that "it blooms most of the year." The Schipp collection is remarkable in having leaves greatly elongated and narrowly cuneiform, to 4.5 cm. long and 3 to 8 mm. wide, not broadly obovate nor oblanceolate (nor even elliptic) as in the typical form. *O'Neill 8737* agrees with this collection perfectly. *Steere 2410* and *3078*, on the other hand, represent a very luxuriant form with large broadly obovate and heavy leaves, which are conspicuously rounded in outline at the apex. The stems are sometimes purplish and the lowermost leaves are very often attacked by one of several parasitic fungi (vid. *Steere 2410* and *2818*). *Gaumer 1876* has the leaves luxuriant, but entirely normal in shape. This distinguished collector states that the species is found abundantly on the sand dunes "where its runners, taking root at every joint, form large clumps that rarely exceed 3 feet in height."

3a. PHYLIA NODIFLORA VAR. REPTANS (H. B. K.) Moldenke, *Torreyia* **34**: 9. 1934.

Zapania reptans Spreng., *Pl. Min. Cog. Pugill.* **2**: 70. 1813.

Verbena reptans Loisel. ex Spreng., *Pl. Min. Cog. Pugill.* **2**: 70, in syn. 1813.

Lippia reptans H. B. K., *Nov. Gen. & Sp. Pl.* **2**: 263. 1818.

Lippia strigulosa Mart. & Gal., *Bull. Acad. Brux.* **11**²: 319. 1844.

Lippia nodiflora var. *reptans* (H. B. K.) Kuntze, *Rev. Gen. Pl.* **2**: 508. 1891.

Lippia lanceolata Rose apud B. L. Robinson, *Proc. Am. Acad. Sci.* **51**: 532, in syn. 1916 [not *L. lanceolata* Michx., 1803].

Lippia nodiflora Robinson & Greenman apud B. L. Robinson, *Proc. Am. Acad. Sci.* **51**: 532, in syn. 1916.—*L. nodiflora* Millsp. apud Standl., *Field Mus. Publ. Bot.* **3**: 402, in syn. 1930 [not *L. nodiflora* (L.) Michx., 1803].

Lippia canescens Robinson apud B. L. Robinson, *Proc. Am. Acad. Sci.* **51**: 532, in syn. 1916 [not *L. canescens* H. B. K., 1818].

This variety differs from the typical form of the species in being usually more densely strigose throughout and in having the leaves thinner in texture, often rhomboid, broadly rhomboid-elliptic, or even rhomboid-ovate, with the teeth usually more salient and the larger venation (midrib and secondaries) firmer, more or less impressed above and conspicuously prominulous or prominent beneath.—In moist shaded places, clearings, and savannas, practically throughout the range of the species.

YUCATAN: Silam, *G. F. Gaumer 621*, in part (F, G, Mi, N). Progreso, *W. C. Steere 3084* (Mi). Peto, *W. C. Steere 2298* (Mi). Uxmal, *W. C. Steere 1996* (Mi). Chichen Itza, *W. C. Steere 1563* (F, Mi). CAMPECHE: *E. P. Johnson s.n.* (C).⁶ Champoton, *W. C. Steere 1738* (F, Mi), *1748* (F, Mi). Tuxpeña, *C. L. Lundell 823* (F, G, Mi, N). QUINTANA ROO: Lake Chichankanab, *G. F. Gaumer & sons 23670* (F). BRITISH HONDURAS: COROZAL District—*P. H. Gentle 171* (F, Mi). Corozal—Pachacan road, *P. H. Gentle 4780* (N); *C. L. Lundell 4780* (F; Mi; N, 2). Orange Walk District—Honey Camp and vicinity, *C. L. Lundell 553*, in part (F, G, N); *W. C. Meyer 137* (F). Belize District—Belize River, near Belize, *C. L.*

⁶ The label on this specimen states merely "Yucatan & Tabasco," so it is possible that the collection was not made in our area.

Lundell 1951 (F, Mi). El Cayo District—Little Cocquericot, Belize River, *C. L. Lundell 4143* (F, Mi, N), *4163* (F, Mi, N). GUATEMALA: Dept. Peten, San Diego, Rio Pasion, *J. M. Aguilar Hidalgo 434* (F, Mi, N). El Paso, *C. L. Lundell 1544* (F, Mi).

This plant has been given specific rank by many workers on American botany, notably by Greene, Millspaugh, Robinson, Standley, and Lundell, and, indeed, if only some of the luxuriant forms from the Yucatan area were examined, it might seem to well deserve specific rank. Such collections as *Steere 1563* and *1996*, *Lundell 823*, *1544*, *4143*, and *4163*, and *Aguilar Hidalgo 434* seem remarkably distinct from *P. nodiflora*, but other collections, like some of *Steere 1738* and *Gaumer 621*, exhibit these distinct luxuriant leaves only at the apex of the plant and show the more typical *P. nodiflora* leaves toward the base, or, at least, leaves approaching those of typical *P. nodiflora* in shape. *Lundell 4780* represents an especially densely white-strigose form. *Gentle 171* was determined by Standley as *P. nodiflora* and does, indeed, approach it closely. Its leaves are less conspicuously strigose beneath than on the luxuriant form of the variety, although some specimens with luxuriant leaves (like the Chicago specimen of *Lundell 553*) are just as obscurely strigose as typical *P. nodiflora*. On the other hand, some small-leaved specimens of var. *reptans* (like *Meyer 137*) are as conspicuously strigose as most of the specimens of the luxuriant form. If a large series of specimens is examined from all portions of its extensive range, great variability will be found and the seeming distinctness of the Yucatan material will be found not to be constant or reliable.

Lundell in Carnegie Inst. Wash. Publ. **478**: 42, 75, & 203 (1937) describes this plant as a sprawling herb, common in inhabited clearings. Some of the more ovate-leaved forms have been confused with *P. betulaefolia* (e.g., *Gaumer & sons 23670*). *Aguilar Hidalgo 434* actually exhibits petioles to 2 cm. in length and leaf-blades to 5 cm. long and 3 cm. wide! *Gaumer 621* is a mixture of *P. nodiflora* and var. *reptans*, indicating again that the differences between the two are not very pronounced at all times. *Lundell 553* is a mixture with *Salvia occidentalis* Sw.—a plant very often mixed with *Phyla* species and especially with *Priva lappulacea* (L.) Pers. Meyer gives some interesting notes on the flowers: “. . . corolla white, with a tinge of yellow, pink, or lavender down within, 4-lobed, but 1-sided, i.e., with the lower lobe larger than the upper. . . . Blossoming commences at the outer or lower part of the head and as blossoming proceeds the head elongates.” The variety has been collected in anthesis in our area from April to October.

4. *PHYLA STOECHADIFOLIA* (L.) Small, Bull. Torrey Club **36**: 162. 1909.

Verbena stoechadifolia L., Sp. Pl., ed. 1, 19. 1753.

Verbena subfruticosa Aubl., Pl. Guian. Fr. **1**: 16. 1775.—*V. suffruticosa* Aubl. apud Steud., Nom. Bot., ed. 2, **2**: 750, in syn. 1841.—*V. suffruticosa* Steud. apud Hook. f. & Jacks., Ind. Kew. **2**: 1179, in syn. 1895.

Zapania reclinata Lam., Tabl. Encycl. Méth. Bot. **1**: 58. 1791.

Zapania stoechadifolia (L.) Pers., Syn. Pl. **2**: 140. 1806.—*Z. staechadifolia* A. L. Juss. apud Hook. f. & Jacks., Ind. Kew. **2**: 1248, in syn. 1895.

Lippia stoechadifolia (L.) H. B. K., Nov. Gen. & Sp. Pl. **2**: 265. 1818.

Panope stoechadifolia Raf., Fl. Tellur. **2**: 103. 1836.

Shrubby, 2 to 5 or more dm. tall (to 2 m. tall, Standley), often sprawling; stems ascending or suberect, often sprawling, usually little branched, loosely appressed-strigose and canescent; branches tetragonal, strict, weak, appressed-strigose and canescent, mostly herbaceous; petioles 1 to 5 mm. long or almost obsolete, winged; leaf-blades linear-lanceolate or oblong-lanceolate, rather firm or stiff in texture, 2.5 to 11.5 cm. long, 5 to 20 mm. wide,

acute at apex, sharply and evenly mucronulate-serrate, cuneately narrowed at base into the short petioles, strongly pinnate-veined, the midrib and many short secondaries impressed above and prominent beneath, often almost plicate-veined, evenly canescent-strigose and scabrous above, densely and rather irregularly appressed-pubescent and glandular-punctate beneath; peduncles axillary or lateral, solitary, mostly longer than the subtending leaf, 3.5 to 9.5 cm. long, canescent-strigose with appressed antrorse hairs; spikes at first subglobose, at length oblong-cylindric, 1 to 2.5 cm. long, 6 to 9 mm. wide, obtuse at apex; bractlets closely imbricate, cuneate-obovate or suborbicular, abruptly acuminate or mucronulate at apex, about equaling the calyx; calyx 2-toothed, compressed; corolla pale lilac or whitish, about 4 mm. long, surpassing the bractlets, its tube twice as long as the calyx.—Edges of lakes and lagoons, riverbanks, clearings, and waste places, from southern Florida and the Bahamas, through the Greater Antilles to Guadeloupe, and from Mexico to Guatemala; also in Venezuela and the Guianas.

YUCATAN: Near Merida, *P. Valdez* 25 (C; F; G; Mi, 2). In cultivation at Izamal, *G. F. Gaumer* 500 (F, G, N). CAMPECHE: Tuxpeña, *C. L. Lundell* 1320 (F; G; Mi, 5; N). QUINTANA ROO: Chichankanab, *G. F. Gaumer* 1813 (F, G). BRITISH HONDURAS: Orange Walk District—Tower Hill Estate, *J. S. Karling* 26 (F). El Cayo District—El Cayo, *H. H. Bartlett* 12932 (Mi, N). Belize River, *C. L. Lundell* 4238 (F, Mi). Toledo District—Malfredi Lagoon, *W. A. Schipp* 1166 (F, Mi, N). GUATEMALA: Dept. Peten, Uaxactun, *H. H. Bartlett* 12736 (F, Mi, N). San Pedro de Martir River, El Paso, *C. L. Lundell* 1471 (F, Mi).

Millsbaugh in *Field Mus. Publ. Bot.* **1**: 42 (1895) cites an additional Gaumer collection from Cozumel Island, and on page 317 (1896) of the same volume cites the vernacular names "té del país" [thé del paiz] and "cabalyaxnic" [cabal-yaxnic] and describes the species as "shrubby, 6 feet high." According to Standley in *Field Mus. Publ. Bot.* **3**: 402 (1930) the name "cabalyaxnic" is applied more commonly to *Ruellia tuberosa* L. Lundell in *Carnegie Inst. Wash. Publ.* **478**: 42 & 75 (1937) cites *Cook & Martin* 199 from Peten, Guatemala, not seen by the present writer. He describes the species as a "large sprawling suffrutescent plant; common along the wet banks of the river, in inhabited clearings, and in recently abandoned clearings." In another place he calls it a "low spreading weed." Standley (*loc. cit.*) records the vernacular names of "té de Yucatán" and "té cimarrón" from Peten. Valdez states that it is a common plant, ". . . its leaves used as a poultice or dusted as a powder for the cure of putrid ulcers. It is also considered antiseptic." Bartlett states that the flowers open white, turning pale purple in age. Schipp states "flowers blue" ["fruits blue" on some labels, apparently an error in copying]. It has been collected in anthesis in our area in February, April, and May.

6. BOUCHEA Cham., *Linnaea* **7**: 252. 1832 [nom. conserv.].

Denisaea Neck., *Elem.* **1**: 306. 1790 [nom. rejic.].

Annual or perennial herbs, densely pubescent or glabrous; leaves opposite, usually petiole, sometimes sessile, the blades usually serrate to serrate-crenate, rarely incised, dissected, or entire; inflorescence racemose, rarely spicate, terminal (seldom axillary), elongate, loosely to densely many-flowered, bracteolate; flowers solitary in the axils of the bractlets, usually pedicellate; bractlets subulate or lanceolate, sometimes enlarged and leaf-like; calyx persistent, tubular, 5-ribbed, the ribs terminating in 5 more or less unequal teeth; corolla funnel-form, its tube cylindric, straight and erect or curvate, its limb oblique, spreading, unequally 5-lobed, the 2 posterior lobes shorter than the 3 anterior lobes; stamens 4, didyna-

mous, included, the posterior pair inserted at about the middle of the corolla-tube and the anterior pair inserted somewhat above the middle; filaments short; anthers ovate to subcordate, 2-celled; pistil single, compound; style filiform; stigma 2-lobed, the anterior lobe club-shaped, the posterior lobe tooth-like, on a level with the anterior pair of stamens; ovary 2-celled, oblong, each cell 1-ovulate; fruit dry, schizocarpous, linear, beaked, included in the calyx or exerted, separating into 2 cocci at maturity; cocci completely separate or coherent at the base, the dorsal surface more or less reticulately ridged, the commissural surface plane, furrowed, or ridged, sometimes a little roughened.

A genus of about 17 species and varieties, ranging from the southern United States and the Bahamas, through the West Indies, Mexico, and Central America, to Bolivia, southern Brazil, northern Argentina, and Uruguay.

Type species: *Verbena pseudogervaoi* A. St. Hil. [= *Bouchea fluminensis* (Vell.) Moldenke].

Cocci with beaks about 1.5 mm. long 1. *B. prismatica*
 Cocci with beaks 2 to 3.5 mm. long 1a. *B. prismatica* var. *longirostra*

1. *BOUCHEA PRISMATICA* (L.) Kuntze, Rev. Gen. Pl. 2: 502. 1891.

Verbena prismatica L. Sp. Pl., ed. 1, 19. 1753.

Zapania prismatica (L.) Lam., Tabl. Encycl. Méth. Bot. 1: 59. 1791.

Stachytarpheta prismatica (L.) Vahl, Enum. 1: 209. 1804.

Bouchea Ehrenbergii Cham., Linnaea 7: 253-254. 1832.

Denisea prismatica (L.) Kuntze, Rev. Gen. Pl. 3²: 254. 1893.

Bouchea prismatica (L.) Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4^{3a}: 154. 1895.

Valerianoides jamaicense Millsp. apud Standl., Field Mus. Publ. Bot. 3: 399, in syn. 1930 [not *Valerianodes jamaicense* (L.) Kuntze, 1891].

Erect or somewhat sprawling herb, usually less than 50 cm. tall; stems and the rather numerous ascending branches obtusely tetragonal, medullose, often purplish, minutely puberulent throughout, often much more densely so and canescent on the younger parts, frequently sulcate; nodes annulate; leaves decussate, but often with several small ones or greatly abbreviated branchlets in their axils; petioles very slender, 1.1 to 3.2 cm. long, short-pubescent or puberulent; blades thin-chartaceous, varying from oblong or elliptic to ovate, 2.5 to 8.8 cm. long, 1.4 to 6.2 cm. wide, acute at apex, coarsely but regularly serrate with rather broad teeth from the apex to below the middle, acute or short-cuneate and entire at base, rather densely short-pubescent on both surfaces when immature, becoming much more sparsely so or even glabrate in age; racemes subspicate, terminal and terminating long or short axillary branches which often far surpass the terminal spike, erect, 7.5 to 28 cm. long, about 1 cm. wide or less, many-flowered; peduncles slender, short, puberulent; rachis slender, angled, often very slightly flexuous, minutely puberulent; flowers somewhat spreading in anthesis, closely appressed to the rachis in bud and fruit, overlapping; bractlets lanceolate-subulate, 4 to 6 mm. long, puberulent; pedicels 1 mm. long or less; calyx 7 to 9 mm. long, its teeth nearly 2 mm. long; corolla varying from purple, rose-red, or violet to pink, lilac, or blue; cocci equaling or slightly surpassing the calyx, straight, about 1.5 mm. long, emarginate, the dorsal surface ridged and roughened, the commissural surface somewhat furrowed, the beak pronounced.—In fields, clearings, and waste places and along roadsides, from the Bahamas and Mexico, through the West Indies and Central America, to Venezuela, Colombia, and Ecuador.

YUCATAN: *G. F. Gaumer 1160* (F), 24305 (F). Progreso, *G. F. Gaumer 1139* (Bm, Br, Cp, D, E, F, K, P, S, V, W). Muna, *W. C. Steere 2127* (F, Mi). Chichen Itza, *W. C. Steere 1071* (F, Mi). Pisté, *C. L. & A. A. Lundell 7876* (Mi, 2; N). CAMPECHE: *Herb. Bonpland s.n.* (B; N, fragment); *Herb. Kunth s.n.* (B). QUINTANA ROO: Chichankanab, *G. F. Gaumer*

1935, in part (F). GUATEMALA: Dept. Peten, La Libertad and vicinity, *J. M. Aguilar Hidalgo* 166 (E, F, I, Mi); *C. L. Lundell* 2171 [March 22] (Mi), 2171 [March 29] (Mi).

Millspaugh in *Field Mus. Publ. Bot.* **1**: 41 (1895) cites a Linden collection from Yucatan, which, however, is probably *Linden* 157, cited herewith under var. *longirostra*. Lundell in *Carnegie Inst. Wash. Publ.* **478**: 42, 75, 108, & 183 (1937) records the common name "verbena" (*Lundell* 2171) and states that the plant is either "occasional" or "common" in inhabited clearings in Peten. *Gaumer* 1935 is a mixture of this species and *Stachytarpheta jamaicensis*, while *Gaumer* 1160 was originally distributed as that species. In our area *B. prismatica* has been collected in flower and fruit in March and from June to November.

1a. *BOUCHEA PRISMATICA* var. *LONGIROSTRA* Grenz., *Ann. Mo. Bot. Gard.* **13**: 81. 1926.

This variety differs from the typical form of the species in having a somewhat longer calyx (7.5 to 10 mm. long), longer and plainly exerted schizocarps (9 to 11 mm. long), and especially more elongated beaks on the cocci (2 to 3.5 mm. long).—Along with the typical form through most of its range, but more abundant in the Bahamas, Greater Antilles, and Colombia; introduced in Alabama.

YUCATAN: *J. J. Linden* 157 (K, L). Dzitas, *C. & G. E. Seler* 3951 (B; F, 2; G; N, fragment; W). BRITISH HONDURAS: Corozal District—Orange Walk road, *P. H. Genile s.n.* (N). Corozal—Orange Walk road, *C. L. Lundell* 4856 (F, G, I, Mi).

Besides this variety, var. *brevisrostra* Grenz. probably also occurs within the area. It is by far the commonest and most widely distributed variety of the species in Mexico and Central America. It may be distinguished by the much shorter beaks on the cocci (only about 0.5 mm. long). Its leaf-blades are also usually noticeably smaller, more elliptic, more decidedly obtuse or rounded at the apex, and often falcate, and the plant is generally lower and more dwarfed in habit.

7. *STACHYTARPHETA* Vahl, *Enum.* **1**: 205. 1805 [nom. conserv.].

Sherardia Adans., *Fam. Pl.* **2**: 198. 1763 [nom. rejic.; not *Sherardia* Dill., 1754].

Valerianoides Boerh. ex *Medic.*, *Phil. Bot.* **1**: 177. 1789 [nom. rejic.].—*Valerianoides* *Medic.* apud

Kuntze, *Rev. Gen. Pl.* **1**: 509. 1891.—*Valerianoides* *Medic.* apud Hook. f. & Jacks., *Ind. Kew.* **2**: 1168. 1895.—*Valerianoides* Boerh. apud Millsp., *Field Mus. Publ. Bot.* **1**: 41. 1895.

Abena Neck., *Elem.* **1**: 296. 1790.

Vermicularia Moench, *Meth. Suppl.* 150. 1802 [nom. rejic.].

Cymburus Salisb., *Parad. Lond. pl.* 49 & 53. 1806.

Melananthus Pohl, *Pl. Bras. Ic.* **1**: 75, pl. 60–65. 1827.

Stachytarpha Link, *Enum. Hort. Berol.* **1**: 18. 1827.

Tarpheta Raf., *Fl. Tellur.* **2**: 103. 1836.

Herbs or low shrubs, glabrous throughout or villous with simple hairs; leaves opposite or alternate, dentate, often rugose; inflorescence terminal, spicate, the spikes elongate or abbreviated, very densely or laxly many-flowered, occasionally few-flowered; flowers sessile or semi-immersed in the rachis of the spike, each solitary in the axil of a bractlet; bractlets small and narrow, appressed or spreading, or else large, ovate or lanceolate, and imbricate; calyx narrowly tubular, membranous or herbaceous, 5-costate, 5-dentate, the teeth equal or unequal, unchanged in fruit or sometimes variously split; corolla white, blue, purple, or red, its tube cylindric, straight or incurved, slender throughout or ampliate at the apex, its limb spreading, 5-parted, the lobes broad, obtuse or retuse at apex, equal or more or less unequal; perfect stamens 2, anterior, inserted above the middle of the corolla-tube, included; filaments short; anthers unappendaged, the thecae divergent and dehiscent in one con-

tinuous line; staminodes 2, posterior, small; ovary 2-celled, each cell 1-ovulate; style elongate; stigma terminal, orbicular, subcapitate; ovules attached laterally near the base of the cells; fruit oblong-linear, included by the fruiting-calyx, splitting at maturity into 2 hard 1-seeded cocci; seeds erect, without endosperm.

A genus of about 50 species and varieties, widely distributed in subtropical and tropical America; 1 or 2 also naturalized in tropical Asia and Africa.

Type species: *Verbena angustifolia* Mill. [= *Stachytarpheta angustifolia* (Mill.) Vahl].

Corolla blue, purple, or white.

Leaf-blades long and narrow—linear, linear-oblong, or oblong-lanceolate . . . 1. *S. angustifolia*

Leaf-blades broad—ovate, ovate-elliptic, elliptic, or subrotund.

Rachis very stout and heavy, firm and stiff, to 7 mm. in diameter, conspicuously wider than the furrows . . . 2. *S. jamaicensis*

Rachis slender and tenuous, weak and flexible, to 2.5 mm. in diameter, about as wide as the furrows.

Leaf-blades mostly glabrate beneath (or sparsely appressed-strigillose on the larger venation).

Mature calyx and bractlets 4 to 5 mm. long; leaf-blades obtuse or rounded at apex . . . 3. *S. cayennensis*

Mature calyx and bractlets 5 to 7 mm. long; leaf-blades acute at apex . . . 4. *S. guatemalensis*

Leaf-blades densely puberulent beneath . . . 5. *S. Robinsoniana*

Corolla pink, red, or crimson.

Leaf-blades appressed-puberulent with very short hairs or glabrate beneath, obscurely strigillose or glabrate above . . . 6. *S. miniacea*

Leaf-blades pilose-pubescent, canescent-strigose, tomentose, or velutinous beneath; conspicuously long-pilose or -strigose above . . . 7. *S. Frantzii*

I. STACHYTARPHETA ANGUSTIFOLIA (Mill.) Vahl, Enum. 1: 205. 1804.

Verbena angustifolia Mill., Gard. Dict., ed. 8, no. 15. 1768.

Verbena indica Jacq., Obs. Bot. 4: 7, pl. 86. 1771 [not *V. indica* L., 1753].

Stachytarpheta angustifolia Vahl apud Schau. in A. DC., Prodr. 11: 564. 1847.

Valerianodes jamaicense var. *angustifolium* (Mill.) Kuntze, Rev. Gen. Pl. 1: 510. 1891.

Valerianodes jamaicense var. *linearifolium* Kuntze, Rev. Gen. Pl. 1: 510. 1891.

Herbaceous; stems short, dichotomous, obsoletely tetragonal; branches obsoletely tetragonal, usually glabrous except for the long-pilose nodes; leaves membranous, linear-oblong, lanceolate, or oblong-lanceolate, 4 to 10 cm. long, 0.5 to 2.5 cm. wide, attenuate-acute at both ends, rather remotely and more or less coarsely serrate-dentate along the margins or merely sinuate-undulate, often prolonged into the broadly winged petiole and therefore appearing sessile, glabrate or hirsutulous above, usually more or less hirsutulous on the venation beneath, not blackening in drying; spikes terete, rather stout, firmly erect, subsessile, to 23 cm. long, essentially glabrous or subglabrate throughout; rachis conspicuously incrassate, the furrows much narrower than the rachis itself; bractlets large, chaffy, membranous-margined, ovate or lanceolate, about 1 cm. long, long-acuminate to a subulate point at apex, obscurely denticulate along the margins toward apex; calyx compressed, slightly longer than the subtending bractlets, immersed in the rachis, its rim bifid; corolla hypoc crateriform, blue; style included; fruiting-calyx completely immersed in the furrows of the rachis.—Clearings and edges of undrained sinkholes; widely distributed through tropical America from Cuba and Mexico, through the West Indies and Central America, to northern South America; introduced in western tropical Africa.

YUCATAN: Yaxcaba, *G. F. Gaumer* 744, in part (F). Tekax, *G. F. Gaumer* 1226 (F). Progreso, *W. C. Steere* 3024 (F, Mi). QUINTANA ROO: Chichankanab, *G. F. Gaumer* 1477 (F), 2269 (F, N). BRITISH HONDURAS: Orange Walk District—Honey Camp, *C. L. Lundell* 72 (F). Honey Camp, *C. L. Lundell* 626 (F). GUATEMALA: Dept. Peten, La Libertad and vicinity, *J. M. Aguilar Hidalgo* 198 (F, Mi); *C. L. Lundell* 2519 (F, Mi, 2).

Lundell's number 72 was originally distributed as *S. jamaicensis* and Gaumer's numbers 744 and 1226 as *S. indica* (L.) Vahl. Gaumer's number 744 is a mixture of *S. angustifolia* and *S. Robinsoniana* and is recorded as "*Valerianodes jamaicense*" by Millspaugh in Field Mus. Publ. Bot. **1**: 41 (1895). The Chicago specimen of *Aguilar Hidalgo 198* exhibits the abnormal fasciation of the spikes, so often seen in this species and in *S. jamaicensis*. On this specimen one of the spikes is single and normal below, but is 6-branched above, each of the branches being itself quite normal and erect. The species is described as a "shrub" by Lundell on the label of his number 72, but is more probably an herb like *S. jamaicensis*, albeit sometimes tall and coarse. It has been collected in anthesis and fruit in our area from June to November. The *Schipp 838* distributed by Standley as this species is actually *S. jamaicensis*.

2. STACHYTARPHETA JAMAICENSIS (L.) Vahl, Enum. **1**: 206. 1804.

Verbena jamaicensis L., Sp. Pl., ed. 1, 19. 1753.

Stachytarpheta marginata Vahl, Enum. **1**: 207. 1804.

Stachytarpheta pilosiuscula H. B. K., Nov. Gen. & Sp. Pl. **2**: 279. 1818.

Stachytarpha jamaicensis Vahl apud Schau. in A. DC., Prodr. **11**: 564. 1847.

Valerianodes jamaicense (L.) Kuntze, Rev. Gen. Pl. **1**: 509. 1891.—*V. Jamaicense* (L.) Boerh. apud Millsp., Field Mus. Publ. Bot. **1**: 41. 1895.—*Valerianoides jamaicense* (L.) Kuntze apud Britton & P. Wils., Scient. Surv. P. R. **6**: 144. 1925.

Valerianodes jamaicense var. *indicum* f. *glabrum* Kuntze, Rev. Gen. Pl. **1**: 510. 1891.

Valerianodes jamaicense var. *spathulatum* Kuntze, Rev. Gen. Pl. **1**: 510. 1891.

Valerianodes jamaicense var. *spathulatum* f. *glabrum* Kuntze, Rev. Gen. Pl. **1**: 510. 1891.

Abena jamaicensis (L.) A. S. Hitchc., Rep. Mo. Bot. Gard. **4**: 117. 1893.

Stachytarpheta surinamensis Miq. ex Pulle, Enum. Pl. Surinam 402, hyponym. 1905.

Stachytarpheta cayennensis Millsp. & Loes. apud Standl., Field Mus. Publ. Bot. **3**: 403, in syn. 1930 [not *S. cayennensis* (L. C. Rich.) Vahl, 1804].

Verbena officinalis Cuevas apud Standl., Field Mus. Publ. Bot. **3**: 403, in syn. 1930 [not *V. officinalis* L., 1753].

Stachytarpheta dichotoma Heller apud Degener, Fl. Hawaii. fam. 315, sub *S. Jamaicensis*, in syn. 1938.

—*S. dichotoma* Pope apud Degener, l.c. [not *S. dichotoma* (Ruíz & Pav.) Vahl, 1804].

Herbaceous, shiny, often purplish throughout, 6 to 12 dm. tall, sparingly pubescent or glabrate throughout; stems and branches dichotomous, subtetragonal, usually glabrate except for the lanuginous-pilose nodes; leaves alternate or opposite, thin-chartaceous or membranous, varying from oblong to ovate or oval (rarely subrotund), 2 to 8 cm. long, 1.2 to 5 cm. wide, obtuse or acute at apex, coarsely serrate along the margins with acute and spreading teeth and more or less ciliate-scabrous, cuneate-narrowed at base and prolonged into the margined petiole, which is as long as the blades or shorter, glabrous on both surfaces or very slightly pilosulous on the venation beneath, not usually blackening in drying; spikes terete, stout, stiff, often flexuous, 1.5 to 5 dm. long, glabrous throughout; rachis conspicuously incrassate, the furrows much narrower than the rachis itself, especially at maturity; flowers at first erect, later immersed in the thickened rachis; bractlets medium or comparatively small, lanceolate or oblong-lanceolate, 5 to 8 mm. long, about 2 mm. wide, aristate-acuminate at apex, striate, scabridous, the margins scarious and obscurely ciliolate; calyx compressed, about 5 mm. long or about as long as the subtending bractlets, its rim bifid, the teeth triangular or triangular-ovate; corolla hypocrateriform, blue, 8 to 11 mm. long, its tube slightly curved, its limb about 8 mm. wide; style included; fruiting-calyx completely immersed in the furrows of the rachis.—Clearings, beaches, and sunny open places; widely distributed through tropical America, from Alabama and Florida, through the West Indies, Mexico, and Central America, to northern South America; introduced elsewhere.

YUCATAN: Near Merida, *P. Valdez* 44 (F; G; Mi, 2). Chelem, west of Progreso, *C. L. & A. A. Lundell* 7942 (Mi, 3; N). Titar, *C. & G. E. Seler* 3961 (F, G). San Anselmo, *G. F. Gaumer* 1936 (F, Mi). QUINTANA ROO: Chichankanab, *G. F. Gaumer* 1935, in part (F). San Miguel, Cozumel Island, *W. C. Steere* 2816 (F, Mi). Center of Cozumel Island, *C. F. Millspaugh, Plantae Utowanae* 1568 (F). BRITISH HONDURAS: Keys off the coast, *N. S. Stevenson* 158 (F). Belize District—Manatee Lagoon, *M. E. Peck* 186 (G). Stann Creek District—New Town, *W. A. Schipp* 838 (F, G, Mi, N).

Lundell in *Carnegie Inst. Wash. Publ.* 478: 75 (1937) records *Cook & Martin* 205 from Peten, Guatemala, but this collection has not as yet been available to me for examination. He also records the vernacular name "verbena," while Valdez states on a label that the plant is cultivated in Yucatan under the name "berbena" and has emetic properties. Millspaugh in *Field Mus. Publ. Bot.* 1: 42 (1895) records an unnumbered Gaumer collection (1885) from Cozumel Island and another (1886) from Mugeris Island, neither one seen as yet by me. *Gaumer* 1935 is a mixture of this species and *Bouchea prismatica*. The Gaumer and Seler collections were originally distributed as *S. cayennensis* and the Valdez collection as *S. strigosa* Vahl. *S. jamaicensis* is a large erect herb, common, according to Lundell, in inhabited clearings. Schipp describes it as "one of the commonest weeds in waste land." As in the case of *S. angustifolia*, the flower-spikes of this species are very frequently variously deformed or fasciated. It has been collected in anthesis and fruit in our region from February to October. The *Gaumer* 744 cited by Millspaugh in *Field Mus. Publ. Bot.* 1: 317 (1896) is in part *S. angustifolia* and in part the type collection of *S. Robinsoniana*.

Standley in *Field Mus. Publ. Bot.* 3: 404 (1930) records the vernacular names "ibixiu" and "talche" and states that the juice of the leaves is placed in the ears to relieve earache, that the plant is reputed to have tonic, emetic, expectorant, and sudorific properties and has been used locally in Yucatan in the treatment of malaria, yellow fever, amenorrhea, syphilis, and gonorrhoea, and that a tincture of the plant in rum is employed as a lotion to relieve nervous pains. He also states that the Kekchi name for the plant is "mes." In *Contrib. U. S. Nat. Herb.* 23: 1243 (1924) he adds that it has cathartic, anthelmintic, and emmenagogue properties and is used as a remedy for intestinal worms, ulcers, erysipelas, dropsy, and stomach affections, that it has been reported to be poisonous to sheep, and that its leaves are used for adulterating tea and are exported to Europe under the name of "Brazilian-tea."

3. *STACHYTARPHETA CAYENNENSIS* (L. C. Rich.) Vahl, *Enum.* 1: 208 [as "*cajanensis*"]. 1804.
Verbena cayennensis L. C. Rich., *Act. Soc. Hist. Nat. Paris* 1: 105. 1792.—*V. cajanensis* L. C. Rich. apud Vahl, *Enum.* 1: 208, in syn. 1804.
Stachytarpheta hirta H. B. K., *Nov. Gen. & Sp. Pl.* 2: 280. 1818.
Stachytarpheta veronicaefolia Cham., *Linnaea* 7: 246. 1832.
Lippia cylindrica Scheele, *Linnaea* 17: 351. 1843.
Stachytarpha cayennensis Vahl apud Schau, in A. DC., *Prodr.* 11: 562. 1847.—*Stachytarpheta cajanensis* Vahl apud I. R. Johnst., *Proc. Boston Soc. Nat. Hist.* 34: 254. 1909.
Valerianodes cayennense (L. C. Rich.) Kuntze, *Rev. Gen. Pl.* 2: 510. 1891.—*Valerianoides cayennense* (L. C. Rich.) Kuntze apud Britton & P. Wils., *Scient. Surv. P. R.* 6: 143. 1925.
Abena cayennensis (L. C. Rich.) A. S. Hitchc., *Rep. Mo. Bot. Gard.* 4: 117. 1893.
Valerianodes jamaicensis Morong apud Briq., *Arkiv Bot.* 2¹⁰: 21, in syn. 1904 [not *V. jamaicense* (L.) Kuntze, 1891].

Shrub, 1 to 2.5 m. tall, much-branched; stems and branches subterete, varying from loosely pilose to lanuginous-pubescent with canescent hairs or glabrate; leaf-blades membranous, ovate to elliptic, 3 to 7 cm. long, 1.6 to 2.4 cm. wide, obtuse or rounded (rarely

subacute) at apex, regularly crenate-serrate along the margins with subacuminate teeth, narrowed or obtuse at base and more or less cuneate-decurrent into the petiole, scabrate above with sparse strigillose hairs, not at all rugose, mostly glabrate beneath except for the appressed-strigillose venation, often brunnescent in drying; spikes slender, flaccid, to 34 cm. long, glabrous, subglabrate, or only slightly pilosulous throughout; rachis scarcely or very slightly incrassate, the furrows about as broad as the rachis itself; flowers spreading during anthesis; bractlets narrowly linear or subulate, setaceous-acuminate or aristate, scarious along the margins; calyx compressed, about 4 mm. long, 4-costate, glabrate, its rim 4-subulate-dentate, about equaling or surpassing the subtending bractlets; corolla pale blue or white, hypocrateriform, its tube about equaling the calyx, its limb small, about 5 mm. wide; style included; fruiting-calyx erect, half-immersed in the furrows of the rachis.—Banks, hillsides, beaches, and along streams; widely distributed in tropical America, from Mexico and the Greater Antilles, throughout Central America and the West Indies, to Peru and Argentina; introduced in Hawaii and other portions of the Old World.

BRITISH HONDURAS: El Cayo District—Roaring Creek, *C. L. Lundell* 317 (F). Stann Creek District—All Pines, *W. A. Schipp* 679 (F, G, Mi, N).

The species is described by Schipp as common in open places, collected in flower and fruit in our area in August and January. *Valdez* 44, *Seler & Seler* 3961, and *Gaumer* 1936, originally distributed as this species, prove to be *S. jamaicensis*, while *Gaumer* 1935 is in part *S. jamaicensis* and in part *Bouchea prismatica*. The "*Stachytarpheta cayennensis*" recorded by Lundell in Carnegie Inst. Wash. Publ. 478: 109 & 183 (1937) on the basis of *Aguilar Hidalgo* 69, is actually *S. guatemalensis*. Standley in Field Mus. Publ. Bot. 3: 403 (1930) records *S. cayennensis* from Peten, Guatemala [this record is repeated by Lundell on page 75 of the work cited above], but cites no actual specimens to back up this record. He lists also the vernacular names "San Diego" and "verbena" from Peten.

4. *Stachytarpheta guatemalensis* Moldenke, sp. nov.

Fruticulus; caule ramisque tetragonis submarginatis glabris vel sparsissime pilosulis; laminis foliorum ovato-ellipticis 3–10 cm. longis, 1.5–4.5 cm. latis, ad apicem acutis, ad basin in petiolum longe cuneato-attenuatis, utrinque glabris vel subglabris; spicis gracilibus angustatis.

Small shrub, to 1.3 m. tall, abundantly branched; stems and branches slender, mostly rather acutely tetragonal and margined, glabrous, or very sparsely pilosulous toward the apex and at the annulate nodes; leaves opposite; petioles mostly very short, less than 1 cm. long or obsolete, but the attenuate leaf-base simulating a petiole; leaf-blades thin-chartaceous or membranous, ovate-elliptic, 3 to 10 cm. long, 1.5 to 4.5 cm. wide, mostly acute at apex, abruptly long-cuneate into the petiole at base (the basal petiole-like acumination being 1 to 3.5 cm. long), regularly crenate-serrate from below the widest part to the apex, glabrous or subglabrate and shiny on both surfaces; spikes very slender, weak and flaccid, 6 to 17 cm. long, erect, densely many-flowered, glabrous or subglabrate throughout; rachis 1 to 2.5 mm. in diameter, the furrows about as wide as the rachis itself; flowers imbricate, spreading in anthesis, closely appressed before and after anthesis; bractlets narrowly lanceolate, 5 to 7 mm. long, aristate-acuminate at apex, scarious-margined toward base, somewhat divaricate-spreading; calyx (when mature) equaling or slightly surpassing the bractlets, mostly coarctate-rostrate at apex after anthesis; corolla blue.—In forests, thickets, swamps, and waste places, from Yucatan to Nicaragua.

CAMPECHE: Tuxpeña, *C. L. Lundell* 1258 (F, G, Mi, N). BRITISH HONDURAS: Belize Dis-

trict—near Manatee Lagoon, *M. E. Peck* 347 (G). El Cayo District—South Cayo district, *J. E. Thompson s.n.* (F). GUATEMALA: Dept. Peten, La Libertad and vicinity, *J. M. Aguilar Hidalgo* 69 (F, Mi).

The type of this species was collected by Hans von Türckheim (*no. II.1823*) at Coban, Alta Verapaz, Guatemala, at an altitude of 1350 m., in June, 1907, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species is obviously very closely related to *S. cayennensis*, which differs in its smaller bractlets and calyx, its somewhat less glabrous leaves, and its obtuse or rounded leaf-apices, as well as in other characters. *S. guatemalensis* seems to be far more common in Mexico and northern and central Central America than *S. cayennensis*—the latter becoming abundant in Panama and northern South America, as well as in the West Indies. The "*Stachytarpheta cayennensis*" cited by Lundell in Carnegie Inst. Wash. Publ. 478: 109 & 183 (1937), on the basis of *Aguilar Hidalgo* 69, is actually *S. guatemalensis*. Lundell calls it an "herb" and records the vernacular name "verbena," while Thompson records the name "camaq olal" and states that the plant is boiled by the natives and drunk cold as a remedy for dysentery. The Peck specimen was recognized by Robinson as being distinct from *S. cayennensis*, but was erroneously identified by him as *S. dichotoma* (Ruíz & Pav.) Vahl, a South American species.

5. *Stachytarpheta Robinsoniana* Moldenke, sp. nov.

Fruticulus; caule ramisque tetragonis, hornotinis puberulentis, pilis canescentibus; laminis foliorum ovato-ellipticis 2.5–7.5 cm. longis, 1.5–3 cm. latis, ad apicem plerumque acutis, ad basin in petiolum longe cuneato-attenuatis, utrinque dense puberulentis; spicis gracilibus elongatis angustatis.

Small shrub, about 1 m. tall; stems and branches slender, tetragonal (often rather sharply so), the younger parts densely puberulent or pilose-pubescent with short and canescent hairs; leaves opposite; petioles mostly very short, to 1 cm. long, or obsolete, but the attenuate leaf-base simulating a petiole; leaf-blades thin-chartaceous or membranous, ovate-elliptic or ovate, 2.5 to 7.5 cm. long, 1.5 to 3.2 cm. wide, mostly sharply acute at apex, abruptly long-cuneate at base and attenuate into the petiole (the basal petiole-like acumination being 0.5 to 2.5 cm. long), regularly crenate-serrate from below the widest part to the apex, densely puberulent on both surfaces with short canescent hairs; spikes very slender, weak and flaccid, elongate, 14 to 45 cm. long, erect, densely many-flowered, rather densely puberulent with canescent hairs throughout; rachis 1.5 to 2.5 mm. in diameter, the furrows varying from about as wide to less wide than the rachis itself; flowers imbricate, spreading in anthesis, closely appressed before and after anthesis; bractlets narrowly lanceolate, 7 to 8 mm. long, aristate-acuminate at apex, not scarious-margined (or only inconspicuously so toward apex), puberulent and ciliolate, mostly appressed; mature calyx rather deeply immersed in the rachis, surpassing the subtending bractlets; corolla bright purple.—Rocky banks, from Yucatan to Salvador.

YUCATAN: Yaxcaba, *G. F. Gaumer* 744, in part (F, isotype; G, isotype; N, type). Merida, *A. C. V. Schott* 578 (F).

The type of this species was collected by George Franklin Gaumer (*no. 744*, in part) in the woodlands about Yaxcaba, Yucatan, Mexico, in June, 1895, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species is named in honor and appreciation of the late Dr. Benjamin Lincoln Robinson, whose revisionary work on the Verbenaceae was of considerable importance and whose kindness, courtesy, and geniality,

together with his unfailing desire to encourage and help (rather than discourage) the younger man, have endeared him to the hearts of innumerable of the younger botanists of America.

Gaumer 744 is a mixture of *S. angustifolia* and *S. Robinsoniana*. Schott records the vernacular Mayan name of "xtalché." His sterile specimen shows the leaf-blades more ovate, relatively shorter and wider, and the petioles more obvious and not plainly alate. All other characters, however, including the color of the leaves, pubescence on leaves and branches, and type of tothing, agree perfectly with the type collection. The species has hitherto been confused with *S. indica*, *S. jamaicensis*, and *S. cayennensis*, and is cited as "*Valerianoides Jamaicensis*" by Millspaugh in *Field Mus. Publ. Bot.* **1**: 317 (1896). Gaumer in *Cat. Terap. List. Prec. Prod. Izamal Chem. Co.* (1907), under "*Stachytarpheta jamaicense*," reports that this species is used in Yucatan as a tonic, emetic, expectorant, and sudorific. He states also that an extract from this plant has given beneficial results in the treatment of intermittent, remittent, pernicious malarial, and yellow fevers, any menstrual irregularities which may be caused by them, and debility during convalescence from any acute illnesses. It is said also to be employed with good results as an antisiphilitic and antigonorrhoeic.

6. *STACHYTARPHETA MINIACEA* Moldenke, *Phytologia* **1**: 170. 1935.

Perennial herb, about 3.2 m. tall; stems and branches more or less obtusely tetragonal, puberulent, the younger parts brownish in drying, the older parts stramineous; leaves opposite; petioles obsolete, replaced by the petiole-like basal acumination of the blade; leaf-blades chartaceous, rather firm and stiff, oblanceolate-elliptic, 5 to 10.5 cm. long, 2 to 3.5 cm. wide, abruptly acute at apex, abruptly long-cuneate at base (the petiole-like acumination entire and 1.5 to 4.5 cm. long), regularly and rather coarsely serrate from below the widest part to the apex, glabrate or very sparsely and obscurely strigillose with widely scattered and very short inconspicuous hairs above, varying from glabrate to densely (but not conspicuously) appressed-puberulent with very short hairs beneath (the hairs slightly larger on the midrib and secondaries); spikes slender or rather stout, erect, often rather stiff, to 36 cm. long, sparsely white-pilose with short and appressed hairs; rachis becoming rather stout, 2 to 3 mm. in diameter, sparsely white-pilose, the furrows about as wide as the rachis itself; bractlets narrowly lanceolate, 8 to 11 mm. long, uniformly wide-spreading, very long-aristate at apex, very sparsely white-pilose with very short appressed hairs, not scarious; calyx subequalling the bractlets; corolla vermilion.—In acache bush, in clearings, and along roadsides; endemic to the Yucatan Peninsula.

CAMPECHE: Canasayab, *C. L. Lundell 1422* (F; N, fragment). BRITISH HONDURAS: Belize District—Hector Creek, *P. H. Gentle 1509* (F; Mi, 2; N, fragment). Corozal District—Freshwater Creek Reserve, *R. S. Pelly 7* (F), *14* (F, isotype; K, type; N, fragment & photo of type; Z, photo of type).

The species has been collected thus far in flower and fruit only in February and March. *Gentle 1509* was distributed originally as *S. jamaicensis* and *Lundell 1422* as *S. mutabilis* (Jacq.) Vahl. Pelly, on the label of his number 7, describes the plant as an "annual herb."

7. *STACHYTARPHETA FRANTZII* Polak., *Linnaea* **41**: 593. 1877.

Perennial herb or woody and suffrutescent, to 2.5 m. tall, much-branched from the base; stems and branches subtetragonal or plainly tetragonal, dichotomous, densely lanuginous-pilose, less so in age; leaves opposite; petioles obsolete or to 1 cm. long, usually simulated by

the long-attenuate leaf-base; leaf-blades thin-chartaceous or submembranous, ovate or ovate-elliptic, 2.5 to 11.5 cm. long, 1.2 to 5 cm. wide, acute or obtuse at apex, abruptly long-acuminate at base and cuneately attenuate into the petiole (the acumination to 3.5 cm. long), regularly but coarsely serrate from below the widest part to the apex, varying from rather sparsely long-pilose to strigose or densely pubescent and often scabrous above, pilose-pubescent, canescent-strigose, tomentose, or velutinous beneath; spikes rather slender, erect, more incrassate in age, 8 to 30 cm. long, densely or sparsely pilose with appressed-canescant hairs throughout, densely many-flowered; rachis incrassate in age, to 3 mm. in diameter, somewhat wider than its furrows; flowers imbricate, spreading in anthesis, closely appressed before and after anthesis; bractlets narrow-lanceolate, 5 to 10 mm. long, aristate-acuminate at apex, appressed or divergent, striate, white-pilose, scarious-ciliate along the margins; calyx slightly exceeding or subequaling the bractlets; corolla cerise-red or pink, purplish in the throat, its tube about 1.6 cm. long.—Thickets, hedges, and waste places, from southern Mexico to Costa Rica.

YUCATAN: *G. F. Gaumer 24304* (F, N); *G. F. Gaumer & sons 744* (Mi). Chichen Itza, *C. L. & A. A. Lundell 7412* (Mi, N); *W. C. Steere 1475* (F, Mi). Peto, *W. C. Steere 2286* (F, Mi). Muna, *W. C. Steere 2141* (F, Mi). QUINTANA ROO: Lake Chichankanab, *G. F. Gaumer & sons 23748* (F), *23748 bis* (F). BRITISH HONDURAS: Toledo District—Toledo, *M. E. Peck 489* (G, N).

This species is either extremely variable and polymorphic or else several species or varieties are being included under this one name. The three Steere collections are remarkably canescent, while *Gaumer 24304* is a small-leaved brown-hirsutulous form reminding one greatly of an as yet unpublished Veracruz species. Polakowsky and Standley describe the flowers as purple or dark purple, but Gaumer calls them "bright pink," Steere calls them "red," and Lundell says they are "cerise-red, purplish in throat." The species has been widely confused with the red-flowered *S. mutabilis* (Jacq.) Vahl, and *Gaumer & sons 24304* and *23748 bis* were distributed under that name. *Steere 2286* was also distributed under that name by Standley, while *Steere 1475*, which is absolutely indistinguishable from it, was distributed as *S. cayennensis*, as was also Peck's number 489. *Gaumer & sons 744* was originally distributed as *S. indica*. This illustrates very well the confusion which has surrounded this apparently widely distributed and rather common Central American species. It has been collected in flower in our area from April to July. According to Standley in *Field Mus. Publ. Bot.* **18**: 1014 (1938) the spikes are regularly "very stout, the rachis much broader than the furrows," but examination of a rather large series of specimens by the present writer does not confirm this statement. One collector records the species as "12 feet high."

8. PRIVA Adans., Fam. Pl. **2**: 505. 1763.

Burseria Loeffl., *Iter Hisp.* 194. 1758.

Phryma Forsk., *Fl. Aegypt.-arab.* cxv, nom. nud. 1775 [not *Phryma* L., 1753 & 1754].

Blairia Houst. ex Gaertn., *Fruct. & Sem. Pl.* **1**: 265, pl. 56, fig. 1. 1788.

Zapania Lam., *Tabl. Encycl. Méth. Bot.* **1**: 58. 1791.—*Zappania* Zuccagni apud Hook. f. & Jacks., *Ind. Kew.* **2**: 1248. 1895 [not *Zappania* Scop., 1786].

Streptium Roxb., *Pl. Corom.* **2**: 25, pl. 146. 1798.

Tortula Roxb. ex Willd., *Sp. Pl.* **3**: 359. 1801 [not *Tortula* Hedw., 1782].

Herbaceous caulescent perennials, mostly rather harshly pubescent throughout; leaves opposite or subopposite, rather thin-membranous, often quite small, sessile or petiolate, deciduous, mostly ovate in outline, net-veined, mostly dentate; stems, branches, and branch-

lets mostly more or less tetragonal, often more or less decumbent; inflorescence terminal or axillary, indeterminate, racemiform, often subspicate in anthesis, mostly narrow and elongate, pedunculate, erect or subflexuous; flowers hypogynous, small or medium-sized, each solitary in the axil of a small bractlet, arranged in a spirally alternate or pseudo-secund manner on the mostly elongate rachis, never whorled; bractlets small, one subtending each flower; calyx mostly tubular in anthesis, 5-ribbed, often slightly 5-plicate, slightly zygomorphic or practically actinomorphic, gamosepalous, terminating in 5 mostly short equal or subequal teeth, persistent, accrescent, enlarging with and investing the fruit, usually contracted and more or less coarctate-rostrate at the orifice at maturity; corolla gamopetalous, more or less zygomorphic, hypocrateriform or infundibular, surpassing the calyx, its tube cylindrical, straight or somewhat curvate, more or less ampliate at apex, its limb spreading, oblique, more or less bilabiate, the abaxial lip 3-lobed with 1 large central and 2 medium-sized lateral lobes, the axial lip 2-lobed, with usually very small lobes; fertile stamens 4, didynamous, the upper pair better developed and usually inserted slightly above the middle of the corolla-tube, the lower pair inserted approximately at the middle of the tube, all included or equaling the tube; filaments very slender; anthers erect, ovate or oblong, 2-celled, dorsifixed at or below the middle, introrse, the connective usually conspicuously thickened and sagittate, unappendaged, the thecae parallel or divergent at base, opening by a lateral longitudinal slit, the fifth (posterior) stamen reduced to a minute staminode or absent; pistil solitary, bicarpellary, included; style terminal, usually equaling the lower stamens, 2-lobed at apex, the anterior lobe longer and recurved or erect, stigmatiferous at apex, the posterior lobe reduced, very minute and tooth-like, not stigmatiferous; ovary compound, 4-celled or (by abortion of the posterior cells) 2-celled; ovules basal, erect, anatropous, solitary in each cell; fruit a dry often woody schizocarp, included by the fruiting-calyx, composed of 2 usually similar 2-celled (or by abortion 1-celled) cocci, which separate easily on maturity; pericarp hard, the dorsal surface echinate, scrobiculate, or ridged, the commissural surface excavated, concave, or plane; seeds without endosperm.

About 20 species and varieties of tropical and subtropical Asia, Asia Minor, Africa, and America; the 10 American forms ranging from Florida and Texas, through the West Indies, Mexico, and Central America, to Brazil, Bolivia, and Paraguay.

Type species: *Verbena lappulacea* L. [= *Priva lappulacea* (L.) Pers.].

1. *PRIVA LAPPULACEA* (L.) Pers., Syn. Pl. 2: 139. 1806.

Verbena lappulacea L., Sp. Pl., ed. 1, 19. 1753.

Zapania lappulacea (L.) Lam., Tabl. Encycl. Méth. Bot. 1: 59. 1791.

Priva echinata A. L. Juss., Ann. Mus. Hist. Nat. Paris 7: 70. 1806.

Tamonea lappulacea (L.) Poir. in Lam., Encycl. Méth. Bot. 7: 568. 1806.

Blairia lappulacea Houst. ex Steud., Nom. Bot., ed. 2, 1: 208, in syn. 1840.

Priva mexicana Sieber ex Steud., Nom. Bot., ed. 2, 2: 397, in syn. 1841 [not *P. mexicana* (L.) Pers., 1806].

Priva lamiiifolia Mart. & Gal., Bull. Acad. Roy. Brux. 11²: 325. 1844.

Bouchea dichotoma Mohr ex Moldenke in Fedde, Repert. 41: 25, in syn. 1936.

Salvia lappulacea Pavon ex Moldenke in Fedde, Repert. 41: 25, in syn. 1936.

Perennial herb, to 1 m. tall; stems spreading and decumbent or procumbent; branches prostrate to ascending or even erect, usually acutely tetragonal, often sulcate, pilose-pubescent with curved or uncinat hairs, glabrescent in age below; larger nodes usually annulate with a band of longer hair; petioles slender, 0.8 to 3 cm. long, more or less pilose with scattered whitish hairs; blades membranous, ovate, 1.4 to 14.5 cm. long, 0.9 to 8.5 cm. wide, acute or acuminate at apex, rather uniformly and coarsely serrate along the margins (except at the very base and on the acumination) with blunt or acute and appressed teeth, mostly sub-

truncate or subcordate (or acute when young) at base, with the actual center short-cuneate, pilose or strigose above with scattered whitish bulbous-based hairs, pilose and puberulent beneath with scattered hairs; veinlet reticulation inconspicuous; inflorescence terminal on stems and branches, 4.5 to 21 cm. long, 5 to 15 mm. wide, many-flowered, the flowers loosely alternate on the puberulent-pilose rachis; peduncles slender, 0.8 to 5.8 cm. long, more or less puberulent-pilose, the uppermost leaves at the base of the peduncle often much reduced; bractlet usually surpassing the pedicel in anthesis; calyx oblong-campanulate, 2 to 3.1 mm. long, about 2.3 mm. wide, densely short-tomentose with uncinata hairs about 0.3 mm. long and interspersed among them scattered straight hairs about 0.5 mm. long, obscurely 5-ribbed only toward the apex, its rim 5-apiculate with very minute apiculations; corolla hypocrateriform, usually blue, pink, violet, or purple, occasionally lavender or white, with a few scattered hairs on both surfaces, its tube broadly cylindric, straight, about 3.6 mm. long on the axial and 3.3 mm. long on the abaxial side, about 1.8 mm. wide, the central abaxial lobe about 1.8 mm. long and 1.5 mm. wide, the 2 lateral abaxial lobes each about 1.2 mm. long and 0.7 mm. wide, the 2 small axial lobes each about 1 mm. long and wide, all broadly elliptic-lingulate and rounded; upper pair of fertile stamens inserted about 1.5 mm. and the lower pair about 1 mm. above the base of the corolla-tube, included; ovary 4-celled, 4-ovulate; fruiting-calyx broadly ovate, thin-membranous, conspicuously inflated, enclosing the fruit and very shortly beaked at apex, 5 to 7 mm. long, 3 to 4.5 mm. wide, densely hispidulous with uncinata whitish hairs; schizocarp oblong, conspicuously quadrangular, composed of 2 exactly similar closely joined 2-celled woody cocci, glabrous throughout, each mature coccus about 3 mm. long and 2 mm. wide, the dorsal surface echinate with 2 parallel longitudinal marginal rows of short straight sharp spines (each spine 0.5 to 1 mm. long), the area between the rows of spines very obscurely scrobiculate-reticulate or transversely ridged, the sides transversely ridged with slender subparallel ridges, the commissural surface plane or nearly so, not margined.—Clearings, roadsides, and waste places; a cosmopolitan weed in the tropics and subtropics of America, from Florida, through the West Indies, Mexico, and Central America, to Peru, Brazil, and Bolivia; also naturalized in Java.

YUCATAN: *G. F. Gaumer* 24029 (F, W); *C. & G. E. Seler* 5555 (B, 2). Izamal and vicinity, *G. F. Gaumer* 364, in part (B; Bm; Br; Cp; E; Ed; F; G; K; L; N; V; W; X, 2), 394, in part (F), *s.n.* (F, K); *C. & G. E. Seler* 3923 (B). Itzimna, near Izamal, *C. & G. E. Seler* 3938 (B). Buena Vista, *G. F. Gaumer s.n.* (F). Suburbs of Merida, *A. C. V. Schott* 22 (F). Suburbs of Quinta del Obispo, *A. C. V. Schott* 23 (Bm, F). Uxmal, *W. C. Steere* 2050 (Mi). Chichen Itza, *C. & G. E. Seler* 3995 (B; F; G, 2); *W. C. Steere* 1233 (Mi), 1456 (Mi). CAMPECHE: *E. A. Goldman* 458 (W). Ciudad del Carmen, *C. D. Mell* 2061 (N, W). Champoton, *W. C. Steere* 1731 (Mi). Tuxpeña, *C. L. Lundell* 883 (Ca; E; F; I; Mi, 2; N; W). QUINTANA ROO: Chichankanab, *G. F. Gaumer* 1702 (Br, Cp, E, F, K, Lu, W), 1702 *bis* (D); *G. F. Gaumer & sons* 1702 (Bm, Ca, K, L, Mi, P, S, Us, V). Center of Cozumel Island, *C. F. Millspaugh, Plantae Utowanae* 1548 (F). Cozumel Island, *G. F. Gaumer s.n.* (K). BRITISH HONDURAS: Orange Walk District—*J. S. Karling* 42 (F, W); *C. L. Lundell* 79 (F), 363 (F); *W. C. Meyer* 139 (F). Belize District—*M. E. Peck* 293 (G), 293*b* (B). Corozal District—*P. H. Gentle* 174 (F, Mi). Stann Creek District—Stann Creek, *W. A. Schipp* 845 (Bm, Ca, Cb, E, F, G, I, K, Mi, N, S). GUATEMALA: Dept. Peten, Uaxactun, *H. H. Bartlett* 12162 (F, I, Mi). La Libertad, *C. L. Lundell* 3693 (F, 2; Mi, 2).

Millspaugh in *Field Mus. Publ. Bot.* 1: 41 (1895) cites an additional Gaumer specimen, which I have not seen, from Cozumel Island, and on page 387 (1898) cites *Stone 186* from Tekanto. He also records the vernacular name "ɔallunɔay" and "berbenilla." In *Field Mus. Publ. Bot.* 2: 92 (1900) he records the name "xpakunpak" (=stick-tight) from Cozumel

Island and states that the Mayas use the bruised herb as a remedy for gonorrhoea. Many collectors describe the species as an annual. The corollas drop off very easily if the plant is jarred. Schipp found it "occasional in swampy places," and Bartlett collected it in a dry arroyo. Lundell describes it as a common weed in the area.

9. **PETREA** Houst. ex L., Sp. Pl., ed. 1, 626 (1753), Gen. Pl., ed. 5, 275. 1754.

Petrea B. Juss. apud Hook. f. & Jacks., Ind. Kew. 2: 477, in syn. 1895.

Shrubs, trees, or woody vines; leaves opposite or whorled, deciduous, exstipulate, pinnately net-veined, often roughened and with prominent venation; inflorescence axillary or terminal, indeterminate, racemiform, the racemes mostly elongate, many-flowered; bractlets and prophylla small, numerous, caducous; torus swollen; flowers hypogynous, perfect, alternate on the rachis, often distant, each subtended by 1 or more prophylla; calyx gamosepalous, mostly actinomorphic, its tube cylindrical or campanulate, mostly ribbed, membranous during anthesis, its rim normally 5-lobed, the lobes mostly equal, blue, violet, purple, or white, mostly longer than the tube, alternate with the corolla-lobes, bearing on its ventral surface at the base of the lobes a thin-membranous calicinal crest, which either is in the form of a narrow sinuate or 5-toothed coronet or is 5-cleft to the base, the teeth alternate with the calyx-lobes, erect during anthesis; corolla gamopetalous, hypocrateriform, mostly darker blue or purple than the calyx, or white, mostly slightly zygomorphic, its tube cylindrical, urceolate, or infundibular, the basal portion mostly narrow, the upper portion mostly abruptly and widely ampliate, its limb rotate, 5-lobed, the lobes mostly of 2 sizes, the anterior largest (rarely of 3 sizes, with the 2 posterior ones smallest), mostly much shorter than the calyx-lobes and alternate with them, the posterior ones outside in prefloration; stamens 4, didynamous, inserted close together near the middle of the corolla-tube, included; filaments very short and slender; anthers oblong or ovate, dorsifixed near the base, 2-celled, each theca opening by means of a longitudinal slit, introrse, the connective mostly enlarged, often surpassing the thecae; staminode present or absent; pistil one, compound, but 1-carpellary through the abortion of 1 carpel, included by the corolla-tube; style single, terminal; stigma capitate, mostly oblique, more or less distinctly bilobed; ovary subglobose or oblong, borne on a more or less conspicuous disk, more or less completely 2-celled, each cell 1-ovulate; ovules lateral, ascending, hemianatropous or imperfectly anatropous, or pendent and orthotropous; fruiting-calyx incrassate, its tube not much accrescent, mostly losing its blue color, but becoming very hard and tough and mostly plicate-ribbed, its lobes greatly accrescent, stiffened, reticulate-veined, divergent, acting as wings for floating the fruit, the calicinal crest very callose, mostly curving inward and converging, thus completely closing the mouth of the calyx-tube; fruit drupaceous, completely enclosed by the mature calyx, the exocarp leathery or fleshy, the endocarp hard, more or less completely 2-celled, forming 2 pyrenes, not easily separating, each pyrene 1-seeded, or by abortion the fruit 1-pyrened and 1-seeded; seeds laterally or apically attached, without endosperm.

About 34 living species and varieties of tropical and subtropical America, extending from Cuba and Jamaica, through the West Indies, and from northern Mexico, through Central America, to southern Brazil, Bolivia, Paraguay, and Peru. Fossil species are known from Europe and the United States. One species has become naturalized in Java; many are cultivated.

Type species: *P. volubilis* L.

Corolla blue, violet, purple, or lilac 1. *P. volubilis*
 Corolla white 1a. *P. volubilis* var. *albiflora*

I. *PETREA VOLUBILIS* L., Sp. Pl., ed. 1, 626. 1753.

Petrea volubilis Gaertn., Fruct. & Sem. Pl. **2**: 471, pl. 177, fig. 5. 1791.—*Petrea volubilis* Schiede apud Standl., Contrib. U. S. Nat. Herb. **23**: 1237, in syn. 1924.—*Petrea volubilis* Millsp. apud Standl., Field Mus. Publ. Bot. **3**: 403, in syn. 1930.

Petrea (volubilis?) mexicana Cham., Linnaea **7**: 367. 1832.—*Petrea Mexicana* Willd. ex Cham., Linnaea **7**: 367, in syn. 1832.

Petrea Stapelsiae Paxt., Mag. Bot. **4**: 199–200. 1838.—*P. Stapelsiae* Paxt. apud Hook. f. & Jacks., Ind. Kew. **2**: 478. 1895.

Petrea ovata Mart. & Gal., Bull. Acad. Brux. **11**²: 328. 1844.

Petrea Sub-serrata Bárcena, Notic. Cient. Estad. Hidalg. 31–32. 1877 [not *P. subserrata* Cham., 1832].

Petrea scandens Jacq. ex Moldenke in Fedde, Repert. **43**: 33, in syn. 1938.—*Petrea scandens* Heller ex Moldenke, l. c.

Petrea volubilis var. *mexicana* Schiede ex Moldenke in Fedde, Repert. **43**: 33, in syn. 1938.

Petrea guranensis Cham. ex Moldenke in Fedde, Repert. **43**: 33, in syn. 1938.

Petrea Staphylea Hort. ex Moldenke in Fedde, Repert. **43**: 33, in syn. 1938.

Woody vine or subshrub, to 13 m. tall; branches and branchlets slender, grayish or brownish, prominently lenticellate, rather densely short-pubescent or puberulent with mostly subappressed brownish hairs (on older wood) or spreading subhirsute hairs (on young shoots), very obtusely tetragonal or subterete; leaf-scars large and prominent, borne on very conspicuous corky sterigmata; leaves opposite; mature petioles stout, 4 to 13 mm. long, rather densely or sparsely short-pubescent with spreading brownish hairs or puberulent, often with dense fasciculations (actually aborted racemes) of densely ferruginous-brownish hirsute-pubescent bractlets in their axils; mature blades rather firmly chartaceous, very scabrous on both surfaces, elliptic, 3 to 21 cm. long, 1.4 to 10.6 cm. wide, acute or short-acuminate (rarely obtuse or emarginate) at apex, entire (rarely sparsely dentate), the margins often more or less undate or subrevolute, acute or obtusely narrowed at base (rarely rounded or subcordate), densely asperulous on both surfaces, often obscurely short-pubescent along the midrib above and the larger venation beneath, or puberulent, but not conspicuously so; racemes axillary, very abundant, varying from erect or nutant to pendent, solitary in each axil, often clustered near the tips of the branches and branchlets, 8 to 29 cm. long, 4 to 8 cm. wide, mostly short, rather loosely many-flowered; pedicels about 8 mm. long in anthesis, obscurely puberulent; torus expanded, not ribbed; calyx in anthesis light, its tube cylindrical, gradually ampliate toward apex, about 3 mm. long, about 2 mm. wide at base and 2.5 to 3 mm. wide at apex, not ribbed, densely pubescent, its rim 5-lobed, the lobes membranous, oblong, 13 to 18 mm. long, 4 to 6 mm. wide, rounded at apex, glabrous on both surfaces; calicinal crest composed of 5 membranous, triangular-ovate, erect lobes, about 1 mm. long and wide, sparsely ciliate on the margins, acute at apex; corolla hypocrateriform, its tube infundibular, 6 to 8 mm. long, the basal portion narrow-cylindric and 1.5 to 2 mm. wide, conspicuously ampliate to 4 to 5 mm. at apex, the lower $\frac{3}{4}$ glabrous and the upper $\frac{1}{4}$ densely puberulent outside, puberulent within and densely villous-pubescent among the stamens, the anterior lobe broadly elliptic, 5 to 6.5 mm. long, 4 to 4.5 mm. wide, slightly sinuate along the margins, densely puberulent on both surfaces, the remaining lobes similar, but smaller, 4 to 6 mm. long, about 4 mm. wide; stamens inserted 4.5 and 5 mm. above the base of the corolla-tube; staminode obsolete; ovary oblong-subobovate, about 2 mm. long and 1 mm. wide, glabrous; fruiting-calyx tough, to 4 mm. long, more densely long-pubescent, its lobes firm and stiff, to 22 mm. long and 7 mm. wide, divergent, the calicinal crest callose and converging inward, closing the mouth of the calyx-tube.—In thickets and forests, from Cuba and northern Mexico to Panama; introduced in Java; cultivated elsewhere.

YUCATAN: *J. C. C. Bequaert* 9 (A, F, W); *G. F. Gaumer & sons* 23585 (Cb, 2; E; F; N;

W), 23673 (Cb, F, S, W). Izamal, *G. F. Gaumer* 379 (A, 2; B, 2; Bm; Cp; E; Ed; G; K; N; S; V; W; X, 2), 379 *bis* (F), *s.n.* (F, K); *G. F. Gaumer & sons* 379 (E, N); *J. M. Greenman* 415 (F, G). Hunabchen, *C. & G. E. Seler* 3880 (B, F). Between Ticul and Tabi, *C. & G. E. Seler* 3903 (B, F). Xkombec, *C. & G. E. Seler* 4031 (B, F, G). Calcehtoh, *W. Stone* 259 (D). Chichen Itza, *C. L. & A. A. Lundell* 7329 (Mi), 7413 (Mi); *W. C. Steere* 1508 (F, Mi). CAMPECHE: *G. N. Collins* 44 (W); *C. L. Lundell* 1204 (A, F); *C. & G. E. Seler* 4946 (B). BRITISH HONDURAS: Without locality, *R. S. Pelly* 34 (F). El Cayo District—El Cayo, *H. H. Bartlett* 11494 (Mi); *M. Chanek* 143 (Mi). Near Camp 6, *P. H. Gentile* 2366 (Mi). Corozal District—*P. H. Gentile* 316 (F, Mi). San Juanquin, *C. L. Lundell* 4972 (E, Mi, N). Belize District—near Manatee Lagoon, *M. E. Peck* 388 (B, G). Toledo District—Indian Reserve, Malfredi Lagoon, *W. A. Schipp* S-556 (A, Ca, E, F, K, Mi, N). GUATEMALA: Dept. Peten, La Libertad and vicinity, *J. M. Aguilar Hidalgo* 362 (Mi); *C. L. Lundell* 3431 (Mi). Uaxactun, *H. H. Bartlett* 12133 (Mi), 12559 (A; F; Mi; N, 2; S), 12566 (Mi).

Millspaugh in *Field Mus. Publ. Bot.* **1**: 42 (1895) cites an unnumbered Johnson collection from "Yucatan, loc. ignot." as "*P. volubilis*, Jacq.?" If by this he means *E. P. Johnson* 106 in the Kew and Columbia University herbaria, the citation is not correct, for this collection was made at San Juan Bautista, in the state of Tabasco, according to original notes by Johnson preserved on the Columbia University specimen. On page 317 (1896) of this volume Millspaugh records the vernacular name "yoxop-dimin" [*Gaumer* 379]. Millspaugh and Loesener in *Engl. Bot. Jahrb.* **36**: Beibl. 80: 26 (1905) record the Maya name "opp-tzimin" and the additional names "tortilla tostada del caballo" and "bejuco del caballo." Lundell in *Carnegie Inst. Wash. Publ.* **478**: 75, 146, & 183 (1937) records the name "Santa Rita" and states that it is a large woody vine, with a stem sometimes to 10 cm. in diameter, occasional in climax forests, secondary upland forests, swamp forests (escobal), and abandoned milpas. The blue flowers are very showy and the species is often planted for ornament. He also records the common name "piocha viejo" [*C. L. & A. A. Lundell* 7329]. It has been collected in flower in our area from January to July and in fruit in September. The species has been widely confused with the South American *P. arborea* H. B. K. and is so recorded by Millspaugh in *Field Mus. Publ. Bot.* **1**: 317 (1896) & 387 (1898).

1A. *PETREA VOLUBILIS* var. *ALBIFLORA* (Standl.) Moldenke, *Revista Sudam. Bot.* **5**: 2. 1937.

Petrea arborea f. *albiflora* Standl., *Field Mus. Publ. Bot.* **11**: 140. 1932.

Petrea volubilis f. *albiflora* (Standl.) Standl., *Field Mus. Publ. Bot.* **18**: 1012. 1938.

This variety differs from the typical form of the species in having a pure white calyx and corolla. Its racemes, also, are mostly terminal or terminating very short axillary twigs, and are more uniformly elongate (15 to 38 cm. long).—Open forests; endemic to British Honduras.

BRITISH HONDURAS: Stann Creek District—Sittee River, *W. A. Schipp* 727 (A, isotype; Bm, isotype; Ca, isotype; Cb, isotype; E, isotype; F, type; G, isotype; K, isotype; N, isotype & photo of type; S, isotype; Z, photo of type).

Schipp describes this plant as a beautiful semiscandent shrub growing in open forests, rare along the Sittee River, with "handsome sprays of pure white flowers." Standley in *Field Mus. Publ. Bot.* **18**: 1012 (1938) says, "In passing, it may be remarked that most botanists agree in according the status of form rather than variety to casual color forms."

I agree with this statement, but I do not regard the plant under discussion as a "casual color form." As is well shown in the case of the white-flowered varieties of *P. arborea* [*P. arborea* var. *Broadwayi*] from Trinidad and of *P. Kohautiana* [*P. Kohautiana* var. *alba*] from Barbados, Trinidad, and British Guiana, the white-flowered varieties of *Petrea* are apparently quite constant—so much so that they have been introduced into the horticultural trade as "white-wreaths"—and are not mere "casual color forms."

10. **CITHAREXYLUM** B. Juss. ex L., Sp. Pl., ed. 1, 625 (1753); Gen. Pl., ed. 5, 273 [as *Citharexylon*]. 1754.

Rauwolfia Ruiz & Pav., Fl. Peruv. 2: 26, pl. 152. 1799 [not *Rauwolfia* Plum., 1753].

Scleroon Benth. ex Lindl., Bot. Reg. 29: Misc. 65. 1843.

Trees or shrubs; branches and branchlets tetragonal, sometimes spiny; leaf-scars mostly large, corky, and elevated, borne on more or less prominent sterigmata; leaves opposite or verticillate, deciduous, exstipulate, entire or dentate, usually bearing a pair of prominent glands at the base of the blade; inflorescence indeterminate, racemiform or spicate, axillary and terminal, mostly elongate and many-flowered, rarely reduced to only a few flowers, erect or nutant, mostly simple, occasionally sparsely branched; flowers small, each subtended by a tiny inconspicuous bractlet; calyx tubular or cyathiform, thin, accrescent, its rim truncate or 5-toothed or -lobed; corolla infundibular or hypocrateriform, mostly yellow or white, its tube narrow-cylindric and regular, its limb spreading, 5-parted, with broad slightly irregular lobes, the 2 hindermost outermost in prefloration, mostly more or less pubescent in the throat; stamens 4, didynamous, inserted at or above the middle of the corolla-tube, included, a fifth stamen represented by a very rudimentary staminode; filaments very short; anthers ovate or sagittate, introrse, erect, with 2 parallel thecae opening by longitudinal slits and a thickened connective which often surpasses the thecae in length; style terminal, included, often thickened toward the apex; stigma very shortly bifid; ovary perfectly or imperfectly 4-celled, composed of 2 carpels, each cell containing one lateral anatropous ovule; fruiting-calyx conspicuously enlarged and indurated, cupuliform or patelliform, shorter than the fruit; fruit drupaceous, with juicy exocarp and hard endocarp, with two 2-celled and 2-seeded pyrenes, which are often separated by a median fissure.

A genus of about 119 species and varieties, from Bermuda, Florida, and Texas, through Mexico, Central America, and the West Indies, to central Argentina and Uruguay; several fossil forms are known from the United States, Europe, and Colombia.

Type species: *C. spinosum* L.

Leaf-blades densely hirtellous beneath 2. *C. hirtellum*

Leaf-blades obscurely puberulent or glabrous beneath.

Leaves often ternate or whorled in 4's; blades roughened above by the abundant prominulous veinlet-reticulation, dull green 1. *C. hexangulare*

Leaves regularly opposite; blades smooth above, shiny; veinlet-reticulation not prominulous.

Leaf-blades distinctly acuminate at apex and base; petioles usually elongate 3. *C. Schottii*

Leaf-blades rounded, obtuse, emarginate, or acute at apex, acute at base; petioles usually very short 4. *C. caudatum*

1. **CITHAREXYLUM HEXANGULARE** Greenm., Field Mus. Publ. Bot. 2: 187-188. 1907.

Citharexylum affine Mart. & Gal., Bull. Acad. Roy. Brux. 11²: 328. 1844 [not *C. affine* D. Don, 1831].

Tree or shrub, to 12 m. tall; trunk to 15 cm. in diameter; branches and branchlets mostly acutely tetragonal, very minutely puberulent, becoming glabrate, conspicuously longitudinally ribbed between the angles; nodes annulate; petioles very slender, 0.6 to 1.9 cm.

long, minutely puberulent or glabrate; blades chartaceous, dull, lanceolate, lanceolate-oblong, or elliptic, 4 to 16.2 cm. long, 1.1 to 5.5 cm. wide, acute or acuminate at apex and base, entire, prolonged into the petiole, usually bearing a pair of elongate glands on the prolongation beneath, very minutely and obscurely puberulent on both surfaces, becoming glabrate; vein and veinlet reticulation very fine and abundant, prominulous on both surfaces, especially above; racemes axillary or terminating short twigs, simple or compound with 2 to 10 opposite or whorled branches, erect, densely many-flowered, the main raceme 10 to 31 cm. long and to 1 cm. wide, the lateral ones 4.5 to 12 cm. long; peduncles slender, 1.5 to 5.5 cm. long, acutely tetragonal, minutely puberulent; rachis very slender, minutely puberulent; pedicels filiform, about 1 mm. long, puberulent; bractlets minute, subulate, equaling or slightly exceeding the pedicels, persistent; calyx tubular-campanulate, about 3.5 mm. long, 5-toothed, 5-nerved and with intermediate smaller subanastomosing veins, glabrate except for the ciliolate rim; corolla tubular-campanulate, 5 to 6 mm. long, white, pubescent on both surfaces, its tube slightly exceeding the calyx, its lobes somewhat unequal, ovate-rotund to broadly oblong, 2 to 3 mm. long, nearly or quite as broad, spreading or reflexed; perfect stamens 4, the fifth reduced to a mere staminode, included; ovary glabrous; style pubescent; fruiting-calyx cupuliform, about 4 mm. long and wide, striate-ribbed, glabrate, its margin shallowly and often irregularly dentate or erose; fruit oblong, to 6 mm. long and 4 mm. wide, turning from yellow to reddish brown and finally black.—Riversides, banks, and flood-plains, Mexico to Costa Rica.

CAMPECHE: *E. P. Johnson* 80 (C, K).⁷ QUINTANA ROO: west end of Lake Coba, *C. L. & A. A. Lundell* 7679 (Mi, 2; N). BRITISH HONDURAS: Without locality, *H. C. Sampson* 14 (K, 2). El Cayo District—Banana Bank on Belize River, *C. L. Lundell* 7022 (Mi). Duck Run, *C. L. Lundell* 6969 (I; Mi, 2; N). Toledo District—Rio Grande River, *W. A. Schipp* 1190 (Bm; Cb; E; F; K; Mi; N, 2; S). Moho River, *M. E. Peck* 567 (B, G).

C. L. & A. A. Lundell 7679 is rather anomalous in having especially short leaf-blades, decidedly lanceolate in shape, but similar leaves may be seen occasionally on typical branches. The collection is described as being from a shrub only 3 to 5 feet tall in low second growth. Typical specimens have very much longer and more oblong-lanceolate or even elliptic leaf-blades. It is said to be a common tree along riverbanks and has been collected in anthesis in our area from June to October.

2. CITHAREXYLUM HIRTELLUM Standl., Field Mus. Publ. Bot. 4: 257. 1929.

Shrub, to about 2 m. tall; stems to about 5 cm. in diameter; branches and branchlets acutely tetragonal, finely hirtellous with brown hairs, more densely hirtellous on the youngest parts; nodes annulate; petioles slender or stoutish, 5 to 7 mm. long, densely hirtellous; blades thick-chartaceous, mostly rigid, elliptic (or subrotund), 5 to 9 cm. long, 1.1 to 6 cm. wide, acute or acuminate (rarely obtuse or rounded) at apex, entire, cuneate or subacuminate at base, with a pair of elongated glands at the very base, finely hirtellous above when immature, becoming glabrate, but usually decidedly scabridous, densely hirtellous beneath with brown hairs; racemes axillary and terminal, erect, simple, 6 to 14 cm. long, to 1.5 cm. wide, many-flowered; peduncles slender, 1 to 5 cm. long, densely hirtellous; rachis densely hirtellous; pedicels filiform, to 1 mm. long, hirtellous; bractlets linear-subulate, 1 to 2 mm. long; calyx cylindrical-campanulate, 4.5 to 5 mm. long, subacute at base, sparsely hirtellous, its rim remotely denticulate; corolla about 7 mm. long, white, its tube scarcely longer than the calyx, glabrous, its lobes rounded, sparsely and minutely puberulent;

⁷ This collection may actually be from Tabasco, since the label merely states "Yucatan & Tabasco."

fruiting-calyx broadly campanulate, heavy, 6 to 7 mm. long and wide, glabrous, its rim 5-lobed, the lobes broad and rounded; fruit elliptic, 8 to 10 mm. long, about 6 mm. wide, fleshy, red.—Pasture-land and high ridge, British Honduras and Honduras.

BRITISH HONDURAS: Corozal District—Freshwater Creek, *J. B. Kinloch* 2 (F, Y); *P. H. Gentle* 238 (Mi, N), 435 (F, I, K, Mi, N, S). Xiabe, Corozal, *P. H. Gentle* 4922 (N); *C. L. Lundell* 4922 (A, Ba, E, I, Mi, N, S). Orange Walk District—vicinity of Tower Hill, *J. S. Karling* 9 (B, photo of type; F, type; K, isotype & photo of type; N, photo of type; S, photo of type; W, isotype; Z, photo of type). Belize District—Maskall, *P. H. Gentle* 1177 (A; E; F; G; I; K; Mi; N, 2).

It has been collected in our area in anthesis in May and in fruit in August.

3. *CITHAREXYLUM SCHOTTII* Greenm., Field Mus. Publ. Bot. **2**: 190. 1907.

Citharexylum quadrangulare Millsp. apud Greenm., Field Mus. Publ. Bot. **2**: 190, in syn. 1907 [not *C. quadrangulare* Jacq., 1760].

Arborescent shrub or tree, to 10 m. tall; stem covered with gray bark and dotted with numerous lenticels; branches and branchlets acutely tetragonal and ribbed, brownish, minutely pulverulent or glabrate; nodes obscurely annulate; leaves opposite (or approximate on vigorous shoots); petioles very slender, 7 to 20 mm. long, glabrous; blades chartaceous, lighter beneath, lanceolate-oblong or narrowly oblong-elliptic, 3.3 to 10.5 cm. long, 2 to 3 cm. wide, acute or acuminate at apex, entire, acuminate at base and attenuate into the petiole, usually with a pair of small black glands at the very base, glabrate on both surfaces; racemes axillary and terminal, numerous, erect or nutant, simple or compound with 1 or 2 pairs of branches, mostly short, 3 to 9.5 cm. long, many-flowered; peduncle and rachis slender, glabrate, nigrescent, the former 4 to 11 mm. long; pedicels filiform, 1 to 1.5 mm. long, glabrate, to 3 mm. long in fruit; bractlets setaceous-subulate, about 1 mm. long; calyx tubular-campanulate, about 2.5 mm. long, 5-angled in cross section, its rim sinuately 5-dentate; corolla about twice as long as the calyx, pale yellow-green, externally glabrous or essentially so, pubescent in the throat within, its tube exceeding the calyx, obconic, its lobes oblong-rotund, pubescent on the inner surface, ciliolate; fruiting-calyx cupuliform, about 3 mm. long and 5.5 mm. wide, very minutely puberulent or glabrous and shiny, its rim subtruncate, subentire or 5-angulate; fruit oblong or oblong-obovate, 5 to 7 mm. long, about 4 mm. wide, rather fleshy.—Forests and thickets, Yucatan Peninsula; endemic.

YUCATAN: *G. F. Gaumer* 23163 (F), 23466 (V), 24037 (Bm, Cb, Cp, E, F, N, S, W). Izamal, *G. F. Gaumer* 765 (A, B, Bm, Br, Ca, Cp, E, I, K, Lu, Mi, N, S, V, W), 765 bis (F, 3). Ebula, *G. F. Gaumer & sons* 23463 (Cb, E, F, N, W). Near Merida, *A. C. V. Schott* 575 (B, photo of type; Br, isotype; E, isotype; F, type; K, photo of type; N, photo of type; S, photo of type; Z, photo of type), *s.n.* [VIII.25.1865] (W), *s.n.* [IX.22.1865] (W). Chichen Itza, *W. C. Steere* 1337 (E, F, I, Mi, S). Piste, near Chichen Itza, *C. L. & A. A. Lundell* 7878 (Mi, 2; N); *W. C. Steere* 1419 (F; Mi, 2). Valladolid, *W. C. Steere* 1660 (F, Mi). Merida-Progreso road, *C. L. & A. A. Lundell* 8132 (Mi, 2; N). QUINTANA ROO: Chichankanab, *G. F. Gaumer* 1944 (E, F, N, S, W). Lake Coba, *C. L. & A. A. Lundell* 7781 (Mi, 2; N).

Standley in Field Mus. Publ. Bot. **3**: 400 (1930) records the vernacular names "tatakche," "iximche," and "palo de violín," and comments: "The 'ixtatakche' listed by Pérez is probably a different plant. It is described as a 'yerba,' and is said to be applied to old sores to heal them." Steere records the name "chacni-bach" (*no.* 1337), and the Lundells list "xchobenche" (*no.* 7878). It has been collected in anthesis from May to August. Millspaugh in Field Mus. Publ. Bot. **1**: 386 (1898) cites *Schott* 89 under "*Citharexylum quadrangulare*

Jacq." from Merida, but according to notes on the British Museum specimen of this number, this collection is from Havana, Cuba, and examination proves it to be *C. fruticosum* var. *subvillosum* Moldenke, a form not known from the Yucatan area.

4. *CITHAREXYLUM CAUDATUM* L., Sp. Pl., ed. 2, 872. 1763.

Citharexylum album Mill., Gard. Dict., ed. 8, no. 2. 1768.

Citharexylum erectum Sw., Prodr. 91. 1788.—*C. erectum* Jacq. apud Schau. in A. DC., Prodr. 11: 612, in syn. 1847.

Citharexylum Berterii Spreng., Syst. Veg. 2: 763. 1825.

Citharexylum surrectum Griseb., Fl. Br. W. I. 497. 1861.

Citharexylum caudatum Seem. ex Griseb., Fl. Br. W. I. 497, in syn. 1861.

Citharexylum Lindenii Turcz., Bull. Soc. Nat. Mosc. 36²: 208. 1863.

Citharexylum quadrangulare A. Rich. apud O. E. Schulz in Urb., Symb. Ant. 6: 58, in syn. 1909 [not *C. quadrangulare* Jacq., 1760].

Shrub or tree, to 15 m. tall; stem to 13 cm. in diameter; branches and branchlets tetragonal or subterete, often striate, glabrous, rather medullose, brownish; nodes obscurely annulate; leaves opposite; petioles slender or stoutish, 0.3 to 2.4 cm. long, glabrous; blades firmly chartaceous or subcoriaceous, very shiny on both surfaces, lighter beneath, lanceolate, oblong, or narrowly elliptic, 4 to 17.5 cm. long, 2.4 to 7.7 cm. wide, blunt or subacute (rarely apiculate or emarginate) at apex, entire, cuneately narrowed to the base, with the margins recurved to enclose a pair of elongate dark glands at base, punctate beneath, entirely glabrous on both surfaces; racemes axillary or terminal, erect or pendent, 3 to 40 cm. long, 1 to 1.5 cm. wide, densely many-flowered, unbranched or rarely furcate; peduncles and rachis slender, glabrate, the former 0.5 to 4.5 cm. long; pedicels very slender, 1 to 2.5 mm. long, glabrate, to 3 mm. long in fruit; bractlets setaceous, 1 to 2 mm. long, glabrate; flowers fragrant; calyx campanulate, about 3 mm. long, mostly glabrate, its rim subtruncate and entire or minutely apiculate; corolla white or cream-colored, its tube about twice as long as the calyx, its limb 4 to 5 mm. wide; fruiting-calyx cupuliform or eventually patelliform, light and herbaceous or indurated, to 3 mm. long and 4 mm. wide, 5-angled, glabrous, its rim subtruncate, 5-apiculate or eventually irregularly erose and split; fruit oblong, very shiny, to 12 mm. long and 10 mm. wide, changing from yellow, orange, or red when immature to black when ripe.—Coastal thickets and mangrove swamps, forests and pine ridges, from the Bahamas, Greater Antilles, and Mexico, to Martinique, Panama, and Peru (?).

BRITISH HONDURAS: Without locality, *S. J. Record* 14 (F); *J. D. Smith* 41 (W, 2). Belize District—Belize, *H. V. Johnson s.n.* (W); *C. L. Lundell* 1873 (Mi, 2), 4214 (Mi, N), 4215 (Mi, S); *J. D. Smith s.n.* (F). Three miles north of Sibun River, 9 miles south of Belize, *H. O'Neill* 8736 (I, Mi). Gales Point, *H. H. Bartlett* 11337 (F, 2; K; Mi, 5; W). Pine ridge north of aviation field, Belize, *H. H. Bartlett* 11220 (Mi, N). Belize—Sibun River road, *P. H. Gentle* 1 (F, Mi), 61 (F, I, Mi, N, S). Near Manatee Lagoon, *M. E. Peck* 102 (G). El Cayo District—Vaca, *P. H. Gentle* 2268 (Mi, N). Mountain Pine Ridge, *C. L. Lundell* 6690 (Mi, 2; N); *H. H. Bartlett* 11796a (Mi). Stann Creek District—Stann Creek Valley, *J. B. Kinloch* 196 (F); *W. A. Schipp* 268 (A; B; Bm; Ca; Cb, 2; E; F; G; J; K; Mi; N; S; W).

The unnumbered J. D. Smith collection was distributed originally as *C. villosum* Jacq., an entirely different plant not known as yet from the Yucatan area. Gentle records the common names "bird-seed" and "pigeon-feed" (*no. 1*). *C. caudatum* has been collected in anthesis in our area from January to August, on pine ridges, in swampy pine forests, jungles, open creek-beds, and mangrove lagoons. The flowers are said to be sweet-scented.

The long and graceful racemes render the tree a rather showy one both in flower and in fruit.

11. **REHDERA** Moldenke in Fedde, Repert. **39**: 48-49. 1935.

Trees or shrubs; leaves decussate-opposite, 3-plinerved; flowers borne in spike-like racemes which are abbreviated and nutant; calyx tubular, firm, deeply 5-fluted or -costate, its rim 5-toothed with short triangular teeth; corolla hypocrateriform, actinomorphic, its tube cylindric, as long as the calyx, its limb 5-parted, its lobes long and narrow, very densely barbato-tomentose inside; perfect stamens 4, inserted near the apex of the corolla-tube and subequating it, didynamous; anthers oblong, introrse, dorsifixed near the base, 2-celled; staminode small and inconspicuous; pistil single; style terminal, simple, glabrous; stigma subcapitate, very slightly 2-lobed; ovary oblong-obovoid, composed of 2 carpels, completely 4-celled, the axial side and the dissepiment of each carpel greatly thickened, the locules approximately half as long as the ovary, each nearly filled by a single flattened-obovoid ovule attached at its very base; fruiting-calyx fugacious, splitting into 5 linear segments and early deciduous; fruit a schizocarp, narrowly obovate-oblong, each coccus somewhat flattened and each composed of a central linear-oblong 2-celled sclerenchymatous fertile portion with a semitransparent marginal wing on each side, rounded or slightly retuse at the apex; seeds linear, about 1 cm. long, greatly flattened and wing-like at the upper end.

A genus of 3 known species, ranging from southern Mexico to Costa Rica.

Type species: *Citharexylum trinerve* Blake [= *Rehdera trinervis* (Blake) Moldenke].

Leaf-blades long-acuminate or caudate at apex 1. *R. penninervia*
 Leaf-blades broadly rounded, obtuse, or subacute at apex 2. *R. trinervis*

1. **REHDERA PENNINERVIA** Standl. & Moldenke ex Moldenke in Fedde, Repert. **39**: 50-51.

1935.

Citharexylum penninervium Standl. ex Moldenke in Fedde, Repert. **39**: 50, in syn. 1935.

Tree; trunk to 90 cm. in diameter; branchlets and twigs medium-slender, subterete or obtusely tetragonal, light gray, glabrate; nodes not annulate; petioles very slender, about 1.5 cm. long, very minutely puberulent or glabrate; blades firmly chartaceous, rather uniformly gray-green on both surfaces, sometimes becoming brunneous in drying, oblong or elliptic, 4.7 to 10 cm. long, 2.8 to 3.8 cm. wide, long-acuminate or caudate at apex, entire, acute at base, glabrous above, glabrate beneath or more or less barbellate in the axils of the larger veins, not glanduliferous; racemes axillary and terminal, few- or many-flowered, 1 to 3 cm. long, often compound with a pair of basal branches almost as long as the central one; peduncles and rachis slender, rather densely short-pubescent, light, the former 4 to 10 mm. long; pedicels obsolete or to 1 mm. long in fruit; bractlets linear, about 3 mm. long; prophylla setaceous, minute; flowers not known; fruiting-calyx herbaceous, light, cupuliform, about 5 mm. long and wide, glabrous, 5-ribbed, its rim truncate or shallowly 5-scalloped or -toothed, separating into 5 cuneate sectors by splitting in perfectly straight lines between the ribs, thus early deciduous; fruit dry, oblanceolate-spatulate, about 17 mm. long and 8 mm. wide, splitting from the apex into 2 similar halves (cocci), glabrous, shiny.—Jungles of Peten, Guatemala; endemic.

GUATEMALA: Dept. Peten, Uaxactun, *H. H. Bartlett 12317* (B, photo of type; F, type; I, isotype; K, photo of type; Mi, 2 isotypes; N, isotype & photo of type; S, isotype & photo of type; W, isotype; Z, photo of type).

Lundell in Carnegie Inst. Wash. Publ. 478: 75 (1937) records the vernacular name "palo blanco" and describes the bark as light brownish, closely split longitudinally, becoming pulverulent, and the heartwood mahogany-colored. He states that it is occasional in tall swamp forests (botanal).

2. *REHDERA TRINERVIS* (Blake) Moldenke in Fedde, Repert. 39: 53. 1935.

Citharexylum trinerve Blake, Proc. Biol. Soc. Wash. 34: 45. 1921.

Citharexylum macrocarpum Standl., Journ. Wash. Acad. Sci. 14: 243. 1924.

Shrub or tree with a rounded crown, to 20 m. tall; trunk to 25 cm. in diameter; branches and branchlets slender, grayish, twiggy, rather obtusely tetragonal, glabrate; twigs very slender, usually more acutely tetragonal, minutely puberulent or glabrescent; nodes not annulate; petioles very slender, 5 to 9 mm. long, very minutely puberulent; blades chartaceous, very dark green and extremely glossy above, lighter and less shiny beneath, broadly elliptic, obovate, oblanceolate, or subrotund, 2 to 9.5 cm. long, 1.4 to 4.5 cm. wide, broadly rounded and obtuse or subacute at apex, entire, broadly acute or very short-acuminate at base, not glanduliferous, glabrate on both surfaces; vein and veinlet reticulation abundant, usually prominulous on both surfaces; racemes axillary and terminal, abbreviated, numerous, nutant, simple, 2 to 4 cm. long, densely many-flowered; peduncles and rachis very slender, minutely puberulent or glabrate, brownish, the former 5 to 10 mm. long; pedicels subobsolete or to 1 mm. long; bractlets few and linear, to 1 cm. long, puberulent, often absent; prophylla setaceous, 1 to 2 mm. long; calyx tubular, 5 to 5.2 mm. long, about 2.5 mm. wide, glabrous, corrugated, 5-ridged, rather heavy (especially on the much-thickened ridges, much thinner between the ridges), each ridge terminating in a mucro about 0.5 mm. long, the more or less hyaline margin between the mucros more or less pilose and at the center marked with a tuft of hairs about 0.2 mm. long; corolla hypocrateriform, pale green or white, its tube cylindric, 4.5 to 5.2 mm. long, about 1.3 mm. wide at base, ampliate to 2 mm. at apex, glabrous outside, its limb spreading, its lobes narrow-oblong, equal, about 5.3 mm. long, 1.5 to 1.8 mm. wide, densely pilose-pubescent or barbato-tomentose on the inner surface; filaments about 1 mm. long; staminode inconspicuous; style about 1.5 mm. long; ovary oblong or oblong-obovoid, about 1.3 mm. long and 1 mm. wide, glabrous; fruiting-calyx light and herbaceous, cupuliform, closely investing the base of the fruit, but early caducous, about 4 mm. long, 4 to 5 mm. wide, glabrous and shiny, its rim shallowly 5-angulate, splitting into 5 narrow segments; fruit narrowly obovate-oblong, about 8 mm. long and 6 mm. wide, dry, glabrous, shiny.—On low hills and in river-valley forests, from Yucatan to Costa Rica.

YUCATAN: *R. S. Flores s.n.* (F); *G. F. Gaumer 24086* (Cp), 24096 (A; Bm; Cb; Cp, 2; E; F; K, 2; L; N; S, 2; Us; W), 24388 (Cb, F, N, W), 24431 (F, W). Xnocac, *G. F. Gaumer & sons 23502* (A, isotype; B, photo of type; Bm, isotype; Br, isotype; Ca, isotype; Cb, isotype; Cp, 2 isotypes; E, isotype; F, type & isotype; K, isotype & photo of type; L, isotype; Mi, isotype; N, isotype & photo of type; S, 2 isotypes & photo of type; Us, isotype; V, 2 isotypes; Z, photo of type). Along Kaua road, Chichen Itza, *C. L. & A. A. Lundell 7587* (Mi, N). QUINTANA ROO: *Coba, C. L. & A. A. Lundell 7812* (Mi, 2; N).

Flores records the vernacular name "saquilzciché," while the Lundells record it as "sacuisilche" (*no. 7812*) [sac = white; uisil = furrow; che = tree, or, the tree with the white furrowed bark]. The flowers are said to be fragrant and the wood white and fine-grained. It is found in advanced deciduous and relic forests in our area, collected in anthesis in June, July, and September.

12. *DURANTA* L., Sp. Pl., ed. 1, 637 (1753); Gen. Pl., ed. 5, 284. 1754.

Castorea Plum. ex Mill., Gard. Dict. Abridg., ed. 4. 1754.—*Castorea* Mill. apud Prain, Ind. Kew. Suppl. 5: 49, in syn. 1921.

Ellisia P. Browne, Hist. Pl. Jamaic. 262. 1756.

Hoffmannia Loebl., Iter Hisp. 194. 1758 [not *Hoffmannia* Sw., 1788].

Durantia L. apud Mill., Gard. Dict., ed. 8. 1768.

Glabrous or pubescent, often spinose, shrubs; leaves opposite or whorled, entire or dentate; inflorescence indeterminate, racemiform, elongate, mostly terminal, rarely axillary; flowers small, pedicellate, each borne in the axil of a small bractlet; calyx tubular or subcampanulate, truncate, 5-costate and subplicate, each rib terminating in a short subulate tooth, the posterior tooth smallest; corolla salverform, its tube cylindric, straight or curved above, exerted from the calyx, its limb spreading, regular or oblique, 5-parted, mostly pubescent at the mouth, its lobes rounded, usually unequal, mostly pubescent on the inner surface; stamens 4, didynamous, included, inserted at or above the middle of the corolla-tube; filaments very short; anthers sagittate, dorsifixed, erect, with parallel thecae; ovary more or less completely 8-celled, composed of four 2-celled carpels, each cell 1-ovulate; style terminal, shorter than or equaling the lower stamens; stigma obliquely subcapitate, very shortly and unequally 4-lobed; fruiting-calyx accrescent, flask-shaped, usually surpassing and closely appressed to the fruit, but not coalesced with it, usually coarctate-rostrate at apex; fruit drupaceous, mostly completely included by the mature calyx, the exocarp fleshy, the endocarp hard; pyrenes 4, each 2-celled and 2-seeded.

A genus of 36 species and varieties of tropical and subtropical America, from Florida and Bermuda, through the West Indies, Mexico, and Central America, to Argentina.

Type species: *D. erecta* L. [= *D. repens* L.].

1. *DURANTA REPENS* L., Sp. Pl., ed. 1, 637. 1753.

Duranta erecta L., Sp. Pl., ed. 1, 637. 1753.—*Durantia erecta* Mill., Gard. Dict., ed. 8. 1768.

Duranta Ellisia Jacq., Enum. Pl. Carib. 26. 1760.

Duranta Plumieri Jacq., Select. Am. 186, pl. 176, fig. 76. 1763.—*D. Plumieri* L. apud H. B. K., Nov. Gen. & Sp. Pl. 2: 254. 1818.—*Durantia Plumieri* Mill., Gard. Dict., ed. 8. 1768.

Durantia racemosa Mill., Gard. Dict., ed. 8. 1768.

Duranta angustifolia Salisb., Prod. 108. 1796.

Duranta latifolia Salisb., Prod. 108. 1796.

Duranta dentata Rich. ex Pers., Syn. Pl. 2: 142. 1806.

Duranta microphylla Willd., Enum. Hort. Berol. Suppl. 43, nom. nud. 1813.—*D. microphylla* Desf., Cat. Hort. Paris, ed. 3, 392. 1829.

Duranta xalapensis H. B. K., Nov. Gen. & Sp. Pl. 2: 255. 1818.

Duranta spinosa L. apud Schau. in A. DC., Prodr. 11: 615, in syn. 1847.

Duranta inermis L. apud Schau. in A. DC., Prodr. 11: 615, in syn. 1847.

Castorea racemosa L. apud Schau. in A. DC., Prodr. 11: 615, in syn. 1847.

Ellisia acuta L. apud Schau. in A. DC., Prodr. 11: 615, in syn. 1847.

An extremely variable and polymorphic shrub or small tree, to 6 m. tall; branches slender, often drooping or trailing, unarmed or spiny; branchlets tetragonal; leaves numerous, ovate-elliptic, oval, or obovate, 1.5 to 5 cm. long, varying from obtuse to apiculate or acuminate at apex, entire or serrate above the middle, cuneate at base into the short petiole, glabrate on both surfaces; racemes terminal and axillary, 5 to 15 cm. long, loosely many-flowered, erect or usually recurved, often paniculate; bractlets minute, occasionally subfoliaceous; pedicels 1 to 5 mm. long; calyx tubular, 3 to 4 mm. long, angled, its teeth triangular at base, subulate at apex, shorter than the tube; corolla blue, lilac, or lavender, its tube surpassing the calyx, its limb 7 to 9 mm. wide; fruit yellow, globular, 7 to 11 mm. in diameter, completely enclosed by the accrescent yellowish calyx, which is produced into a curved beak.—In

forests, scrubland, clearings, and waste places, throughout subtropical and tropical America, south to Argentina; also introduced into the Old World tropics and widely cultivated.

YUCATAN: *G. F. Gaumer* 23949 (F); *E. A. Goldman* 572 (F); *M. Steggerda* 34c (F). Chichen Itza, *J. C. C. Bequaert* 92 (Mi); *C. L. & A. A. Lundell* 7342 (Mi, 2; N); *C. & G. E. Seler* 5548 [469] (G); *W. C. Steere* 1041 (F, Mi). Merida, *A. C. V. Schott* 381 (F). Buena Vista, *G. F. Gaumer* 577 (F, 2; G; N); *G. F. Gaumer & sons* 577 (F). Izamal, *J. D. Gaumer* 3 (F); *G. F. Gaumer s.n.* (F); *G. F. Gaumer & sons* 23375 (G, N). Xoalumkin, *C. & G. E. Seler* 4039 (F). Xkomber, *C. & G. E. Seler* 4023 (F, G). Ebula, *G. F. Gaumer & sons* 23263 (F, G, N). Hac. Yaxche, Ticul District, *C. & G. E. Seler* 5589 [510] (G). Southeast Kancabdzonot, *G. F. Gaumer & sons* 23891 (F, G). Uxmal, *W. C. Steere* 2028 (Mi). CAMPECHE: Santa Rita, *C. L. Lundell* 1389 (F, G, Mi, N). QUINTANA ROO: Cozumel Island, *G. F. Gaumer s.n.* (G). San Miguel, Cozumel Island, *W. C. Steere* 2939 (Mi).

Standley in *Contrib. U. S. Nat. Herb.* **23**: 1241 (1924) records the Maya name "xcambocoché" [Schott records it as "X kambocoché"], but in *Field Mus. Publ. Bot.* **3**: 401 (1930) he states that this is an erroneous application of the name and that vernacular names actually are "kanppocoché" [kan = yellow; ppoco = hat; che = tree, or, the yellow-hat-tree, because, according to Gaumer, the fruits are bright yellow and the top of the tree is hat-shaped] and "hombocoché." Gaumer also writes the name "kampokó-ché"; Steere writes it "kanpóko-ché"; and Steggerda writes it "kan poco che."

G. F. Gaumer says that "this is a shrub 10 feet high; the trunk is about 3 inches thick at most; it ripens its fruit in April and May; its bright yellow berries are eaten by the chachalaca (*Ortalis vetula* Wag.) and other birds." In answer to Millspaugh's query: "Is it certain that this was a tree as stated in your notes or was it possibly a vine that covered entirely a once-living tree? It is the same as *J. D. G.*'s 3, which he calls 'Kanppocoché,'" Gaumer says, "I have just been investigating this plant and while I find no tendency to vine, yet I found today bushes 20 feet high, which, growing up through other bushes, send out branches—very slender—which hang like those of the weeping willow on all sides, giving to the shrub when all are densely covered with its bright yellow berries the well-known appearance of a hat."

It has been collected in anthesis in our area from February to August. The flowers of this plant are often modified into club-shaped galls, the calyx becoming very woody, 1 to 1.5 cm. long, 4 to 5 mm. wide at the apex, regularly narrowed from there to the base, glabrous or nearly so, gray or white, lobed at the apex, and the corolla-tube becoming much elongated (to 2 cm. long), its limb not opening. Numerous varieties and species have been segregated, some of which may, on further investigation, prove worthy of being maintained. The fruit, besides being eaten by birds, has been used as a febrifuge, and stimulant properties have been ascribed to the flowers. The white-flowered form [var. *alba* (Masters) L. H. Bailey] is not definitely known from our area.

13. *CALLICARPA* L., *Sp. Pl.*, ed. 1, 111 (1753); *Gen. Pl.*, ed. 5, 50. 1754.

Spondylococcus Mitch. ex L., *Gen. Pl.*, ed. 5, 50, in syn. 1754.

Burchardia Heist. ex Duham., *Arb. et Arbust.* **1**: 111, pl. 44. 1755.

Johnsonia T. Dale ex Mill., *Gard. Dict.*, ed. 7. 1759.

Tomex L. ex Adans., *Fam. Pl.* **2**: 446, in syn. 1763.

Illa Adans., *Fam. Pl.* **2**: 446. 1763.

Porphyra Lour., *Fl. Cochinch.*, ed. 1, **1**: 69. 1790.

Amictonis Raf., *Sylv. Tellur.* 161. 1838.

Trees or shrubs; leaves normally opposite, simple, deciduous, exstipulate; inflorescence cymose (determinate), axillary or supra-axillary; flowers usually polygamous, actinomorphic; calyx gamosepalous, tubular, campanulate, or cyathiform, its rim 4-fid, 4-lobed, 4-toothed, or entire, rarely 5-toothed; corolla gamopetalous, infundibular or hypocrateriform, its tube straight, usually broadly cylindrical, ampliate above, its limb 4- (rarely 5-) parted, its lobes lingulate, isomorphic, spreading; stamens 4 or rarely 5, always present, inserted at or very near the base of the corolla-tube, alternate with the corolla-lobes, usually more or less exerted, isometrous; filaments filiform, separate, glabrous; anthers oblong or elliptic, dorsifixed near their base, extrorse, 2-celled, the thecae parallel and each opening by a longitudinal slit (or rarely by a terminal pore); pistil single, terminal, compound, absent from the staminate flowers; style capillary, single, glabrous; stigma depressed-capitate or peltate; ovary single, compound, usually subglobose and more or less pubescent, 4-celled, composed of two 2-celled carpels, each cell containing 1 high-lateral ovule, rudimentary or absent in staminate flowers; fruiting-calyx usually unchanged, patelliform; fruit drupaceous, more or less globose or depressed-globose, with a fleshy and variously colored exocarp and a hard endocarp, the latter separating into 4 (or through abortion less numerous) osseous pyrenes, each containing a single seed; embryo straight, with scanty or no endosperm.

A genus of about 150 species and varieties, widely distributed in subtropical and tropical America, Asia, and Oceanica, a few species extending into temperate portions of Asia (China and Japan) and the southeastern United States.

Type species: *C. americana* L.

Leaf-blades thick-textured, mostly glabrous on the upper surface (except when very young), mostly plainly areolate or subbullate above and very densely white-tomentose beneath, the lamina completely obscured by the dense tomentum . . . 1. *C. Pringlei*

Leaf-blades thin-textured, mostly persistently, but minutely, stellate-pubescent on the upper surface, mostly not areolate or subbullate above, more sparsely stellate-furfuraceous or -flocose beneath, the pubescence usually not completely obscuring the lamina 2. *C. acuminata*

1. *CALLICARPA PRINGLEI* Briq., Bull. Herb. Boiss. **4**: 345-346. 1896.

Callicarpa americana Sessé & Moc., Pl. Nou. Hisp. **2**: 18. 1893 [not *C. americana* L., 1753].

Shrub or tall tree, to 16 m. tall; branches stout, terete, glabrous; branchlets obtusely tetragonal, usually flattened and ampliate at the nodes, extremely densely flocose-tomentose with stellate and many-branched hairs, usually of cinereous or whitish color, but becoming fulvous or ferruginous in age; petioles 5 to 20 mm. long, densely flocose-tomentose; blades usually thick-textured or even coriaceous, bright and shiny green above, ovate or ovate-elliptic, 6 to 17 cm. long, 3.5 to 8 cm. wide, acuminate at apex, varying from coarsely and sharply serrate to denticulate along the margins (with mucronate teeth), varying from acute to truncate at base, very sparsely stellate with incanous hairs above (especially in the channels of the midrib and larger veins) when immature, glabrous and shiny when mature, usually conspicuously areolate or even subbullate above in drying, very densely white-tomentose beneath, frequently with a velvety or satiny sheen, the tomentum composed of many-branched hairs; cymes axillary, to 7.5 cm. long and 6.5 cm. wide, much shorter than the subtending leaves, densely many-flowered, many times dichotomous, their branches densely white-tomentose; peduncles rather stout, 1.2 to 3.5 cm. long, densely white-tomentose; pedicels slender, 0.5 to 2 mm. long, stellate-pubescent; bractlets and prophylla linear or setaceous; calyx campanulate, 0.9 to 1.4 mm. long, 1.3 to 1.6 mm. wide, tetragonal, 4-costate, granulose-pulverulent and more or less puberulent, its rim subtruncate, 4-toothed; corolla white, its tube 1.5 to 2.1 mm. long, ampliate above, slightly granulose outside, its limb 4-parted, the lobes oblong-lingulate, 1.3 to 1.4 mm. long, about 0.8 mm. wide, blunt

at apex, granulose outside; filaments 4.2 to 6.6 mm. long, glabrous; style to 9 mm. long; ovary depressed-globose, about 0.5 mm. long and wide, tetragonal, 4-sulcate, pulverulent; fruiting-calyx patelliform or very shallowly cupuliform, 2 to 4 mm. wide, pulverulent-puberulent or lightly pubescent, very thin, its rim subtruncate, entire or minutely 4-apiculate at first, later splitting rather irregularly; fruit subglobose, about 4 mm. long and wide, essentially glabrous.—Forests and brushlands, central and southern Mexico; endemic.

YUCATAN: Southeast Kancabdzonot, *G. F. Gaumer & sons* 23886 (A; Bm; Cb; Cp; E; F; K; N; S; Us; W; Z, 5 photos). QUINTANA ROO: Cozumel Island, *G. F. Gaumer* 82 (B; F; G; K; Z, 2 photos).

This plant is undoubtedly very closely related to *C. acuminata* and may represent only a variety of it. *Gaumer* 82 was originally distributed by Hemsley as "*Callicarpa acuminata* H. B. K., form ?" The widely distributed *C. acuminata*, however, has in general much thinner leaf-blades, with the venation on their upper surface usually obscure and never so beautifully impressed as in the typical form of *C. Pringlei*, or so prominent beneath on adult leaves, and the pubescence much less dense and more sordid throughout. The leaf-blades, also, in *C. acuminata* are not nearly so ovate in shape, not at all so regularly serrate, and are more persistently stellate-pubescent above. Intermediate forms, however, occur abundantly, and may prove to be hybrids or else indicate that *C. Pringlei* is merely one of the many forms of *C. acuminata*, with in this case a definite geographic distribution.

2. *CALLICARPA ACUMINATA* H. B. K., Nov. Gen. & Sp. Pl. **2**: 252. 1817 [not *C. acuminata* Roxb., 1814, hyponym].

Callicarpa subintegerrima H. B. K., Nov. Gen. & Sp. Pl. **2**: 252-253. 1817.

Callicarpa Bonplandiana Schult., Mant. **3**: 50-51. 1827.

Callicarpa mollis Willd. ex Steud., Nom. Bot., ed. 2, 257, in syn. 1840 [not *C. mollis* Sieb. & Zucc., 1844].

Callicarpa Schlimii Turcz., Bull. Soc. Imp. Nat. Mosc. **36**²: 217. 1863.

Callicarpa minutiflora Rusby, Mem. N. Y. Bot. Gard. **7**: 339. 1927.

Callicarpa lancifolia Pavon ex Moldenke in Fedde, Repert. **40**: 38, in syn. 1936 [not *C. lancifolia* Millsp., 1906, nor Merr., 1915].

Shrub or tree, to 10 m. tall; trunk to 12 cm. in diameter; branches usually rather stout, obtusely tetragonal, rather densely stellate-floccose-tomentose above, becoming less so or even glabrous in age; branchlets more slender, flattened at the nodes, usually very densely floccose-tomentose with whitish or yellowish tomentum during anthesis, later becoming gradually less so; petioles stout, 6 to 28 mm. long, very densely floccose-tomentose; blades chartaceous or membranous, rather dark green above, much lighter beneath, ovate-oblong or very rarely subobovate, 6.5 to 28.5 cm. long, 2.5 to 11.5 cm. wide, acute or acuminate at apex (often caudate), varying from entire or subentire to sharply serrate (except at the base) along the margins, acute or acuminate at base, often somewhat narrowed into the petiole, rather persistently stellate-furfuraceous above (especially along the midrib and larger veins), more or less densely stellate-tomentose or furfuraceous-floccose and glandular-punctate beneath, the lamina usually not completely obscured by the tomentum, not conspicuously areolate or subbullate above; cymes chiefly in the uppermost leaf-axils, often very laxly corymbose and greatly branched, usually rather long-pedunculate, 2.5 to 20 cm. long, 3 to 17 cm. wide, usually very many-flowered (frequently densely so); flowers slightly fragrant; peduncles stout, 1.5 to 6.5 cm. long, densely floccose or furfuraceous with flavescent or canescent tomentum; pedicels slender, 1 to 3 mm. long, densely canescent-tomentose; calyx small, thin-textured, campanulate, 1.1 to 1.5 mm. long and wide, often 4-angled and 4-costate, granulose-pulverulent, its rim truncate or subtruncate, often very

shortly 4-dentate or irregularly erose; corolla white or greenish white, its tube 1.6 to 2.6 mm. long, ampliate above, its limb 4-parted, the lobes short, ovate-lingulate, 0.8 to 0.9 mm. long, 0.9 to 1 mm. wide, very blunt or obtuse at apex, sometimes slightly crisped or sub-emarginate; filaments 3.1 to 7.6 mm. long; style 4.2 to 7 mm. long; ovary depressed-globose, about 0.6 mm. long and wide, 4-sulcate, glabrous; fruiting-calyx very small, shallowly patelliform, 2 to 3 mm. wide, glabrate, its rim truncate and entire; fruit dark purple or almost black, subglobose, 3 to 4.5 mm. long and wide, glabrous.—Forests and clearings, from northern Mexico, through Central America, to the mountains of Colombia and Bolivia.

YUCATAN: *G. F. Gaumer 684a* (A, E), 24071 (Cb, Cp, E, F, S, W); *J. J. Linden s.n.* (P); *A. C. V. Schott 513* (Bm); *C. & G. E. Selser 5588* [509] (B, 2), 5597 [518] (B, 2); *M. Steggerda 15b* (F). Chichen Itza, *J. C. C. Bequaert 26* (A; F; W; Z, photo); *C. L. & A. A. Lundell 7519* (Mi, N); *W. C. Steere 1004* (E, F, I, Mi). Valladolid, *W. C. Steere 1682* (Mi). Uxmal, *W. C. Steere 2057* (Mi). Chankon, *J. C. C. Bequaert 80* (A; I, photo; Z, photo). Izamal, *G. F. Gaumer 870* (B; Bm; Cp; E; F; G; N; Us; W; X, 2). Buena Vista, *G. F. Gaumer s.n.* (A, Bm, Cp, F, K, Us, V). Peto, *W. C. Steere 2292* (Mi). Tizimin, *J. R. Swallen 2533* (Mi). CAMPECHE: Tuxpeña, *C. L. Lundell 895* (A, Ca, E, F, G, I, Mi, N, W), 1006 (Ca, E, F, G, I, Mi, N, W). QUINTANA ROO: Chichankanab, *G. F. Gaumer 1688* (E, F, N, S, W). Coba, *C. L. & A. A. Lundell 7810* (Mi, N). BRITISH HONDURAS: Without locality, *E. K. Francis 6* (K); *H. W. Winzerling III.3* (W; Y; Z, photo). El Cayo District—El Cayo, *M. Chanek 198* (Mi). Corozal District—San Antonio, *P. H. Gentle s.n.* [*C. L. Lundell 4760*] (A, I, Mi, N); *P. H. Gentle 199* (Mi, N). GUATEMALA: Dept. Peten, La Libertad and vicinity, *M. Aguilar Hidalgo 63* (A, E, I, Mi); *C. L. Lundell 2344* (Mi), 3027 (F; Mi, 3), 3635 (Mi), 3755 (Mi, S). Remate, Lake Peten, *C. L. Lundell 2088* (F, I, Mi).

Millspaugh in *Field Mus. Publ. Bot.* **1**: 316 (1896) describes this as a shrub about 20 feet tall, abundant in forests and brushlands, and records the vernacular name "sac pukim." The unnumbered Gaumer collection from Cozumel Island which he cites as a possible variety on page 42 (1895) of this volume is here regarded as *C. Pringlei*. Standley in *Contrib. U. S. Nat. Herb.* **23**: 1253 (1924) also records the Maya name "sac pukim," while in *Field Mus. Publ. Bot.* **3**: 399 (1930) he records "zacpukim" and "pukin." Steggerda records the name "x puc yim," and Steere lists "pukil" (*no. 1004*). It has been collected in anthesis in our area from March to November. *Bequaert 26* may possibly be *C. Pringlei*.

The bark of *C. acuminata* is said to be tan-colored, the wood white, with a large pith, the calyx pale green, and the stamens yellow. Lilac and violet flowers have also been reported, although not from our area. Lundell in *Carnegie Inst. Wash. Publ.* **478**: 47, 75, 109, 111, 113, 138, & 183 (1937) states that in Peten it is a shrub 1 to 3 m. tall, common in inhabited and recently abandoned clearings and marginal forests, and reports the name "ceniciento."

14. AEGIPHILA Jacq., *Obs. Bot.* **2**: 3. 1764.

Manabea Aubl., *Hist. Pl. Guian.* **1**: 61. 1775.

Omphalococca Willd. in *Roem. & Schult., Mant.* **3**: 10. 1827.

Amerina P. DC., *Prodr.* **9**: 512-513. 1845.

Brückea Klotzsch & Karst. in *Karst., Ausw. Neu. Gew. Venez.* **31**. 1848.

Pseudaegiphila Rusby, *Mem. N. Y. Bot. Gard.* **7**: 339. 1927.

Woody plants, mostly trees or shrubs, sometimes woody vines; branches and branchlets tetragonal or subterete; leaves simple, usually decussate-opposite, rarely ternate, deciduous,

exstipulate; inflorescence cymose, the cymes often so modified as to more closely resemble panicles, false umbels, glomerules, heads, or thyrsi, or even reduced to a few or only a single flower, axillary or terminal; flowers actinomorphic, perfect, but usually conspicuously diclinous; calyx gamosepalous, more or less campanulate, cyathiform, or tubular, its margin truncate and entire or 4- or 5-toothed or -lobed, conspicuously accrescent, becoming greatly incrassate and indurated in fruit; corolla gamopetalous, infundibular or hypocrateriform, its tube cylindrical, its limb equally 4- or 5-parted, its lobes imbricate; stamens 4 or 5, equal, isomorphic, inserted below the mouth of the corolla-tube and above its base, included or exerted, alternate with the corolla-lobes; pistil one, the style terminal or subterminal, capillary, single, the stigma bifid, its branches elongate and awl-shaped; ovary perfectly or imperfectly 4-celled, each cell 1-ovulate, the ovules lateral or high-lateral, hemianatropous; fruit drupaceous, typically 4-seeded (1- to 3-seeded by abortion), the seeds without endosperm.

A genus of about 150 species and varieties of tropical and subtropical America, extending from Cuba and Mexico, through the West Indies and Central America, to Peru, Bolivia, and Argentina.

Type species: *A. martinicensis* Jacq.

Inflorescence axillary.

Inflorescence glomerate; petioles 3 to 10 cm. long; leaf-blades very thin-membranous, 16 to 35 cm. long, 9 to 23 cm. wide 2. *A. monstrosa*

Inflorescence cymose; petioles 1.5 to 2 cm. long; leaf-blades subcoriaceous, 7 to 10 cm. long, 3 to 4 cm. wide 3. *A. pauciflora*

Inflorescence mostly terminal, paniculate or thyrsoid 1. *A. elata*

I. AEGIPHILA ELATA Sw., Prodr. 31. 1788.

Nuxia elata (Sw.) Pers., Syn. Pl. 1: 132. 1805.

Omphalococca cornifolia Willd. in Roem. & Schult., Mant. 3: 132. 1827.

Psychotria mollis Spreng. ex P. DC., Prodr. 4: 513. 1830.

Aegiphila cornifolia (Willd.) Kunth, Abh. Akad. Berol. 215. 1831.

Aegiphila laevis Poepp. ex Walp., Repert. 4: 119, in syn. 1845 [not *A. laevis* (Aubl.) Gmel., 1789].

Aegiphila macrophylla H. B. K. ex A. Rich. in Sagra, Hist. Cub., part 2, 11: 146. 1850.—*A. macrophylla* A. Rich. apud Griseb., Cat. Pl. Cuba 216. 1866 [not *A. macrophylla* H. B. K., 1818, or Desf., 1829, nor Sieber, 1847].

Aegiphila sylvatica Sw. ex Moldenke, Brittonia 1: 462, in syn. 1934 [not *A. sylvatica* Moldenke, 1933].

Branching shrub or woody vine, sometimes trailing, often high-climbing, 2 to 8 m. tall; branches elongate, stout; branchlets slender, obtusely tetragonal, glabrous or minutely puberulent toward apex; petioles terete, 5 to 12 mm. long, often much thickened at base, puberulent or very lightly ferruginous-pubescent; leaf-blades coriaceous (or membranous when immature), dark green above, paler beneath, very shiny, not blackening or becoming very fragile in drying, varying from ovate to elliptic, 7 to 20 cm. long, 2.5 to 9 cm. wide, abruptly attenuate or narrowly acuminate at apex, entire, blunt or rounded at base or rarely subcordate, glabrous above, appressed-pubescent on the midrib and larger veins beneath, becoming glabrous and often thinly glandular-punctate in age; inflorescence axillary and terminal; cymes about $\frac{1}{3}$ or $\frac{1}{2}$ as long as the subtending leaves, opposite, solitary, many-flowered, usually quite distinct from the panicle; panicle terminal, corymbose or thyrsoid, about 16 cm. long and 11 cm. wide, erect, usually naked; peduncles 1 to 4 cm. long, often flattened and ampliate above, minutely puberulent or glabrate; pedicels slender, 4 to 8 mm. long, puberulent; calyx varying from turbinate-infundibular to cupuliform, usually acute and ventricose at base or constricted above the ovary, 2 to 4 mm. long, 2.6 to 4.2 mm. wide, firm, lax around the corolla-tube, puberulent or pubescent, its rim membranous, distinctly 4-lobed, dilated, its lobes ovate, erect, retuse or mucronulate; corolla

infundibular or hypocrateriform, yellowish or cream-colored, its tube slender, cylindric, 4 to 8 mm. long, its lobes usually 4, oblong- or elliptic-lingulate, 3 to 6 mm. long, about 3.7 mm. wide, spreading, obtuse at apex; stamens 4, inserted about 3.5 mm. below the mouth of the corolla-tube, long-exserted or included; filaments filiform, 0.3 to 7 mm. long, glabrous; pistil long-exserted or included; style capillary, 2 to 4 mm. long, glabrous; stigma bifid, its branches 2 to 4.5 mm. long; ovary subrotund, dark, about 0.9 mm. long and wide, flattened above, 4-celled; fruiting-calyx greatly enlarged and indurated, cupuliform, about 5 mm. long, 6 to 10 mm. wide, roughened, glabrate, its rim shallowly and irregularly lobed or sometimes deeply split; fruit subglobose or subtetragonal, about 7 mm. long and wide, flattened at both ends, rather firm, yellow, 3- or 4-seeded, almost included by the calyx when immature, semi-included when mature.—Margins of woods, hedges, and borders of streams, from Cuba and Mexico, through the West Indies and Central America, to Venezuela and the Guianas.

BRITISH HONDURAS: Without locality, *J. A. Burns* 10 (F, Y). Stann Creek District—near Big Creek, *P. H. Gentle* 2633 (N). Mullins River road, *W. A. Schipp* 216 (A; B; Bm; Ca; Cb, 2; E; F; G; J; K; Mi; N; S; W).

The flowers are said to be slightly fragrant. Schipp reports the species as being "common" and a "fairly large bush of spreading habit" or "medium-sized shrub of bushy habit of growth in secondary forest." Most other collectors call it a woody vine or, at least, a subscandent shrub. It has been collected in flower in our area in June and September.

2. *AEGIPHILA MONSTROSA* Moldenke, *Trop. Woods* 25: 12. 1931.

Very robust shrub or small tree, 3 to 10 m. tall; stems to 20 cm. in diameter; wood soft, white, brittle; branches exceedingly stout and robust, terete, to 1.5 cm. in diameter, hollow in the center, light gray, glabrous; branchlets obtusely tetragonal, deeply canaliculate toward the apex, grayish brown, glabrous or minutely puberulent; leaves opposite; petioles slender or stoutish, 3 to 10 cm. long, glabrous; blades thin-membranous, rather dark green and shiny on both surfaces, oblong to elliptic, often extremely large, 16 to 35 cm. long, 9 to 23 cm. wide, slightly acuminate at apex, entire, broadly acute or slightly acuminate at base, very minutely puberulent on both surfaces, becoming glabrous in age; inflorescence axillary, sessile, glomerate or fasciculate, numerous at the nodes of 1 or 2 years back, dense, many-flowered; flowers very odorous; pedicels slender, 1 to 2 mm. long, puberulent; calyx campanulate, herbaceous, about 3.5 mm. long and wide, glabrate or minutely pubescent, lax around the corolla-tube, its rim subtruncate or shallowly repand, scarious; corolla infundibular, white, its tube slender, about 10.5 mm. long, somewhat ampliate above, glabrous or minutely puberulent, its lobes 4, broadly ovate-lingulate, about 3.7 mm. long and 3.8 mm. wide at base, abruptly rounded at apex; stamens 4, inserted about 3.7 mm. below the mouth of the corolla-tube, somewhat exserted or long-exserted; filaments filiform, 5 to 11 mm. long, glabrous; pistil long-exserted or included; style capillary, 5 to 15 mm. long, glabrous; stigma bifid, its branches 3.7 to 6 mm. long; ovary subglobose, dark, flattened and umbilicate at apex, about 0.8 mm. long and wide, glabrous, 4-celled; fruiting-calyx cupuliform, greatly enlarged and indurated, verrucose; fruit subglobose or oblong, 6 to 7 mm. long and wide, flattened and umbilicate at both ends, glabrous, up to semi-included by the mature calyx.—In forests and secondary upland bush, southern Mexico to Honduras.

BRITISH HONDURAS: Without locality, *H. W. Winzerling* 105 (F, W). Toledo District—Dolores, Sarstoon River, *W. A. Schipp* 1083 (A, Bm, Ca, Cb, E, F, K, Mi, N, S). Orange Walk District—Honey Camp, *C. L. Lundell* 146 (F, G, K, Mi, W). Corozal District—

P. H. Gentle 263 (Mi, N), 404 (Mi, W). El Cayo District—north of El Cayo, *H. H. Bartlett* 11941 (Mi). El Cayo, *H. H. Bartlett* 13011 (Mi). Belize District—Maskall, *P. H. Gentle* 948 (A, E, I, Mi, N, S, 2). GUATEMALA: Dept. Peten, El Paso, *C. L. Lundell* 1492 (Mi).

Gentle records the vernacular name "hulub" (*nos.* 263 and 404). *Schipp* reports the species as "common" in British Honduras, while *Lundell* in *Carnegie Inst. Wash. Publ.* 478: 47 & 75 (1937) describes it as "a shrub 1 to 2 meters high; occasional in secondary upland bush" in Peten. It has been collected in flower in our area in November and December, and in fruit in February and April.

3. *AEGIPHILA PAUCIFLORA* Standl., *Trop. Woods* 16: 41. 1928.

Shrub; branchlets slender, obtusely tetragonal, densely ochraceous, becoming merely minutely cinereous-strigillose or finally glabrate; petioles slender, 1.5 to 2 cm. long, cinereous-strigillose; leaf-blades subcoriaceous, somewhat lustrous above, oblong-elliptic, 7 to 10 cm. long, 3 to 4 cm. wide, rather abruptly acuminate to an acute tip at apex, entire, gradually or abruptly acute or acuminate at base, densely and minutely cinereous-strigillose on both surfaces when young, becoming glabrate in age; inflorescence axillary; cymes solitary, opposite, few-flowered, lax; peduncles extremely slender, 6 to 15 mm. long, cinereous-strigillose; pedicels filiform, 1.5 to 3 mm. long (or less), cinereous-strigillose; calyx broadly turbinate or campanulate, 2.6 to 3 mm. long, 2 to 3.2 mm. wide, acute at base, grayish-strigillose, its rim truncate, entire or remotely and minutely 4- (or 5-) denticulate; corolla infundibular, glabrous, its tube cylindrical, 4 to 6 mm. long, ampliate above, its lobes 4, spreading, lanceolate-lingulate, 2.5 to 3.2 mm. long, about 1.8 mm. wide, rounded at apex; stamens 4, inserted about 1.5 mm. below the mouth of the corolla-tube, long-exserted; filaments filiform, about 4.5 mm. long, glabrous; pistil exserted; style capillary, about 3.4 mm. long, glabrous; stigma bifid, its branches about 1.3 mm. long; ovary subrotund, about 0.9 mm. long and wide, flattened and umbilicate at both ends, glabrous, 4-celled; fruiting-calyx and fruit not known.—In Indian huamil, British Honduras; endemic.

BRITISH HONDURAS: El Cayo District—Camp 6, south of Vaca, *D. Stevenson* 5 (A, photo of type; B, photo of type; D, photo of type; F, type; G, photo of type; K, photo of type; N, photo of type; P, photo of type; S, photo of type; W, photo of type; Z, photo of type).

15. *CORNUTIA* Plum. ex L., *Sp. Pl.*, ed. 1, 628 (1753); *Gen. Pl.*, ed. 5, 276. 1754.

Agnanthus Vaill. ex L., *Gen. Pl.*, ed. 5, 276, in syn. 1754.

Cornuta L., *Gen. Pl.*, ed. 6, 316. 1764.

Hosta Jacq., *Hort. Schoenbr.* 1: 60, pl. 114. 1797 [not *Hosta* Tratt., 1814, nom. conserv.].

Hostana Pers., *Syn. Pl.* 2: 143. 1806.

Odoriferous trees and shrubs, mostly pubescent or tomentose throughout, often glandular-punctate; branches and branchlets mostly rather stout, tetragonal, often margined; nodes mostly annulate, often conspicuously so; leaves simple, opposite, exstipulate, deciduous, petiolate, mostly comparatively large and broad and more or less pubescent; inflorescence mostly terminal and paniculate, with rather large pyramidal-thyrsoid panicles, sometimes also axillary and purely cymose; cymes not involucrate; flowers small, zygomorphic, perfect; calyx mostly small, varying from cupuliform or cyathiform to campanulate, obconic, or patelliform, slightly irregular when mature, mostly unchanged or shriveled to a patelliform condition in fruit, its rim in anthesis entire or minutely 4- (or 5-) dentate or rarely lobed; corolla hypocrateriform, irregular, blue, violet, or purple in color, its tube cylindrical, often

inflated at base, constricted at the middle, and ampliate above, straight or slightly curvate, the adaxial side longest, pubescent within and often also outside, its limb spreading, 2-lipped, 4-parted, the adaxial lip 3-lobed with subequal ovate- or elliptic-lingulate lobes overlapping in bud or the central one outside, the abaxial lip composed of 1 lobe which is larger than the others and included by them in bud and is made up of 2 distinct halves of which the upper is thinner, more glabrous, and folded inward like a flap in bud, the entire limb pubescent within and mostly also outside; stamens 4, inserted in the corolla-tube at or above the middle, didynamous, the 2 lower ones fertile, longer, sometimes exerted, alternate with the largest corolla-lobe, the 2 upper ones reduced to filiform, mostly anantherous, included staminodes; filaments flattened, mostly more or less pubescent; anthers 2-celled, dorsifixed, the thecae widely divergent at base, dehiscing by a longitudinal slit, the connective much thickened; pistil one, compound, included; style terminal, single, usually pubescent; stigma very small, shortly and unequally bifid; ovary subglobose, pubescent, composed of two 2-celled carpels, distinctly 4-celled, each cell containing 1 high-lateral hemianatropous ovule; disk present beneath the ovary and about equal to it in size; fruit drupaceous, small, abundant, subglobose, the exocarp fleshy, the endocarp hard and bony, the pyrene 4- (or through abortion 3- to 1-) celled and -seeded; seeds without endosperm, the coat perforated at base, osseous, rugose.

A genus of about 23 species and varieties of the American tropics, from the Greater Antilles and Mexico, through Central America, to Peru and Brazil.

Type species: *C. pyramidata* L.

- Mature calyx in anthesis 1 to 1.5 mm. long, often patelliform; branches, branchlets, and rachis long-pubescent, hirsute, villous, or tomentose 1. *C. grandifolia*
 Mature calyx in anthesis 2 to 3.1 mm. long, cupuliform, campanulate, or tubular; branches, branchlets, and rachis merely appressed-puberulent.
 Mature corolla-tube approximately 9 mm. long; calyx heavy, about 3 mm. wide in anthesis 2. *C. latifolia*
 Mature corolla-tube mostly 5 to 7 mm. long; calyx light, 2 to 2.5 mm. wide in anthesis 3. *C. pyramidata* var. *isthmica*

I. CORNUTIA GRANDIFOLIA (Schlecht. & Cham.) Schau. in A. DC., Prodr. 11: 682. 1847.

Hosta grandifolia Schlecht. & Cham., Linnæa 5: 97. 1830.

Hosta grandiflora A. Dietr., Sp. Pl. 1: 252. 1831.

Cornutia grandiflora (A. Dietr.) Steud., Nom. Bot., ed. 2, 1: 422. 1840.

Cornutia pyramidata var. *dentata* Kuntze, Rev. Gen. Pl. 2: 506. 1891.

Callicarpa dentata Pavon ex Moldenke in Fedde, Repert. 40: 118, in syn. 1936 [not *C. dentata* Roth, 1818, or Roxb., 1831, or Wall., 1832].

Shrub or tree, to 8 m. tall; branchlets stout, very medullose, obtusely (or sometimes acutely) tetragonal, occasionally 4-margined and sulcate, densely villous-tomentose with spreading, fuscous, buff, or brownish hairs, the pubescence wearing off at the angles and in age; nodes marked with a band of longer and denser tomentum; petioles stout, 1 to 2.5 cm. long, densely villous-tomentose; blades thin-chartaceous or membranous, elliptic or elliptic-ovate, 8.5 to 31 cm. long, 6.5 to 19.2 cm. wide, acuminate at apex, dentate along the margins from about $\frac{1}{3}$ the way up to the base of the acumination with short acute or acuminate teeth or entire, acuminate at base and prolonged into the petiole, more or less densely villous above with multicellular hairs 1 to 2 mm. long or merely densely appressed-pubescent, densely short-villous beneath with brownish or buff hairs as on the branchlets and in the inflorescence; inflorescence terminal and thyrsoid (or a few axillary cymes in the uppermost axils), 15 to 42 cm. long, 5 to 25 cm. wide, many-flowered, its numerous branches 1 to 3 times bifurcate, the ultimate divisions densely several-flowered; peduncles obsolete or to

2.5 cm. long and with the sympodia exactly similar to the branchlets in texture, color, and pubescence; calyx patelliform or cupuliform, 1 to 1.5 mm. long, 2.6 to 3.1 mm. wide, densely short-pubescent, its rim truncate and entire; corolla varying from sky-blue or bluish to light violet, mauve, or purple, puberulent throughout outside (except for the upper half of the abaxial lobe) and pubescent within, its tube broadly cylindrical, curvate, 7.8 to 8.8 mm. long, the abaxial lobe about 9.5 mm. long and 4.3 mm. wide, the adaxial lobes about 5.2 mm. long and 3.8 mm. wide; fruiting-calyx patelliform, about 1 mm. long and 3 mm. wide, densely pubescent, its rim entire; fruit subglobose, fleshy, 3 to 4 mm. long and wide, densely pubescent with spreading hairs.—In forests and thickets and along roadsides, Mexico to Panama.

BRITISH HONDURAS: Without locality, *C. S. Brown* 13 (F, Y); *W. A. Schipp* 205 (A). Belize District—near Manatee Lagoon, *M. E. Peck* 96 (G). Gracie Rock, Sibun River, *P. H. Gentle* 1685 (Dp, E, I, Mi, N, S). Stann Creek District—Middlesex, *W. A. Schipp* 265 (B, Bm, Ca, Cb, E, F, G, J, K, Mi, N, S, W). El Cayo District—Macaw Bank, *C. L. Lundell* 6577 (Mi; N, 2).

Schipp describes this species as "occasional in secondary forests" in some parts of British Honduras and "common throughout the forests" in other parts, and says it is a medium-sized shrub or small tree, to 20 feet tall, of bushy habit of growth, with a trunk diameter to 3 inches. The flowers and foliage have a very strong odor, very attractive to certain insects. It has been collected in flower in our area from June to August.

2. *CORNUTIA LATIFOLIA* (H. B. K.) Moldenke in Fedde, Repert. **40**: 179. 1936.

Hosta latifolia H. B. K., Nov. Gen. & Sp. Pl. **2**: 248. 1817.

Cornutia pyramidata Spreng., Syst. Veg. **1**: 39. 1825 [not *C. pyramidata* L., 1753].

Shrub or tree, to 11 m. tall; stems to 15 cm. in diameter; branches white, acutely or obtusely tetragonal, subglabrate; branchlets rather slender, acutely tetragonal, often 4-margined, densely pulverulent-puberulent with brownish hairs; nodes conspicuously annulate with a corky, more densely puberulent ridge; petioles rather slender, 4 to 15 mm. long, densely puberulent, mostly more or less margined; blades thin-chartaceous, broadly elliptic, 7 to 19 cm. long, 4.5 to 7 cm. wide, short-acuminate at apex, entire, acuminate at base and decurrent into the petiole, rather densely pulverulent above and also more or less puberulent, interspersed with strigillose hairs, very densely resinous-punctate and pulverulent-puberulent beneath, velvety to touch; inflorescence terminal, thyrsoïd, 13 to 26 cm. long, 4.5 to 5 cm. wide, composed of 4 to 6 pairs of opposite many-flowered cymes, densely puberulent throughout, occasionally 1 or 2 pairs of cymes also in the uppermost leaf-axils; peduncles (3 to 4 cm. long), sympodia, and inflorescence-branches similar to the branchlets in all respects, densely puberulent with brownish hairs; calyx cupuliform, about 3.1 mm. long, 2.8 to 3 mm. wide, densely short-pubescent, its rim minutely 4-toothed; corolla blue or bluish purple, densely short-pubescent throughout outside (except for the upper half of the abaxial lobe) and within, its tube narrow-cylindrical, almost straight, 6.5 to 9.3 (mostly about 9) mm. long, the abaxial lobe 4.6 to 5.2 mm. long, 3.6 to 4.1 mm. wide, the adaxial lobes 2.6 to 4.1 mm. long, 2.6 to 3.6 mm. wide.—Low forests, from Veracruz through the Yucatan Peninsula.

YUCATAN: *E. C. Stewart* 83 (Mi). Izamal, *G. F. Gaumer* 822 (Cp; E; F; G; N; N, photo; S; W; X; Z, photo). Chichen Itza, *W. C. Steere* 1458 (E; F; I; Mi; N; N, photo; Z, photo). Muna, *W. C. Steere* 2113 (Mi). Peto, *W. C. Steere* 2233 (Mi). Xocenpich, *C. L. & A. A. Lundell* 7888 (Mi, 2; N). CAMPECHE: *F. H. A. von Humboldt & A. J. A. Bonpland s.n.* (B, isotype; N, photo of isotype; Z, photo of isotype). Champoton, *W. C. Steere* 1741 (F,

Mi). QUINTANA ROO: Laguna Chan-kabnab, Lake Chichancanab, *W. C. Steere* 2394 (Mi). BRITISH HONDURAS: Orange Walk District—*W. C. Meyer* 38 (F); *H. W. Winzerling* III.2 (W). Corozal District—*P. H. Gentle* 186 (F, Mi, N, W). Aventura, *P. H. Gentle* s.n. [*C. L. Lundell* 4746] (F, I, Mi, N). Belize District—one mile north of Maskall, *H. O'Neill* 8747 (I, Mi). GUATEMALA: Dept. Peten, La Libertad and vicinity, *J. M. Aguilar Hidalgo* 54 (A; E; F; I; Mi; N, photo; Z, photo).

Lundell in Carnegie Inst. Wash. Publ. 478: 138 & 183 (1937) reports the vernacular name "chialche" (*Aguilar Hidalgo* 54) and states that the species is "a shrub or treelet of marginal forest; used in the treatment of fever." Moldenke in Fedde, Repert. 40: 180-181 (1936) records the names "tzultesnuk" from Yucatan and "matasano" from British Honduras. Millspaugh in Field Mus. Publ. Bot. 1: 316 (1896) cites *Gaumer* 822 under "*Cornutia pyramidata* Linn.," and the herbarium material of this number was originally distributed under that name. *Aguilar Hidalgo* 54, on the other hand, has been identified and distributed as *C. grandifolia*. O'Neill reports that parts of the plant are boiled with oil and honey and used in the treatment of asthma. Stewart reports the common name "loth-ché." It has been collected in anthesis in our area from June to August. The entire inflorescence, including the pubescence on the calyxes, pedicels, inflorescence-branches, and sympodia, is often blue in color—this blue color persisting even on dried specimens.

3. CORNUTIA PYRAMIDATA VAR. ISTHMICA Moldenke in Fedde, Repert. 40: 187. 1936.

Tree, to 11 m. tall; branchlets stout, very medullose, acutely tetragonal, often 4-margined or -alate, purplish or buff in drying, densely puberulent with brownish, chestnut, or fulvous hairs; nodes more or less annulate with a wide band of denser puberulence or longer hairs; petioles stoutish, 5 to 15 mm. long or almost obsolete through the leaf-base being protracted as wings along both sides, densely short-pubescent with brownish, chestnut, or fulvous hairs; blades chartaceous, elliptic or elliptic-ovate (rarely obovate), often more or less conduplicate at base or apex in pressing, 7 to 19 cm. long, 4.9 to 9.8 cm. wide, acute or slightly acuminate at apex, entire or slightly angulate along the margins, acuminate at base and attenuate into the alate petiole, densely puberulent or pulverulent-puberulent above, very densely short-pubescent or -tomentellous beneath with brownish, chestnut, or fulvous hairs, and usually marked with numerous resinous globules among or beneath the tomentum; inflorescence terminal, paniculate, 5 to 45 cm. long, 7 to 10 cm. wide, very many-flowered, the branches usually very numerous, 1 to 3 times bifurcate, brownish puberulent throughout; calyx cupuliform, 2 to 3.1 mm. long, 2.5 to 2.6 mm. wide, densely short-pubescent; corolla blue, violet, or purple, densely short-pubescent throughout outside (except for the upper half of the abaxial lobe) and more sparingly within, its tube usually 5 to 7 mm. long the abaxial lip 2.6 to 3.6 mm. long, 2.6 to 2.8 mm. wide, the remaining lobes 2 to 2.8 mm. long, 2.3 to 2.6 mm. wide; fruiting-calyx very small, patelliform, about 1 mm. long, 2 to 3 mm. wide, densely short-pubescent with brownish hairs, its rim entire or slightly angulate; fruit subglobose, 3 to 4 mm. long and wide, fleshy, pulverulent-puberulent and glandular-punctate throughout.—Marginal forests, Veracruz and Tabasco, through the Yucatan Peninsula.

CAMPECHE: Tuxpeña, *C. L. Lundell* 852 (A, isotype; Ca, isotype; E, isotype; F, isotype; G, isotype; I, isotype; K, isotype; Mi, isotype; N, type & 2 photos of isotypes; W, isotype; Z, 2 photos of isotypes). BRITISH HONDURAS: Without locality, *E. J. F. Campbell* 100 (K). Orange Walk District—*C. L. Lundell* 41 (F, W), 104 (F, K); *H. W. Winzerling* III.20 (F, Y). Honey Camp, coastal region, *C. L. Lundell* 433 (A, Cp, E, F, G, K, N, Us, W).

GUATEMALA: Dept. Peten, *O. F. Cook & R. D. Martin 128* (W). La Libertad, *C. L. Lundell 2252* (Mi), 3450 (F; G; Mi; N, 2 photos; S; Z, 2 photos).

Lundell in Carnegie Inst. Wash. Publ. 478: 75 (1937) cites *Cook & Martin 128* as "*Cornutia pyramidata* L. (?)" and records the vernacular name "latche." On pages 111, 113, 138, & 183 he records the present variety and states that it is "a large shrub of marginal forests" and the central zone of drained sinkholes or zukches in Peten. The "*Cornutia pyramidata*" recorded by Millspaugh in Field Mus. Publ. Bot. 1: 316 (1896) is actually *C. latifolia*. The true *C. pyramidata* is confined to the West Indies. *C. pyramidata* var. *isthmica* and *C. latifolia* are very similar in appearance. Since they have also practically the same geographic distribution, it is questionable whether they are actually distinct from each other. The entire young inflorescences are often quite blue in both—a condition, however, which is seen in all the northern species of the genus. Moldenke in Fedde, Repert. 40: 188 (1936) records the name "pangagé" from Campeche and the Maya name "lattche" from Peten. *Lundell 433* was originally distributed as *C. pyramidata* and no. 3450 as *C. grandifolia*.

16. **VITEX** Tourn. ex L., Sp. Pl., ed. 1, 635 (1753); Gen. Pl., ed. 5, 285. 1754.

Limia Vand., Fl. Lusit. 42, pl. 3, fig. 21. 1788.

Nephrandra Willd. in Cothen., Disp. Veg. 8. 1790.

Chrysomallum Thou., Gen. Nov. Madag. 8. 1806.

Pyrostoma G. F. W. Mey., Prim. Fl. Esseq. 219. 1818.

Wallrothia Roth, Nov. Pl. Sp. 317. 1821.

Ephialis Banks & Soland. ex A. Cunn., Ann. Nat. Hist., ser. 1, 1: 461. 1838.

Psilogyne A. DC., Bibl. Univ. Genève. 17: 132. 1838.

Casarettoa Walp., Repert. 4: 91. 1844.

Macrostegia Nees in A. DC., Prodr. 11: 218. 1847.

Agnus-castus Tourn. ex Carr., Rev. Hort. 42: 415. 1871.

Trees or shrubs, glabrous, tomentose, or villous throughout; leaves opposite, palmately compound, mostly 3- to 7-foliolate (rarely 1-foliolate), the leaflets chartaceous or membranous (sometimes coriaceous), mostly petiolulate, entire or dentate; inflorescence cymose, the cymes short and dense or loosely divaricate, sessile or pedunculate in the leaf-axils or aggregate in terminal racemiform or thyrsoid or laxly diffuse panicles or more rarely contracted into heads; flowers perfect, more or less zygomorphic; bractlets and prophylla very small, mostly linear, sometimes longer than the calyx; calyx campanulate or rarely tubular-infundibular, 5-dentate or 5-fid or rarely 3-fid, the teeth mostly slightly unequal; corolla white, blue, violet, or yellowish, hypocrateriform, zygomorphic, its tube short or rarely elongate, cylindrical, straight or slightly incurved, equal in diameter throughout or slightly amplified above, its limb oblique, spreading, subbilabiate, the upper lip bifid, the lower lip trifid, the 2 posterior lobes exterior and usually shorter, the lateral lobes larger, the anterior lobe inmost and largest, entire or emarginate; stamens 4, didynamous, inserted in the corolla-tube, often exerted, the anthers 2-celled, the thecae distinct, subparallel, divergent, or arcuate, attached near their apex, dehiscing by longitudinal slits; pistil single, compound, bicarpellary; style terminal, filiform, shortly bifid at apex, the branches acute; ovary at first imperfectly 2-celled, during anthesis usually 4-celled, the cells 1-ovulate; ovules attached laterally at or above the middle of the cell; fruiting-calyx often accrescent, usually patelliform or very shallowly cupuliform, rarely subincluding the fruit; fruit drupaceous, more or less fleshy, the endocarp hard, often horny, sometimes very much incrassate in relation to the cells, 4-celled; seeds obovate or oblong, erect, without endosperm.

A genus of about 300 species and varieties, mostly of the tropics and subtropics of both the Old World and the New World; a few also found in the temperate portions of Europe and Asia; widely cultivated and naturalized elsewhere. Several fossil forms are known.

Type species: *V. Agnus-castus* L.

Leaflets glabrous or subglabrate beneath 1. *V. Kuylenii*
 Leaflets usually densely matted-tomentulose or velutinous-pubescent beneath 2. *V. Gaumeri*

1. *VITEX KUYLENI* Standl., Trop. Woods 8: 6. 1927.

Medium-sized or large tree, to 13 m. tall; trunk to 26 cm. in diameter; branchlets medium-slender, obtusely tetragonal, gray, glabrate; twigs acutely tetragonal or compressed, rather densely puberulent, less so or glabrescent in age, brown or buff; nodes obscurely annulate; leaves 3- to 5-foliolate, mostly 5-foliolate; petioles slender, 3.5 to 7 cm. long, conspicuously flattened and submargined above, very minutely puberulent or glabrate; leaflets mostly unequal in size (rarely subequal), the 2 lowermost often much reduced, all petiolulate on margined minutely pulverulent-puberulent or glabrous petiolules, which are 3 to 12 mm. long, those of the lower leaflets usually shorter than those of the central ones; leaflet-blades chartaceous, rather firm and stiff when mature and rather uniformly light green on both surfaces, the central one elliptic, 7 to 23 cm. long, 2.8 to 9.5 cm. wide, acute or short-acuminate at apex, sometimes long-acuminate (rarely obtuse or emarginate), entire or often slightly undulate along the margins, acute or somewhat attenuate-subacuminate at base, glabrous and shiny on both surfaces or obscurely pulverulent-puberulent on the larger venation beneath and on the midrib above; inflorescence axillary, paniculate, elongate, rather sparse, 15 to 27 cm. long, 2.5 to 5 cm. wide, erect, composed of 2 to 7 rather irregular, opposite or subopposite, rather long-stalked cymes, the cymes irregular, 1 to 3 times dichotomous, rather loosely few-flowered; peduncles and rachis brownish or buff, minutely and rather sparsely puberulent, glabrescent in age; calyx campanulate, about 4.5 mm. long, puberulent, its 5 lobes narrowly triangular-oblong, about 2 mm. long, spreading or reflexed, subacute at apex; corolla light blue, violet, or purple, sparsely puberulent outside, its tube about 6 mm. long and 3.5 mm. in diameter, the limb about 14 mm. wide, villous in the throat; fruiting-calyx patelliform, about 1 cm. wide; fruit hard, depressed-spherical, about 7 mm. long and 11 mm. wide, smooth, yellow.—In thickets, on banks of streams, and in open places, Mexico to Honduras.

BRITISH HONDURAS: Without locality, *H. C. Kluge* 25 (Y). Toledo District—Toledo, *M. E. Peck* 920 (B, G). Temash River, *W. A. Schipp* 1309 (A, Cb, E, F, G, Mi, N, S). "Forest Home," Punta Gorda, *W. A. Schipp* 994 (A; Bm; Ca; Cb; E; F; K; Mi; N, 2; S).

Schipp describes the species as a medium-sized tree to 40 feet tall, with a large dense crown of foliage, growing in open places and in partial shade on river banks, with brown close-grained wood, which is hard, but easy to work, the trunk to 10 inches in diameter, and the flowers blue (or "light blue and white") and sweetly odorous. It has been collected in flower in our area in April and June and in fruit in August. *Gentle* 1721, distributed as this species by Standley, belongs in the Bignoniaceae, as can be determined quickly by observing the densely lepidote lower leaf-surfaces, petioles, and twigs, and *Gentle* 1756, also distributed as this species, is actually an anomalous form of *V. Gaumeri*.

2. *VITEX GAUMERI* Greenm., Field Mus. Publ. Bot. 2: 260–261. 1907.

Vitex pyramidata Millsp. apud Greenm., Field Mus. Publ. Bot. 2: 261, in syn. 1907 [not *V. pyramidata* B. L. Robinson, 1894].

Vitex longeracemosa Pittier, Contrib. U. S. Nat. Herb. 20: 486. 1922.

Shrub or large tree, to 30 m. tall; branches and branchlets very stout and heavy, very medullose, obtusely tetragonal, often sulcate, gray or almost white, densely short-pubescent

or puberulent with grayish hairs (rarely becoming glabrate); twigs densely short-pubescent or puberulent with grayish, albidous, or flavescent hairs; nodes mostly distinctly annulate; leaves 5- to 7-foliolate; petioles slender or stout, 3 to 14.5 cm. long, flattened and canaliculate above, densely short-pubescent with albidous, cinereous, or sordid hairs; leaflets usually unequal in size, the 2 lowermost considerably smaller than the central ones, all rather long-petiolulate on slender or stoutish densely puberulent or short-pubescent canaliculate and submargined petiolules, which are 2 to 38 mm. long, those of the 2 lowermost leaflets usually much shorter than those of the central ones; leaflet-blades thin-chartaceous in anthesis, more firm and heavy in age, dark green above, usually much lighter or even albidous beneath, the central one elliptic, ovate-elliptic, or subobovate, 5 to 27 cm. long, 1.8 to 12.5 cm. wide, acute or acuminate at apex, sometimes rather long-acuminate, entire, varying from obtuse, subcordate, or rounded to acute or short-attenuate at base, densely or sparsely short-pubescent, strigillose, or puberulent above, densely matted-tomentulose, velutinous, or short-pubescent beneath with albidous, cinereous, or sordid-gray pubescence, varying to much more sparsely short-pubescent on water sprouts; inflorescence axillary, paniculate-thyrsoid, 8.5 to 30 cm. long, 2 to 15 cm. wide, normally composed of 2 or 3 pairs of lateral paniculate branches, which are 4 to 13 cm. long, each branch composed of 3 to 6 pairs of rather long-stipitate cymes, many-flowered, usually rather loose, densely canescent-puberulent or short-pubescent throughout; peduncles, rachis, and inflorescence-branches rather slender, often distinctly flattened, densely cinereous-puberulent or short-pubescent like the twigs and petioles, the pubescence often wearing off from the angles and exposing a nigrescent under-surface; calyx campanulate, 2.5 to 3 mm. long, canescent-puberulent or pubescent, subbilabiate, acutely 5-toothed, 3 teeth on the lower and 2 on the upper lip, the middle inferior tooth broader and shorter than the rest; corolla lilac, blue, or purple, sparsely evanescent-puberulent outside, barbellate at the insertion of the stamens and puberulent at the base of the inferior lip within, its tube 5 to 6 mm. long, its limb bilabiate, the 2 posterior lobes small, subrotund, about 2 mm. long and wide, reflexed, the 3 anterior lobes 5 to 6 mm. long, spreading, the median lobe slightly pulverulent on the upper surface near its base; fruiting-calyx patelliform, 7 to 8 mm. wide, reflexed in age; fruit fleshy or hard, depressed-globose, 12 to 15 mm. long and wide, smooth, yellow.—Forests and pastures, Mexico to Honduras.

YUCATAN: *J. C. C. Bequaert* 63 (A), 98 (A); *G. F. Gaumer* 24000 (Bm, Cb, E, N, W); *G. F. Gaumer & sons* 23568 (A; Bm; Cb; K; N, fragment; S; Us; V; W); *M. Steggerda* 27c (F). Near Merida, *A. C. V. Schott* 582 (F, 2). Chichen Itza, *C. L. & A. A. Lundell* 7321 (Mi, 2; N); *W. C. Steere* 1558 (E, F, I, Mi, N). Izamal, *G. F. Gaumer* 607 (A, isotype; B, isotype; Bm, isotype; Br, isotype; Ca, isotype; Cp, isotype; E, isotype; Ed, isotype; F, isotype; G, type; I, isotype; K, isotype; Lu, isotype; Mi, isotype; N, isotype & photo of type; S, isotype & photo of type; Us, isotype; V, isotype; W, isotype; X, isotype; Z, photo of type), *s.n.* (F, K). Hacienda Tecoh, *G. F. Gaumer & sons* 23251 (Cb, E, G, N, W). Kancabdzonot, *G. F. Gaumer & sons* 23567 (Ca, Cb, Cp, E, Mi, N, W). CAMPECHE: Tuxpeña, *C. L. Lundell* 1327 (A; Ca; E; G; I; Mi, 3; N). BRITISH HONDURAS: Without locality, *H. M. Heyder* 1 (W, Y); *H. M. Heyder & J. B. Kinloch* xxxv (W); *D. Stevenson* 17 (F, Y); *N. S. Stevenson* *s.n.* (W, Y); *H. W. Winzerling* III.3 (W, Y). Corozal District—San Antonio, *P. H. Gentle* 4933 (N), *s.n.* [*C. L. Lundell* 4933] (E; I, 2; S). Orange Walk District—Honey Camp, *C. L. Lundell* 417 (B, F, K, N, W). Without locality, *J. S. Karling* 21 (F, W); *W. C. Meyer* 61 (F). Belize District—Gracie Rock, Sibun River, *P. H. Gentle* 1756 (F; Mi, 2). Botanic Station, *C. Hummel* 67 (K, 2), *s.n.* (K, 3). El Cayo District—Vaca, *P. H. Gentle* 2528 (Mi, N). El Cayo, *M. Chanek* 184 (Mi, N). Duck Run, *H. H. Bartlett* 13130 (I, Mi, N). Stann Creek District—Stann Creek Railway, *W. A. Schipp* 313

(A; B; Bm, 2; Ca; Cb, 2; E; F; G; J; K; Mi; N; S; W). Big Creek, *W. A. Schipp* 197 (B; Bm; Ca; Cb; E; F; G; J; K, 2; Mi; N; S; W). GUATEMALA: Dept. Peten, Uaxactun, *H. H. Bartlett* 12733 (E; F; G; I; K; Mi; N, 2; S; W). Monte Santa Teresa, *C. L. Lundell* 2662 (E, F, Mi, S), 2791 (K, Mi). La Libertad, *C. L. Lundell* 3540 (Mi, S). El Paso, *C. L. Lundell* 1509 (F, Mi, N, W).

Lundell in Carnegie Inst. Wash. Publ. 478: 38, 39, 75, 96, 136, 143, 183, 191-194, & 203 (1937) reports the vernacular Maya names "yaxnic" and "yaaxnic" [meaning "blue flower"] and describes it as "generally a small to medium-sized tree, but sometimes reaching a diameter of 70 cm. and a height of 20 meters; common in climax forest and secondary upland forest," in the middle tier of the zapotal, in flatland forests, among the tallest trees of the marginal forests, among the second- and third-story trees of the flatland high forests, among the third-story trees of the high forests on well-drained uplands, and in the secondary forests covering abandoned milpas. Steggerda also records the name "yaax nic," and Millspaugh in Field Mus. Publ. Bot. 1: 317 (1896) also lists "yaxnic," although he erroneously identified *Gaumer* 607 as *V. pyramidata* B. L. Robinson, a more northern Mexican species not as yet known from the Yucatan Peninsula. *Gentle* 1756 was determined and distributed by Standley as *V. Kuyleonii*, but is identical with the two Hummel collections. These three sterile collections apparently represent an anomalous British Honduras form of *V. Gaumeri* with very sparse pubescence, or else represent leaves taken from coarse-grown watersprouts. Schipp describes the species as a "giant forest tree growing . . . in a poor class of soil, composed mainly of quartzite." He states that the tree has a spreading crown and that the hard wood is yellow and fairly tough, or, on another label, white when felled and close-grained. On one label he says "wood soft, never used." It has been collected in flower in our area from February to August and is said to be very handsome, with masses of light blue or sky blue flowers. Standley in Field Mus. Publ. Bot. 3: 404 (1930) states that "the tough wood is used for the construction of carts, boats, and agricultural implements."

17. **CLERODENDRUM** Burm. ex L., Sp. Pl., ed. 1, 637 (1753); Gen. Pl., ed. 5, 285. 1754.

Siphonanthus L., Sp. Pl., ed. 1, 109 (1753), Gen. Pl., ed. 5, 47. 1754.

Ovieda L., Sp. Pl., ed. 1, 637 (1753), Gen. Pl., ed. 5, 284. 1754.

Volkameria L., Sp. Pl., ed. 1, 637 (1753), Gen. Pl., ed. 5, 284. 1754.

Siphonanthemum Amm. ex L., Gen. Pl., ed. 5, 47, in syn. 1754.

Douglussia Hout. ex L., Gen. Pl., ed. 5, 284, in syn. (1754); Adans., Fam. Pl. 2: 200. 1763.—

Douglussia Adans. apud Hook. f. & Jacks., Ind. Kew. 1: 560. 1895.

Montalbania Neck., Elem. 1: 273. 1790.

Volkmannia Jacq., Hort. Schoenbr. 3: 48, pl. 338. 1798.

Agricolaea Schrank, Denkschr. Akad. Muench. 98, 1808.—*Agricola* Schrank apud Meisn., Gen. Pl. 1: 637, in syn. 1838.

Torreya Spreng., Neue Entdeck. 2: 221. 1821 [not *Torreya* Raf., 1818 & 1819, or Arn., 1838, or Croom, 1843].

Egena Raf., Fl. Tellur. 2: 85. 1837.

Cornacchia Savi, Mem. Soc. Ital. Mod. 21: 184, pl. 7. 1837.

Rotheca Raf., Fl. Tellur. 4: 69. 1838.

Clerodendron R. Br. ex Meisn., Gen. Pl. 1: 637. 1838.—*Clerodendron* L. ex Meisn., Gen. Pl. 1: 637, in syn. (1838); Schau. in A. DC., Prodr. 11: 658. 1847.

Cyclonema Hochst., Flora 25: 225. 1842.

Spironema Hochst., Flora 25: 226. 1842 [not *Spironema* Raf., 1836, or Lindl., 1840].

Cyrtostemma Kunze, Bot. Zeit. 1: 272. 1843.

Tetrathyanthus A. Gray apud Dalla Torre & Harms, Gen. Siph. 433, in syn. 1904.

Woody plants, mostly trees or shrubs, sometimes vines, usually unarmed or rarely with the petiole-base spinescent, glabrous or variously pubescent throughout; leaves simple, decussate-opposite or whorled, entire or variously dentate, deciduous, exstipulate; inflorescence cymose, the cymes mostly rather loose-flowered, more rarely dense-flowered, pedunculate in the upper leaf-axils or paniculate at the apex of the branchlets or densely aggregate in terminal corymbs or heads; flowers more or less zygomorphic, often large and showy, mostly white, blue, violet, or red, the calyx often of the same color as the corolla or red, white, or green; calyx campanulate or rarely tubular, truncate, 5-toothed, or 5-fid, often accrescent, subtending the fruit in patelliform fashion or enclosing it; corolla hypocrateriform, gamopetalous, its tube narrowly cylindrical, straight or incurved, equal in diameter throughout or slightly ampliate at the mouth, often elongate, more rarely only slightly exceeding the calyx, its limb spreading or subreflexed, 5-parted, the lobes subequal or the 2 posterior and exterior ones slightly shorter and the anterior one larger, sometimes concave; stamens 4, didynamous, inserted in the corolla-tube, long-exserted, involute in bud, perfect, alternate with the corolla-lobes; anthers ovate or oblong, 2-celled, with parallel thecae, opening by longitudinal slits; pistil one, compound, 2-carpellary, the style terminal, elongate, shortly and acutely 2-fid at apex; ovary imperfectly 4-celled, each cell 1-ovulate, the ovules high-lateral, hemianatropous; fruit drupaceous, globose or obovoid, often 4-sulcate and sub-4-lobed, the exocarp more or less fleshy, the endocarp bony or crustaceous, smooth or variously rugose, separating on maturity into 4 pyrenes or these sometimes cohering in pairs; seeds oblong, without endosperm.

A genus of about 350 species and varieties (largest genus in the family) of tropical and subtropical regions, most abundant in Asia and Africa, poorly represented in America except in cultivation and by naturalization. *Cyclonema* (frequently cultivated in America) may be worthy of segregation as a distinct genus.

Type species: *C. infortunatum* L.

Leaves mostly borne on prominent sterigmata; petioles 5 to 9 mm. long; blades oblong, elliptic, or lanceolate, glabrous on both surfaces, acute or acuminate at base; inflorescence mostly axillary

1. *C. ligustrinum*

Leaves not borne on prominent sterigmata; petioles 1.4 to 23.5 cm. long; blades broadly ovate or ovate-rotund, strigillose or short-pubescent on both surfaces, cordate or subtruncate at base; inflorescence terminal.

Leaf-blades coarsely dentate; inflorescence cymose; corolla white, pink, or rose, "double"

2. *C. fragrans* var. *pleniflorum*

Leaf-blades entire or repand-denticulate; inflorescence paniculate; corolla scarlet or bright red, "single"

3. *C. speciosissimum*

1. CLERODENDRUM LIGUSTRINUM (Jacq.) R. Br. in Ait., Hort. Kew., ed. 2, 4: 64. 1812.

Volkameria inermis β Ait., Hort. Kew., ed. 1, 2: 364. 1789.

Volkameria ligustrina Jacq., Coll. Bot. Suppl. 118, pl. 5, fig. 1. 1796.

Clerodendron culinare Sessé & Moc., Fl. Mex., ed. 2, 151. 1894.

Clerodendron fortunatum Sessé & Moc., Fl. Mex., ed. 2, 151. 1894 [not *Clerodendron fortunatum* L., 1756, or Buch.-Ham., 1831].

Clerodendron mexicanum Brand., Univ. Calif. Publ. Bot. 3: 391. 1909.

Clerodendron aculeatum Millsp. apud Standl., Field Mus. Publ. Bot. 3: 400, in syn. 1930 [not *Clerodendron aculeatum* (L.) Schlecht., 1831].

Shrub or low tree, to 3 m. tall, sometimes clambering or vine-like; branchlets long, slender, very obtusely tetragonal or subterete, the young ones brownish, the older ones light gray, conspicuously lenticellate, the youngest minutely puberulent, the older very minutely strigillose or glabrous; petioles very slender, 5 to 9 mm. long, minutely puberulent; blades chartaceous or membranous, elliptic, elliptic-oblong, or elliptic-lanceolate, 1.5 to 10 cm. long, 0.6 to 5.1 cm. wide, acute or occasionally subacuminate at both ends, entire, glabrous on

both surfaces, densely punctate beneath; inflorescence supra-axillary (rarely terminal), cymose; cymes solitary, opposite, 3 to 7.5 cm. long, 2 to 7 cm. wide, laxly few-flowered, the terminal ones (when present) similar, but usually smaller; peduncles widely divaricate, very slender, 1.5 to 4 cm. long, minutely puberulent or subglabrate; bracts few, foliaceous, caducous, 1 to 1.5 cm. long, 3 to 6 mm. wide, stipitate, minutely puberulent or glabrate, punctate beneath; bractlets and prophylla linear, 1 to 6 mm. long, puberulent; pedicels very slender, elongate, 3 to 6 mm. long, puberulent, in fruit to 13 mm. long; calyx campanulate, 6 to 8 mm. long, deeply 5-fid, the lobes lanceolate or deltoid, acuminate at apex; corolla white, its tube narrow-cylindric, straight, 1 to 1.2 cm. long, slightly ampliate at the mouth, its limb spreading, 5-fid, the lobes subequal, shorter than the tube; stamens long-exserted, involute in bud; style equaling the stamens, 2-fid at apex; ovary 4-sulcate; fruit dry, 1 to 1.2 cm. long and wide when mature, smooth, splitting into two 2-seeded halves at maturity. —Marginal forests; thickets, swamps, and the banks of streams and lakes, northern Mexico to Panama.

YUCATAN: Without locality, *G. F. Gaumer* 1933 (Ca, Cp, E, F, G); *A. C. V. Schott* 807 (Bm). Merida, *A. C. V. Schott* 27 (F). Izamal, *G. F. Gaumer* 736 (B, Bm, G, I, Lu, N, S, Us), 875 (E, F, G, N, S, W, X), *s.n.* [1888] (F, G, K); *G. F. Gaumer & sons* 736 (A; Br, 2; Ca; Cp; E; F; K; L; Mi; V). CAMPECHE: *E. A. Goldman* 446 (W). Champoton, *W. C. Steere* 1912 (F, Mi). Palizada, *E. P. Johnson* 12 (C, K), 63 (C, K). BRITISH HONDURAS: Corozal District—*P. H. Gentle* 394 (E, F, Mi, W). Belize District—Sibun River, *P. H. Gentle* 1476 (E, 2; I; Mi; N). Churchyard Pine Ridge, *C. L. Lundell* 6962 (N, Mi). El Cayo District—Belize River, *P. H. Gentle* 2184 (Mi); *C. L. Lundell* 4319 (F, G, Mi), 4344 (F; G; I; Mi, 2; S). GUATEMALA: Dept. Peten, San Diego, Rio Pasion, *J. M. Aguilar Hidalgo* 433 (E; Mi; N, 2). La Libertad and vicinity, *J. M. Aguilar Hidalgo* 353 (I, Mi). El Paso, *C. L. Lundell* 1472 (F, Mi, W).

Millspaugh in *Field Mus. Publ. Bot.* **1**: 42 (1895) cites an unnumbered Johnson collection from "Yucatán, loc. ignot." If this came from the same locality as *nos.* 12 and 63, cited above, it was from the bank of the Palizada River near Palizada, Campeche. Millspaugh, curiously, cites this specimen as "*Volkameria ligustrina* (R. Br.) Jacq." On page 316 of the same volume (1896) he cites *Gaumer* 736 and 875 as "*Clerodendron aculeatum* (L.) Griseb." and records the vernacular name "yointe," and on page 386 (1898) he cites *Schott* 27 under the same name. *C. aculeatum*, however, is a typically West Indian species, known from Veracruz and northern South America, but not known as yet from our area. It is closely related to *C. ligustrinum*, but may be distinguished at once by its smaller leaves and conspicuously spinescent petiole-bases.

Gentle (*no.* 394) describes the species as a "tree," while *Lundell* (*no.* 6962) calls it a "clambering shrub" or (*no.* 1472) a "vine." *Standley* in *Contrib. U. S. Nat. Herb.* **23**: 1252 (1924) and *Field Mus. Publ. Bot.* **3**: 400 (1930) calls it a "shrub, 1.5 to 3 meters high." *Johnson*, in original longhand notes preserved in the Columbia University Herbarium, states for his *no.* 12, "Can discern no difference between the flower of this & the preceding [*no.* 63], yet this was a long slender stem, supporting itself by other trees, something between climbing and standing alone." He describes the flowers as white or very pale yellow. *Standley* in the second reference cited above records the name "itzimte" from Yucatan. He is in error in stating that the persistent petiole-bases are spinose. *Lundell* in *Carnegie Inst. Wash. Publ.* **478**: 25, 26, 75, 138, 183, & 203 (1937) calls the species a shrub which grows densely in Peten along riverbanks that are not too shaded, common on swampy banks,

and an occasional shrub less than 4 m. tall in marginal forests. He records the vernacular name "muste" and states that the leaves are used to flavor fish (a fact reported previously by Sessé & Mocino, forming the basis for their adoption of the specific name "*culinare*"). It has been collected in flower in our area from January to June and in fruit in July.

2. *CLERODENDRUM FRAGRANS* var. *PLENIFLORUM* Schau. in A. DC., Prodr. **11**: 666 [as "*β pleniflora*"]. 1847.

Volkmania japonica Jacq., Hort. Schoenbr. **3**: 48, pl. 338. 1798.

Agricolaea fragrans Schrank, Denkschr. Akad. Muench. **1**: 98. 1808.

Clerodendrum fragrans Willd., Enum. Hort. Bot. Berol. **2**: 659. 1809 [not *Volkameria fragrans* Vent., 1803; *C. fragrans* (Vent.) R. Br., 1812].

Ovieda fragrans (Willd.) A. S. Hitchc., Mem. Torrey Club **12**: 63. 1902.

Viburnum deltoideum M. E. Jones, Extracts Contrib. West. Bot. **18**: 68. 1933.

Clerodendron fragrans var. *flore-pleno* Hort. ex Penna, Rodriguézia **2**: 315. 1936.

Half-shrubby, to 1.5 m. tall, mostly reproducing vegetatively; branches stout and angled, finely pubescent; branchlets more slender, more or less densely short-pubescent; leaves opposite, large; petioles stoutish, 2 to 23.5 cm. long, more or less densely short-pubescent (less so in age), mostly collapsing at base and apex in drying; leaf-blades membranous, broadly ovate, 6 to 29 cm. long, 5 to 28 cm. wide, sharply acute at apex, coarsely and irregularly dentate along the margins, varying from cordate to subtruncate at base, usually slightly cuneately prolonged into the petiole-apex, lightly strigillose-pubescent on both surfaces, usually more densely so on the venation beneath, not squamulose; inflorescence terminal, cymose, very densely many-flowered, subsessile or short-pedunculate, 3 to 6 cm. long, 3.5 to 9 cm. wide, often subtended by a pair of foliaceous long-stipitate bracts; bractlets very numerous, foliaceous, scattered throughout the cymes, oblong or elliptic, 1.5 to 3 cm. long, 3 to 12 mm. wide, subulate-acuminate at apex, attenuate-acute at base, more or less strigillose-pubescent on both surfaces, especially at the margins, long-stipitate; calyx campanulate, 1 to 1.5 cm. long, purple or red, marked with scattered circular or elliptic glandular disks, sparsely strigillose-puberulent or glabrate, 5-cleft, its lobes lanceolate, 4 to 10 mm. long, sharply acuminate; corolla hypocrateriform, more or less full-double, white, pink, or rose, the stamens and pistil mostly modified into supernumerary petals; fruit not developed, except in rare instances.—Cultivated and naturalized in waste places. An Asiatic plant, widely cultivated in all subtropical and tropical regions; naturalized from the southern United States and Mexico, through the West Indies and Central America, to Paraguay, Argentina, and Chile.

YUCATAN: *A. C. V. Schott* 725 (E). Izamal, *G. F. Gaumer* 724 (A; B; Br, 2; Ca; E; F; L; Lu; Mi, 2; N; V; W; X). Merida, *C. F. Millspaugh* 22 (F). CAMPECHE: *E. P. Johnson s.n.* (C).⁸ Palizada, *P. M. A. Morelet s.n.* [1849] (P). BRITISH HONDURAS: Coroza District—*P. H. Gentle* 241 (I, Mi, N). El Cayo District—El Cayo and vicinity, *M. Chanek* 121 (F, Mi). Toledo District—Eldorado, *W. A. Schipp* 1068 (Bm; Cb; E; F; K, 2; Mi; N; S). GUATEMALA: Dept. Peten, La Libertad, *C. L. Lundell* 2408 (F, 2; Mi).

Millspaugh in Field Mus. Publ. Bot. **1**: 316 (1896) and Standley in Field Mus. Publ. Bot. **3**: 400 (1930) record "jasmin de Italia" and "jazmín de Italia" as common names in our area. Millspaugh states that the plant is common in cultivation at Izamal. Lundell in Carnegie Inst. Wash. Publ. **478**: 109 & 183 (1937) calls the species "*Clerodendron fragrans* Vent." and records the name "jazmin de España." Gentle records the name "Spanish jasmin." The true *C. fragrans* (Vent.) R. Br. has normal "single" flowers (not full-double)

⁸ This specimen may not have been collected in our area. Its label merely states "Yucatan & Tabasco."

and is not known from our area. Schipp says that var. *pleniflorum* is a very showy shrub, naturalized all over British Honduras, the flowers "white with a faint flush of pink."

3. CLERODENDRUM SPECIOSISSIMUM Van Geert ex Morren, Hort. Belg. 3: 322-323, pl. 68 [as "*Clerodendron*"]. 1836.

Clerodendron speciosissimum Paxt., Mag. Bot. 3: 217 & 271. 1837.

Clerodendron fallax Lindl., Bot. Reg. 30: 19. 1844.

Clerodendron fallax var. *superbum* Ayres in Moore & Ayres, Mag. Bot. 1: 101. 1850.

Clerodendron papuanum Scheff., Ann. Jard. Bot. Buitenz. 1: 41. 1876.

Clerodendron Buchananii var. *fallax* (Lindl.) Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 92. 1921.

Clerodendron squamatum Rock apud Degener, Fl. Hawaii. fam. 315, sub *Clerodendron fallax*, in syn. 1934.—*C. squamatum* Neal & Metzger apud Degener, l. c. [not *Clerodendron squamatum* Vahl, 1791].

Shrub to 4 m. tall; branchlets usually rather medullose or hollow, gray or brownish, obtusely tetragonal, often deeply sulcate in drying, very densely short-pubescent; leaves opposite; petioles often rather stout, 1.4 to 21 cm. long, densely short-pubescent with cinereous or fulvous hairs; blades membranous, broadly ovate or ovate-rotund, 10 to 35 cm. long, 8.5 to 26 cm. wide, very abruptly and broadly acute at apex (rarely sharply acute or even short-acuminate), entire or irregularly repand-denticulate along the margins, cordate at base, more or less short-pubescent above with rather sparse whitish multicellular hairs, densely or rarely sparsely short-pubescent beneath with cinereous or brownish multicellular hairs, often marked with scattered black glandular disks along the midrib and secondaries beneath; inflorescence terminal, paniculate; panicle very lax and loosely many-flowered, 15 to 40 cm. long, 14 to 25 cm. wide, composed of 5 to 13 decussate-opposite pairs of greatly divaricate cymes, often conspicuously bracteate; peduncles continuous with the branchlets and exactly similar in texture and pubescence, 5 to 7 cm. long, stout; bracts large and foliaceous, often several pairs, subtending the peduncle and the inflorescence-branches, similar to the leaves in all respects, but smaller, or else more triangular-ovate and more sharply acute at apex; bractlets linear, 3 to 5 mm. long, puberulent; calyx campanulate, red, about 5 mm. long, 3 to 4 mm. wide, appressed-pubescent or puberulent, the 5 lobes triangular-ovate, about 3 mm. long, long-acuminate at apex; corolla scarlet or bright red, its tube slender, 2 to 2.5 cm. long, the limb wide-spreading, the lobes obovate, 1.5 to 1.8 cm. long, about 7 mm. wide; stamens and pistil exerted about 3 cm.; fruiting-calyx patelliform, bright red, about 1 cm. wide, firm, puberulent; fruit scarlet, depressed-quadrangular, about 5 mm. long and 7 mm. wide, deeply 4-lobed and -sulcate, separating into 4 distinct pyrenes on maturity.—An Asiatic shrub widely cultivated in tropical and subtropical regions, naturalized in the West Indies.

YUCATAN: Cultivated, Izamal, *G. F. Gaumer 909* (Bm; Ca; Cp; E; F; S; Us; X, 2).

Millspaugh in Field Mus. Publ. Bot. 1: 386 (1898) cites this collection as "*Clerodendron Colebrookianum* Walp." and states that the species is "rarely cultivated" in Yucatan, "one bush 4 feet high at Izamal, blooming in September." The true *C. Colebrookianum*, however, differs quite noticeably from our species and is not known either wild or cultivated in the New World, although it exists in cultivation in Europe and Asia.

AVICENNIACEAE Small, Fl. Miami 150 & 161. 1913.

Shrubs and trees of maritime regions, mostly inhabiting the saline or brackish coastal mangrove lagoons; growth in diameter of trunks and stems brought about by concentric layers of mestome rings; branches, branchlets, and twigs commonly terete, prominently

nodose, and articulate; leaves opposite, thick-textured, persistent, petiolate, exstipulate, the blades entire; inflorescence axillary or terminal, determinate and centrifugal (cymose), spicate or subcapitate, the axillary inflorescences mostly paired; flowers sessile, perfect, hypogynous, small; calyx composed of 5 nearly separate sepals, the segments ovate and plainly imbricate, subtended by a pseudo-involucre composed of a scale-like bractlet and 2 alternate scale-like prophylla, which are slightly shorter than the calyx and are imbricate with each other and with the calyx-segments; corolla actinomorphic, gamopetalous at base, campanulate-rotate, 4-parted; stamens 4, inserted in the corolla-tube, equal or subdidynamous; gynoecium composed of 2 united carpels; ovary compound, but with a free central often more or less 4-winged placenta; ovules 4, pendent, orthotropous, hanging from the tip of the central columella; fruit a compressed oblique capsule, with a juicy and somewhat fleshy usually tomentellous exocarp, dehiscent by 2 valves, by abortion regularly only 1-seeded, seeds without a testa; embryo viviparous; radicle hairy; cotyledons 2, folded lengthwise.

This family is often considered merely a tribe or a subfamily of the Verbenaceae, from whose tribes Viticeae or Teijsmanniodendreae it has probably arisen. Its worthiness of being elevated to family rank, however, was pointed out by Saint Hilaire (1826), Endlicher (1838), Bocquillon (1862), Eichler (1875), Van Tieghem (1898), and Warming (1912), and the researches of wood anatomists, like Record and Panshin, point also to this conclusion.

I. **AVICENNIA** L., Sp. Pl., ed. 1, 110 (1753); Gen. Pl., ed. 5, 49. 1754.

Bontia L. ex Loefl., Iter Hisp. 193. 1758.

Donatia Loefl., Iter Hisp. 193, in syn. 1758.

Upata Adans., Fam. Pl. 2: 201. 1763.

Sceura Forsk., Fl. Aegypt.-arab. 37. 1775.

Rac̄ka J. F. Gmel., Syst. Veg. 245. 1791.

Halodendrum Thou., Gen. Nov. Madagas. 8. 1806.—*Halodendron* Roem. & Schult., Syst. Veg. 3: 485. 1818.

Oepata Rheede ex Endl., Gen. Pl. 1: 639, in syn. 1838.

Hilairanthus Van Tiegh., Journ. de Bot. 12: 357-358. 1898.

Characters of the family.

About 16 living species and varieties, inhabiting the maritime regions of the tropics and subtropics of both the Old World and the New World; one of the chief constituents of almost all coastal mangrove lagoons; 3 fossil species known—2 from the United States and 1 from Colombia.

Type species: *A. officinalis* L.

I. **AVICENNIA NITIDA** Jacq., Enum. Pl. Carib. 25. 1760.

Bontia germinans L., Sp. Pl., ed. 2, 891. 1763.

Avicennia tomentosa Jacq., Select. Stürp. Amer. Hist. 178, pl. 112, fig. 2. 1763.—*A. tomentosa* G. F. W. Mey., Prim. Fl. Esseq. 221. 1818.—*A. tomentosa* Sieber (in part) ex Presl, Bot. Bemerk. 98, in syn. 1844.

Avicennia tomentosa var. *cumanensis* H. B. K., Nov. Gen. & Sp. Pl. 2: 283. 1818.

Avicennia tomentosa var. *campechensis* H. B. K., Nov. Gen. & Sp. Pl. 2: 284. 1818.

Avicennia tomentosa var. *guayaquilensis* H. B. K., Nov. Gen. & Sp. Pl. 2: 284. 1818.

Avicennia elliptica Holm in Thunb., Pl. Bras. Dec. 3: 37. 1821.—*A. elliptica* Thunb. ex Schau. in A. DC., Prodr. 11: 700, in syn. 1847.

Avicennia floridana Raf., Atl. Journ. 148. 1833.—*A. floridana* Gandoger, Bull. Soc. France 65: 64. 1918.

Avicennia Meyeri Miq., Linnaea 18: 262. 1844.

- Avicennia nitida* Rodsch. ex Miq., *Linnaea* **18**: 262. 1844.—*A. nitida* Sessé & Moc., *Fl. Mex.*, ed. 2, 142. 1894.
Avicennia Lamarckiana Presl, *Bot. Bemerk.* 99. 1844.
Avicennia oblongifolia Nutt. ex Chapm., *Fl. South. U. S.* 310. 1860.
Avicennia officinalis var. *nitida* (Jacq.) Kuntze, *Rev. Gen. Pl.* **2**: 502. 1891.
Avicennia officinalis var. *lanceolata* Kuntze, *Rev. Gen. Pl.* **2**: 502. 1891.
Hilairanthus nitidus (Jacq.) Van Tiegh., *Journ. de Bot.* **12**: 357. 1898.
Hilairanthus tomentosus (Jacq.) Van Tiegh., *Journ. de Bot.* **12**: 357. 1898.
Avicennia germinans L. apud Bakh., *Bull. Jard. Bot. Buitenz.*, ser. 3, **3**: 218, in syn. 1921.
Avicennia officinalis Millsp. apud Standl., *Publ. Field Mus. Bot.* **3**: 399, in syn. 1930 [not *A. officinalis* L., 1753].

Tree, to 16 m. tall; branchlets and twigs slender, brownish, more or less tetragonal, glabrous, often nitid; petioles rather slender, 2 to 27 mm. long, mealy or glabrous; blades firmly chartaceous or subcoriaceous, dark- or gray-green and very shiny above, mostly of the same color beneath, but the lamina obscured by a very dense whitish furf so as to impart a bicolored appearance to the leaves, occasionally brunnescent or nigrescent on both surfaces (especially when the furf is absent), oblong, lanceolate, elliptic, or obovate, 4.5 to 15 cm. long, 1.8 to 4.4 cm. wide, obtuse or acute at apex, entire, acute, acuminate, or cuneate at base, glabrous but densely impressed-punctulate above, varying from uniformly whitish- or grayish-furfuraceous or -farinaceous (with very closely appressed furf) to glabrous and more or less punctate beneath, the furf deciduous in patches on some forms; inflorescence axillary and terminal, spicate; spikes 1.5 to 6.5 cm. long, 1 to 1.5 cm. wide in anthesis, the axillary ones usually confined to a single pair at the base of the terminal one and shorter than it, or a second pair in the next lower leaf-axils; flowers usually opposite, 1 to 15 pairs per spike, sessile, usually closely crowded; bractlets and prophylla ovate or oblong, sessile, closely appressed to the calyx, obtuse or acute at apex, densely sericeous-pubescent with cinereous appressed hairs outside; calyx-lobes ovate, 3 to 5 mm. long, 2 to 3 mm. wide, densely appressed-pubescent on the outer surface, glabrous within; corolla white, 12 to 20 mm. long, parted to about the middle, the tube equaling or shorter than the calyx, practically glabrous, the lobes 2 to 2.5 mm. long, oblong or subquadrate, spreading, densely cinereous-pubescent outside with appressed hairs, velutinous-tomentose within; stamens slightly exerted from the corolla-tube, included by the lobes; fruit more or less obpyriform or ovate and asymmetric, 1.2 to 2 cm. long, 7 to 12 mm. wide, apiculate at apex when immature, densely white- or gray-pulverulent throughout, often also more or less appressed-strigose at apex.—Mangrove lagoons, from Florida and Texas, Bermuda, the Bahamas, and both coasts of Mexico, through the West Indies and Central America, to the coasts of Brazil and Peru; also on the Galapagos and other islands off the coasts of tropical and subtropical America; common and polymorphic.

YUCATAN: Port of Silam, *G. F. Gaumer* 619 (E, F, Us), 635, in part (B, Bm, Cp, E, F, G, K, N, Us, V, W, X). Las Bocas de Silam, *G. F. Gaumer & sons* 23340 (Cb, E, F, G, N, S, W). Progreso, *C. L. & A. A. Lundell* 8140 (Mi, 2; N); *C. F. Reiche* 978 (Mu, 2), *s.n.* [1927] (Mu); *W. C. Steere* 3092 (E, Mi). Sisal, *A. C. V. Schott* *s.n.* (E). Celestun, *A. C. V. Schott* 361 (F), 473 (F, W). CAMPECHE: Campeche, *A. J. A. Bonpland* *s.n.* (N, photo; P, 3; S, photo; Z, photo; type collection of *A. tomentosa* var. *campechensis*); *J. J. Linden* *s.n.* [Mai, 1839] (S), *s.n.* [1840] (Cb), *s.n.* (P). Champoton, *W. C. Steere* 1751 (Mi). QUINTANA ROO: Cozumel Island, *G. F. Gaumer* 146 (B, G, K); *E. A. Goldman* 653 (W). Holbox Island, *G. F. Gaumer* *s.n.* (F). BRITISH HONDURAS: Without locality, *O. F. Cook & R. D. Martin* 15 (W); *C. Hummel* 105 (K). Belize District—Haulover, *C. L. Lundell* 7009 (I, Mi, N). Belize, *P. H. Gentle* *s.n.* [*C. L. Lundell* 4719] (I, Mi, N); *C. L. Lundell* 4131 (Mi, N). Belize—Sibun road, *P. H. Gentle* 64 (F, Mi, N). Manatee Lagoon, *M. E. Peck* 399

(B, G, N). Stann Creek District—Blue Creek, All Pines, *W. A. Schipp* 625 (B, Cb, E, F, G, K, Mi, N, S).

It is not definitely established that Humboldt and Bonpland actually visited Campeche. A visit to this port is not recorded in any of the published accounts of their travels as far as I have been able to ascertain. However, in their "Flora Mexicana" [in H. B. K., Nov. Gen. & Sp. Pl. 7: 433-468. 1825] "Campeche" occurs at least 32 times as a locality for various species. Possibly someone sent them a collection of plants from this locality. Dr. J. H. Barnhart believes, however, that they may have touched at Campeche very briefly either in early March, 1801, or sometime in 1804 while en route by ship to the more distant points recorded in the accounts of their travels. Sprague, in his account of the localities in Mexico visited by Humboldt and Bonpland [Kew Bull. 1924: 24-27], completely overlooked or ignored "Campeche."

This very variable and polymorphic species is extremely abundant in mangrove swamps, at the borders of lagoons, and on tidal flats throughout the area. Its recorded vernacular names in the area are "mangle blanco" (Schott) and "black-mangrove" (Lundell). It is a tree with a trunk up to 23 cm. in diameter or often only a shrub, one of the characteristic and usual components of the mangrove belt of the seashores of Central America. According to Standley it grows most often at the landward edges of lagoons, especially on saline flats that are inundated at high tide. The heartwood is dark brown, oily, very hard, heavy, tough, of medium texture and interlocked grain, laminated, and durable, but tending to split at the phloem layers in the wood and therefore little used commercially. Schipp describes the wood as hard and close-grained and "good for knees in boat-building." It has been collected in anthesis in our area from March to September. Schott confused it with the related Old World family Myoporaceae, and Millspaugh thought that some specimens (notably, *Gaumer* 635 and *Schott* 473) represented the Old World *A. officinalis* L. [vid. Field Mus. Publ. Bot. 1: 316 (1896) & 386 (1898)]. Millspaugh's opinion that two species are represented in the Yucatan material, Humboldt & Bonpland's proposal of 3 varieties, and Jacquin's proposal of 2 distinct species for the common North American, Mexican, Central and South American species here called *A. nitida* are all very understandable. If one examines only a relatively few isolated specimens from various widely scattered points in its tremendous range, as Humboldt & Bonpland seem to have done, or if one considers the very glabrous and nitidous form as contrasted with the densely farinaceous-tomentose form from isolated specimens of each, as Jacquin apparently did, it would be remarkable indeed if one did not reach the same conclusions that these distinguished workers reached. However, if one examines a very large series of specimens from Florida and Texas through both coasts of Mexico and Central America, from Bermuda and the Bahamas through the Greater and Lesser Antilles to Trinidad and the northern South American coastal islands, and from Colombia, Venezuela, and the Guianas, to Brazil, Peru, Ecuador, and the Galapagos and other islands off the western coast of Central and South America, one finds that there is no constancy in these segregated "species" or "varieties." Every intergradation can be found; nor are the extremes of form correlated with extremes in geographic range, as Humboldt & Bonpland imply. Were this so, varietal designations might still be very convenient and justified in spite of intergrading forms. Actually, however, all the extremes of form can be found in one and the same region. Humboldt & Bonpland's "*guayaquilensis*" and

"*cumanensis*" forms are to be found in Yucatan just as well as the "*campechensis*" form. Similarly, Jacquin's glabrous and tomentose forms are to be found not only in the same locality, but actually on the same tree and even on the same twig (!), as can be proved by scores of herbarium specimens and as will be brought out in detail in the present writer's forthcoming monograph of the genus.

Occasionally *Avicennia nitida* is confused by collectors and amateurs with the red-mangrove, *Rhizophora mangle* L., and with the white-mangrove, *Laguncularia racemosa* (L.) Gaertn. f., since all three of these unrelated plants almost invariably grow in close association. Many herbarium sheets of Gaumer 635 are mixtures of *Avicennia nitida* and *Laguncularia racemosa*.

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FLORES, R. S., s.n. (*Rehdera trinervis*); FRANCIS, E. K., 6 (*Callicarpa acuminata*).

GAUMER, G. F., 17 (*Phyla nodiflora*), 82 (*Callicarpa Pringlei*), 146 (*Avicennia nitida*), 364, in part (*Priva lappulacea*), 379 (*Petrea volubilis*), 379 bis (*Petrea volubilis*), 394, in part (*Priva lappulacea*), 478 (*Lantana citrosa*), 500 (*Phyla stoechadifolia*), 503 (*Lantana citrosa*), 510 (*Phyla scaberrima*), 577 (*Duranta repens*), 607 (*Vitex Gaumeri*, type coll.), 619 (*Avicennia nitida*), 621, in part (*Phyla nodiflora*), 621, in part (*Phyla nodiflora* var. *reptans*), 635, in part (*Avicennia nitida*), 684a (*Callicarpa acuminata*), 724 (*Clerodendrum fragrans* var. *pleniflorum*), 736 (*Clerodendrum ligustrinum*), 744, in part (*Stachytarpheta Robinsoniana*, type coll.), 744, in part (*Stachytarpheta angustifolia*), 765 (*Citharexylum Schottii*), 765 bis (*Citharexylum Schottii*), 807 (*Lantana glandulosissima*), 808, in part (*Lantana glandulosissima*), 808, in part (*Lantana scorta*), 822 (*Cornutia latifolia*), 830 (*Lantana citrosa*), 834 (*Ghinia curassavica* var. *yucatanensis*), 834b (*Ghinia curassavica* var. *yucatanensis*, type coll.), 860 (*Lantana glandulosissima*), 870 (*Callicarpa acuminata*), 871 (*Lippia yucatanana*), 875 (*Clerodendrum ligustrinum*), 909 (*Clerodendrum speciosissimum*), 971 (*Lippia yucatanana*, type coll. of *L. albicaulis*), 1139 (*Bouchea prismatica*), 1160 (*Bouchea prismatica*), 1226 (*Stachytarpheta angustifolia*), 1475 (*Lippia yucatanana*), 1477 (*Stachytarpheta angustifolia*), 1527 (*Lippia graveolens*), 1656 (*Lantana glandulosissima*), 1688 (*Callicarpa acuminata*), 1702 (*Priva lappulacea*), 1702 bis (*Priva lappulacea*), 1813 (*Phyla*

stoechadifolia), 1876 (*Phyla nodiflora*), 1933 (*Clerodendrum ligustrinum*), 1935, in part (*Bouchea prismatica*), 1935, in part (*Stachytarpheta jamaicensis*), 1936 (*Stachytarpheta jamaicensis*), 1944 (*Citharexylum Schottii*), 1971 (*Lantana scorta*), 1972 (*Lantana glandulosissima*), 1973 (*Lantana glandulosissima*), 1983 (*Lantana citrosa*), 1988 (*Ghinia curassavica* var. *yucatanensis*), 1989 (*Ghinia curassavica* var. *yucatanensis*), 2003 (*Lantana glandulosissima*), 2004 (*Lantana scorta*), 2109 (*Lippia yucatanana*), 2269 (*Stachytarpheta angustifolia*), 23161 (*Lantana involucrata*), 23163 (*Citharexylum Schottii*), 23401 (*Lantana citrosa*), 23466 (*Citharexylum Schottii*), 23627 (*Lippia yucatanana*), 23949 (*Duranta repens*), 24000 (*Vitex Gaumeri*), 24021 (*Lantana glandulosissima*), 24029 (*Priva lappulacea*), 24037 (*Citharexylum Schottii*), 24071 (*Callicarpa acuminata*), 24086 (*Rehdera trinervis*), 24096 (*Rehdera trinervis*), 24097 (*Ghinia curassavica* var. *yucatanensis*), 24156 (*Lantana reticulata*), 24176 (*Lippia yucatanana*), 24228 (*Ghinia curassavica* var. *yucatanensis*), 24304 (*Stachytarpheta Frantzii*), 24305 (*Bouchea prismatica*), 24308 (*Lippia graveolens*), 24357 (*Lantana involucrata*), 24388 (*Rehdera trinervis*), 24411 (*Lippia yucatanana*), 24431 (*Rehdera trinervis*), s.n. (*Avicennia nitida*), s.n. (*Callicarpa acuminata*), s.n. [1888] (*Clerodendrum ligustrinum*), s.n. [Cozumel Island] (*Duranta repens*), s.n. [Izamal] (*Duranta repens*), s.n. [1888] (*Lantana citrosa*), s.n. [1888] (*Lantana glandulosissima*), s.n. [1888] (*Lantana velutina*), s.n. (*Petrea volubilis*), s.n. [Buena Vista] (*Priva lappulacea*), s.n. [Cozumel Island] (*Priva lappulacea*), s.n. [Izamal & vicinity] (*Priva lappulacea*), s.n. (*Vitex Gaumeri*); GAUMER, J. D., 3 (*Duranta repens*); GAUMER, G. F., & SONS [J. D. & G. J.] 379 (*Petrea volubilis*), 478 (*Lantana citrosa*), 577 (*Duranta repens*), 736 (*Clerodendrum ligustrinum*), 744 (*Stachytarpheta Frantzii*), 808 (*Lantana glandulosissima*), 1702 (*Priva lappulacea*), 23251 (*Vitex Gaumeri*), 23263 (*Duranta repens*), 23340 (*Avicennia nitida*), 23348 (*Phyla nodiflora*), 23375 (*Duranta repens*), 23384 (*Ghinia curassavica* var. *yucatanensis*), 23463 (*Citharexylum Schottii*), 23483 (*Lantana glandulosissima*), 23502 (*Rehdera trinervis*), 23567 (*Vitex Gaumeri*), 23568 (*Vitex Gaumeri*), 23585 (*Petrea volubilis*), 23627 bis (*Lippia yucatanana*), 23670 (*Phyla nodiflora* var. *reptans*), 23673 (*Petrea volubilis*), 23711 (*Phyla nodiflora*), 23748 (*Stachytarpheta Frantzii*), 23748 bis (*Stachytarpheta Frantzii*), 23819 (*Lantana glandulosissima*), 23886 (*Callicarpa Pringlei*), 23891 (*Duranta repens*); GENTLE, P. H., 1 (*Citharexylum caudatum*), 61 (*Citharexylum caudatum*), 64 (*Avicennia nitida*), 166 (*Lantana glandulosissima*), 171 (*Phyla nodiflora* var. *reptans*), 174 (*Priva lappulacea*), 186 (*Cornutia latifolia*), 199 (*Callicarpa acuminata*), 238 (*Citharexylum hirtellum*), 241 (*Clerodendrum fragrans* var. *pleniflorum*), 263 (*Aegiphila monstrosa*), 296 (*Lantana involucrata*), 316 (*Petrea volubilis*), 394 (*Clerodendrum ligustrinum*), 435 (*Citharexylum hirtellum*), 948 (*Aegiphila monstrosa*), 992 (*Paepalanthus Gentlei*, type coll.), 992a (*Paepalanthus Lamarckii*), 993 (*Eriocaulon fuliginosum*), 1177 (*Citharexylum hirtellum*), 1181 (*Ghinia spicata*), 1476 (*Clerodendrum ligustrinum*), 1509 (*Stachytarpheta miniacea*), 1685 (*Cornutia grandifolia*), 1756 (*Vitex Gaumeri*), 2184 (*Clerodendrum ligustrinum*), 2268 (*Citharexylum caudatum*), 2366 (*Petrea volubilis*), 2528 (*Vitex Gaumeri*), 2633 (*Aegiphila elata*), 4771 (*Phyla nodiflora*), 4922 (*Citharexylum hirtellum*), 4933 (*Vitex Gaumeri*), 4944 (*Lantana involucrata*), s.n. [C. L. Lundell 4719] (*Avicennia nitida*), s.n. (*Bouchea prismatica* var. *longirostra*), s.n. [C. L. Lundell 4760] (*Callicarpa acuminata*), s.n. [C. L. Lundell 4746] (*Cornutia latifolia*), s.n. [C. L. Lundell 4944] (*Lantana involucrata*), s.n. [C. L. Lundell 4933] (*Vitex Gaumeri*); GOLDMAN, E. A., 446 (*Clerodendrum ligustrinum*), 458 (*Priva lappulacea*), 572 (*Duranta repens*), 618 (*Lantana involucrata*), 653 (*Avicennia nitida*), 658 (*Lantana Camara* var. *aculeata*); GREENMAN, J. M., 389 (*Lantana citrosa*), 415 (*Petrea volubilis*); GUTIERREZ RIVAS, E., 32 (*Lippia graveolens*).

HERB. BONPLAND, s.n. (*Bouchea prismatica*); HERB. KUNTH, s.n. (*Bouchea prismatica*); HEYDER, H. M., 1 (*Vitex Gaumeri*); HEYDER, H. M., & KINLOCH, J. B., xxxv (*Vitex Gaumeri*); HUMBOLDT, F. H. A. VON, & BONPLAND, A. J. A., s.n. (*Cornutia latifolia*, type coll.); HUMMEL, C., 67 (*Vitex Gaumeri*), 105 (*Avicennia nitida*), s.n. (*Vitex Gaumeri*).

JOHNSON, E. P., 12 (*Clerodendrum ligustrinum*), 50n (*Lippia alba*), 63 (*Clerodendrum ligustrinum*), 80 (*Citharexylum hexangulare*), 81 (*Lippia graveolens*), s.n. (*Clerodendrum fragrans* var. *pleniflorum*), s.n. (*Lantana glandulosissima*), s.n. (*Lantana scorta*), s.n. (*Phyla nodiflora* var. *reptans*); JOHNSON, H. V., s.n. (*Citharexylum caudatum*).

KARLING, J. S., 9 (*Citharexylum hirtellum*, type coll.), 21 (*Vitex Gaumeri*), 26 (*Phyla stoechadifolia*), 42 (*Priva lappulacea*); KINLOCH, J. B., 2 (*Citharexylum hirtellum*), 196 (*Citharexylum caudatum*), 213 (*Eriocaulon Kinlochii*, type coll.); KLUGE, H. C., 25 (*Vitex Kuylenii*).

LINDEN, J. J., 157 (*Bouchea prismatica* var. *longirostra*), s.n. (*Avicennia nitida*), s.n. [Mai, 1839] (*Avicennia nitida*), s.n. [1840] (*Avicennia nitida*), s.n. (*Callicarpa acuminata*); LUNDELL, C. L., 41 (*Cornutia pyramidata* var. *isthmica*), 72 (*Stachytarpheta angustifolia*), 79 (*Priva lappulacea*), 146 (*Aegiphila monstrosa*), 317 (*Stachytarpheta cayennensis*), 363 (*Priva lappulacea*), 417 (*Vitex Gaumeri*), 433 (*Cornutia pyramidata* var. *isthmica*), 553, in part (*Phyla nodiflora* var. *reptans*), 607 (*Phyla nodiflora*), 626 (*Stachytarpheta angustifolia*), 823 (*Phyla nodiflora* var. *reptans*), 852 (*Cornutia pyramidata* var. *isthmica*, type coll.), 883 (*Priva lappulacea*), 895 (*Callicarpa acuminata*), 901 (*Lantana Camara*), 1006 (*Callicarpa acuminata*), 1204 (*Petrea volubilis*), 1258 (*Stachytarpheta guatemalensis*), 1320 (*Phyla stoechadifolia*), 1327 (*Vitex Gaumeri*), 1389 (*Duranta repens*), 1422 (*Stachytarpheta miniacea*), 1471 (*Phyla stoechadifolia*), 1472 (*Clerodendrum ligustrinum*), 1492 (*Aegiphila monstrosa*), 1509 (*Vitex Gaumeri*), 1544 (*Phyla nodiflora* var. *reptans*), 1819 (*Lippia alba*), 1873 (*Citharexylum caudatum*), 1892 (*Phyla nodiflora*), 1914 (*Phyla nodiflora*), 1920 (*Phyla nodiflora*), 1951 (*Phyla nodiflora* var. *reptans*), 2088 (*Callicarpa acuminata*), 2119 (*Lippia hypoleia*), 2171 [March 22] (*Bouchea prismatica*), 2171 [March 29] (*Bouchea prismatica*), 2180 (*Phyla scaberrima*), 2252 (*Cornutia pyramidata* var. *isthmica*), 2292 (*Lantana glandulosissima*), 2344 (*Callicarpa acuminata*), 2384 (*Lantana glandulosissima*), 2408 (*Clerodendrum fragrans* var. *pleniflorum*), 2473 (*Lantana glandulosissima*), 2519 (*Stachytarpheta angustifolia*), 2599 (*Lippia hypoleia*), 2662 (*Vitex Gaumeri*), 2780 (*Lippia hypoleia*), 2791 (*Vitex Gaumeri*), 3027 (*Callicarpa acuminata*), 3149 (*Phyla nodiflora*), 3171 (*Lippia hypoleia*), 3302 (*Phyla scaberrima*), 3531 (*Petrea volubilis*), 3450 (*Cornutia pyramidata* var. *isthmica*), 3493 (*Lantana trifolia*), 3537 (*Phyla scaberrima*), 3540 (*Vitex Gaumeri*), 3635 (*Callicarpa acuminata*), 3688 (*Phyla scaberrima*), 3693 (*Priva lappulacea*), 3755 (*Callicarpa acuminata*), 4131 (*Avicennia nitida*), 4143 (*Phyla nodiflora* var. *reptans*), 4163 (*Phyla nodiflora* var. *reptans*), 4188 (*Lippia alba*), 4214 (*Citharexylum caudatum*), 4215 (*Citharexylum caudatum*), 4232 (*Lippia alba*), 4238 (*Phyla stoechadifolia*), 4319 (*Clerodendrum ligustrinum*), 4344 (*Clerodendrum ligustrinum*), 4719 (*Avicennia nitida*), 4746 (*Cornutia latifolia*), 4760 (*Callicarpa acuminata*), 4771 (*Phyla nodiflora*), 4780 (*Phyla nodiflora* var. *reptans*), 4856 (*Bouchea prismatica* var. *longirostra*), 4922 (*Citharexylum hirtellum*), 4933 (*Vitex Gaumeri*), 4944 (*Lantana involucrata*), 4972 (*Petrea volubilis*), 6577 (*Cornutia grandifolia*), 6690 (*Citharexylum caudatum*), 6962 (*Clerodendrum ligustrinum*), 6969 (*Citharexylum hexangulare*), 7009 (*Avicennia nitida*), 7022 (*Citharexylum hexangulare*); LUNDELL, C. L., & LUNDELL, A. A., 7321 (*Vitex Gaumeri*), 7329 (*Petrea volubilis*), 7342 (*Duranta repens*), 7348 (*Lantana velutina*), 7401 (*Lantana scorta*), 7412 (*Stachytarpheta Frantzii*), 7413 (*Petrea volubilis*), 7519 (*Callicarpa acuminata*), 7587 (*Rehdera trinervis*), 7672 (*Lantana scorta*), 7679 (*Citharexylum hex-*

angulare), 7781 (*Citharexylum Schottii*), 7792 (*Phyla nodiflora*), 7810 (*Callicarpa acuminata*), 7812 (*Rehdera trinervis*), 7876 (*Bouchea prismatica*), 7878 (*Citharexylum Schottii*), 7888 (*Cornutia latifolia*), 7942 (*Stachytarpheta jamaicensis*), 7946 (*Lantana involucrata*), 8087 (*Lantana citrosa*), 8132 (*Citharexylum Schottii*), 8140 (*Avicennia nitida*), 8176 (*Ghinia curassavica* var. *yucatanensis*), 8205 (*Lantana scortia*).

MACBRIDE, J. F., photos 17554 (*Lippia yucatanana*, type coll.); MAINS, E. B., 4118 (*Ghinia spicata*); MELL, C. D., 2061 (*Priva lappulacea*); MEYER, W. C., 38 (*Cornutia latifolia*), 61 (*Vitex Gaumeri*), 134 (*Eriocaulon Williamsii*), 137 (*Phyla nodiflora* var. *reptans*), 139 (*Priva lappulacea*); MILLSAUGH, C. F., 10 (*Lantana involucrata*), 22 (*Clerodendrum fragrans* var. *pleniflorum*), 41 (*Lippia graveolens*), Plantae Utowanae 1496 (*Lantana glandulosissima*), 1548 (*Priva lappulacea*), 1568 (*Stachytarpheta jamaicensis*), 1595 (*Phyla nodiflora*), 1597 (*Lantana involucrata*), 1626 (*Lantana citrosa*), 1673 (*Lantana glandulosissima*), 1716 (*Lantana involucrata*), 1722 (*Phyla nodiflora*); MORELET, P. M. A., s.n. [1849] (*Clerodendrum fragrans* var. *pleniflorum*); MUS. YALE SCHOOL OF FORESTRY 10686 (*Lantana glandulosissima*).

O'NEILL, H., 8543 (*Syngonanthus hondurensis*, type coll.), 8543a (*Syngonanthus Oneillii*), 8546 (*Syngonanthus Lundellianus*, type coll.), 8547 (*Paepalanthus Gentlei*), 8548 (*Syngonanthus Oneillii*, type coll.), 8549 (*Syngonanthus Oneillii*), 8736 (*Citharexylum caudatum*), 8737 (*Phyla nodiflora*), 8738 (*Phyla nodiflora*), 8747 (*Cornutia latifolia*).

PECK, M. E., 96 (*Cornutia grandifolia*), 102 (*Citharexylum caudatum*), 168 (*Ghinia spicata*), 186 (*Stachytarpheta jamaicensis*), 293 (*Priva lappulacea*), 293b (*Priva lappulacea*), 347 (*Stachytarpheta guatemalensis*), 388 (*Petrea volubilis*), 399 (*Avicennia nitida*), 423 (*Phyla betulaefolia*), 489 (*Stachytarpheta Frantzii*), 567 (*Citharexylum hexangulare*), 589 (*Lantana glandulosissima*), 798 (*Lippia alba*), 920 (*Vitex Kuylenii*); PELLY, R. S., 7 (*Stachytarpheta miniacea*), 14 (*Stachytarpheta miniacea*), 34 (*Petrea volubilis*), 73 (*Eriocaulon fuliginosum*); PERRINE, H., s.n. (*Lippia graveolens*).

RECORD, S. J., 14 (*Citharexylum caudatum*); REICHE, C. F., 978 (*Avicennia nitida*), s.n. [1927] (*Avicennia nitida*).

SAMPSON, H. C., 14 (*Citharexylum hexangulare*); SCHIPP, W. A., 197 (*Vitex Gaumeri*), 205 (*Cornutia grandifolia*), 216 (*Aegiphila elata*), 265 (*Cornutia grandifolia*), 268 (*Citharexylum caudatum*), 313 (*Vitex Gaumeri*), 564 (*Lantana involucrata*), 576 (*Phyla nodiflora*), 612 (*Ghinia spicata*), 625 (*Avicennia nitida*), 647 (*Eriocaulon Schippii*, type coll.), 679 (*Stachytarpheta cayennensis*), 693 (*Tonina fluviatilis*), 727 (*Petrea volubilis* var. *albiflora*, type coll.), 755 (*Lippia alba*), 838 (*Stachytarpheta jamaicensis*), 845 (*Priva lappulacea*), 994 (*Vitex Kuylenii*), 1083 (*Aegiphila monstrosa*), 1166 (*Phyla stoechadifolia*), 1190 (*Citharexylum hexangulare*), 1309 (*Vitex Kuylenii*), 1668 (*Clerodendrum fragrans* var. *pleniflorum*), S-130 (*Paepalanthus Lamarckii*), S-556 (*Petrea volubilis*); SCHOTT, A. C. V., 22 (*Priva lappulacea*), 23 (*Priva lappulacea*), 27 (*Clerodendrum ligustrinum*), 361 (*Avicennia nitida*), 381 (*Duranta repens*), 473 (*Avicennia nitida*), 513 (*Callicarpa acuminata*), 575 (*Citharexylum Schottii*, type coll.), 578 (*Stachytarpheta Robinsoniana*), 582 (*Vitex Gaumeri*), 725 (*Clerodendrum fragrans* var. *pleniflorum*), 807 (*Clerodendrum ligustrinum*), s.n. (*Avicennia nitida*), s.n. [VIII.25.1865] (*Citharexylum Schottii*), s.n. [IX.22.1865] (*Citharexylum Schottii*); SELER, C., & SELER, G. E., 3880 (*Petrea volubilis*), 3903 (*Petrea volubilis*), 3916 (*Lantana citrosa*), 3923 (*Priva lappulacea*), 3938 (*Priva lappulacea*), 3951 (*Bouchea prismatica* var. *longirostra*), 3961 (*Stachytarpheta jamaicensis*), 3995 (*Priva lappulacea*), 4023 (*Duranta repens*), 4031 (*Petrea volubilis*), 4039 (*Duranta repens*), 4918 [Macbride photos 17554] (*Lippia yucatanana*, type coll.), 4946 (*Petrea volubilis*), 5548 (*Duranta repens*), 5555 (*Priva lappulacea*), 5588 [509] (*Callicarpa acuminata*),

5589 [510] (*Duranta repens*), 5597 [518] (*Callicarpa acuminata*); SMITH, J. D., 41 (*Citharexylum caudatum*), s.n. (*Citharexylum caudatum*); STEERE, W. C., 1004 (*Callicarpa acuminata*), 1041 (*Duranta repens*), 1071 (*Bouchea prismatica*), 1102 (*Lantana glandulosissima*), 1115 (*Lantana glandulosissima*), 1128 (*Lantana citrosa*), 1221 (*Ghinia curassavica* var. *yucatanensis*), 1233 (*Priva lappulacea*), 1317 (*Lantana glandulosissima*), 1337 (*Citharexylum Schottii*), 1376 (*Ghinia curassavica* var. *yucatanensis*), 1380 (*Lantana velutina*), 1419 (*Citharexylum Schottii*), 1456 (*Priva lappulacea*), 1458 (*Cornutia latifolia*), 1475 (*Stachytarpheta Frantzii*), 1508 (*Petrea volubilis*), 1558 (*Vitex Gaumeri*), 1563 (*Phyla nodiflora* var. *reptans*), 1607 (*Lantana glandulosissima*), 1608 (*Lantana glandulosissima*), 1657 (*Lantana citrosa*), 1659 (*Lantana glandulosissima*), 1660 (*Citharexylum Schottii*), 1682 (*Callicarpa acuminata*), 1731 (*Priva lappulacea*), 1738 (*Phyla nodiflora* var. *reptans*), 1741 (*Cornutia latifolia*), 1748 (*Phyla nodiflora* var. *reptans*), 1751 (*Avicennia nitida*), 1912 (*Clerodendrum ligustrinum*), 1967 (*Lantana glandulosissima*), 1996 (*Phyla nodiflora* var. *reptans*), 2010 (*Ghinia curassavica* var. *yucatanensis*), 2021 (*Lantana glandulosissima*), 2025 (*Lantana citrosa*), 2026 (*Lantana citrosa*), 2027 (*Lantana velutina*), 2028 (*Duranta repens*), 2050 (*Priva lappulacea*), 2051 (*Lantana citrosa*), 2057 (*Callicarpa acuminata*), 2073 (*Lantana glandulosissima*), 2113 (*Cornutia latifolia*), 2127 (*Bouchea prismatica*), 2141 (*Stachytarpheta Frantzii*), 2233 (*Cornutia latifolia*), 2286 (*Stachytarpheta Frantzii*), 2292 (*Callicarpa acuminata*), 2298 (*Phyla nodiflora* var. *reptans*), 2394 (*Cornutia latifolia*), 2395 (*Lantana Camara*), 2410 (*Phyla nodiflora*), 2515 (*Lantana involucrata*), 2523 (*Phyla nodiflora*), 2816 (*Stachytarpheta jamaicensis*), 2818 (*Phyla nodiflora*), 2939 (*Duranta repens*), 2941 (*Lantana scorta*), 3024 (*Stachytarpheta angustifolia*), 3025 (*Lantana scorta*), 3078 (*Phyla nodiflora*), 3084 (*Phyla nodiflora* var. *reptans*), 3092 (*Avicennia nitida*), 3099 (*Lantana involucrata*); STEGGERDA, M., 15b (*Callicarpa acuminata*), 27c (*Vitex Gaumeri*), 34c (*Duranta repens*); STEVENSON, D., 5 (*Aegiphila pauciflora*, type coll.), 17 (*Vitex Gaumeri*); STEVENSON, N. S., 4 [Mus. Yale School of Forestry 10686] (*Lantana glandulosissima*), 158 (*Stachytarpheta jamaicensis*), s.n. (*Vitex Gaumeri*); STEWART, E. C., 74 (*Lantana citrosa*), 83 (*Cornutia latifolia*), 523 (*Lantana glandulosissima*), 683 (*Verbena tenuisecta*), 769 (*Lantana involucrata*); STONE, W., 259 (*Petrea volubilis*); SWALLEN, J. R., 2533 (*Callicarpa acuminata*), 2549 (*Lantana citrosa*).

THOMPSON, J. E., s.n. (*Stachytarpheta guatemalensis*).

VALDEZ, P., 25 (*Phyla stoechadifolia*), 44 (*Stachytarpheta jamaicensis*), 60 (*Lantana glandulosissima*), s.n. (*Lantana glandulosissima*).

WINZERLING, H. W., 105 (*Aegiphila monstrosa*), III.2 (*Cornutia latifolia*), III.3, in part (*Callicarpa acuminata*), III.3, in part (*Vitex Gaumeri*), III.20 (*Cornutia pyramidata* var. *isthmica*).

XVIII

The Labiatae of the Yucatan Peninsula

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THE LABIATAE OF THE YUCATAN PENINSULA¹

The labiate flora of the Yucatan Peninsula, totaling 36 species in 11 genera, can not be said to be distinctive; rather it appears to be made up of a number of diverse elements, predominantly neotropical in distribution. The following species suggest an alliance with the Cordilleran flora of Mexico and Central America: *Asterohyptis Mociniana*, *Hyptis urticoides*, *H. verticillata*, *Salvia hyptoides*, *S. Urica*, and *Scutellaria orichalcea*. The following suggest an alliance with the Caribbean flora: *Teucrium cubense*, *Hyptis scandens*, *Scutellaria Gaumeri*, *Salvia micrantha*, *S. Fernaldii*, *S. misella*, and *S. riparia*. The following suggest a relationship with the Brazilian flora: *Teucrium vesicarium*, *Ocimum micranthum*, *Marsypianthes Chamaedrys*, *Hyptis* spp. Most of the Yucatan species of *Hyptis* are weeds and it is difficult to say whether they are native. They are chiefly Brazilian in origin. Besides these three principal alliances appear several which are more remote. *Satureja Brownei*, a species of wide neotropical distribution, has allies in *S. xalapensis* and *S. Douglasii*. These three species form the section *Hesperothymus* found only in the New World. *S. xalapensis* is Mexican and *S. Douglasii* is found in the rich coastal forests of the Pacific Northwest. The distribution of this section is unique amongst New World Labiatae. *Teucrium cubense*, a Caribbean species, is one of several members of the section *Melosmon*. The other members are found in northern Mexico, in Argentina, and in Chile. At the same time, *T. vesicarium*, which is Brazilian and Colombian in distribution, as well as Mexican, appears to be allied to *T. occidentale*, and *T. canadense* of the eastern United States, and to *T. tenuipes* of the Galapagos Islands.

The following species are endemic to the Yucatan Peninsula: *Hyptis scandens*, *Scutellaria Gaumeri*, *S. Lundellii*, *Salvia Fernaldii*, *S. Lundellii*.

LABIATAE

Herbaceous plants, annual or spreading by rhizomes, less often woody shrubs or shrublets, the herbaceous stems usually square; leaves opposite, sessile or petiolate, linear to cordate, commonly ovate or oblong, entire or toothed, rarely lobed and pinnatifid; flowers variously disposed, more commonly in compact or interrupted spikes, sometimes in terminal hemispheric heads, less often opposite and in racemes or in pedunculate cymes, the inflorescence usually well differentiated from the vegetative parts; calyx commonly more or less 2-lipped, the upper three more or less joined, sometimes completely so, the lower pair usually free, all sometimes equal and deltoid or lanceolate, the tube sometimes enlarged in fruit, even becoming bladder-like, the teeth sometimes spinose; corolla usually clearly bilabiate, sometimes obscurely so, the upper two petals usually joined to form an erect lip which is sometimes galeate, enclosing the stamens, or this lip sometimes very short and deeply notched, the 5 lobes rarely subequal, the lower lip usually spreading, sometimes cupped or dipper-shaped; stamens 4 or 2, usually in two unequal pairs, either enclosed within the upper lip or ascending under it, or thrust out from the tube, the connective varied, sometimes strongly developed at the expense of the filament, the anthers parallel or divergent, one theca sometimes completely or partially aborted; style bifid at the apex,

¹ A few extralimital species from adjacent areas are included; these probably will be found eventually within the peninsula.

arising from the base of the 4-lobed ovary between the lobes, in which case the lobes are quite distinct, or arising from near the apex in which case the lobes (and nutlets) are partially united below; nutlets smooth or pock-marked, sometimes hairy at the apex.

- Stamens 2 only, ascending under the upper lip and enclosed by it or exerted . . . 6. SALVIA
- Stamens 4.
- Calyx formed of two entire lips, the upper of which falls away at maturity and bears an upright appendage 2. SCUTELLARIA
- Calyx equally or unequally 5-toothed, the whole persistent.
- Calyx unequally 5-toothed, 2-lipped, the upper three teeth clearly joined, the lower pair free.
- Lower lip of corolla plane or somewhat hollowed, not at all saccate . . . 7. OCIMUM
- Lower lip of corolla strongly saccate (see also *Hyptis*) 8. COLEUS
- Calyx equally 5-toothed or essentially so.
- Lower lip of corolla strongly saccate, the stamens declined along it.
- Nutlets cymbiform, bearing a hyaline involute margin which is more or less lacerate 10. MARSYPIANTHES
- Nutlets ovate, entire 11. HYPTIS
- Lower lip of corolla plane or essentially so, not saccate.
- Flowers solitary in the axils of the upper leaves.
- Stamens strongly arched; calyx teeth twice as long as the tube . . . 1. TEUCRIUM
- Stamens straight; calyx teeth much shorter than the tube, deltoid-ovate 5. SATUREJA
- Flowers in verticils which are variously disposed in spikes or panicles.
- Leaves lacinate 4. LEONURUS
- Leaves toothed or entire.
- Corolla bright orange, hairy, showy, the glomerules ball-like, 4 to 6 cm. in diameter 3. LEONOTIS
- Corolla white or whitish.
- Calyx teeth acicular, spreading 9. ASTEROHYPTIS
- Calyx teeth deltoid, connivent 1. TEUCRIUM

I. TEUCRIUM L.

Perennial herbs with ovate leaves; flowers disposed in the axils either of the upper diminished but scarcely bract-like leaves, or congested into terminal bracteate spikes; calyces 10-veined, either companulate and deeply 5-lobed or saccate and subequally 5-toothed; corolla tube very short, included within the calyx, the upper lip short, deeply incised, scarcely exerted from the calyx, the lower much longer, spreading, 3-lobed; stamens 4, paired, strongly arcuate and exerted from the upper lip; style equally bifid; nutlets pock-marked.

- Leaf-blades rhomboid, 2.5 to 3.5 cm. long, deeply toothed, calyx lobes twice the length of the shallow tube 1. *T. cubense*
- Leaf-blades ovate, commonly 6 to 8 cm. long, crenate-serrate; calyx lobes less than half the length of the saccate tube 2. *T. vesicarium*

I. *T. CUBENSE* Jacq., Enum. Syst. Pl. Carib. 25. 1760.

Low glabrous herbs with several stems ascendant from a woody crown, 30 to 40 cm. long; leaf-blades commonly 2.5 to 3.5 cm. long, rhomboid or rhomboid-ovate, coarsely toothed, even lobed near the base, glabrous, borne on indefinite petioles about 2 to 5 mm. long; flowers solitary in the axils of the upper diminished and often entire or 3-toothed but scarcely bractlike leaves, borne on slender pedicels 4 to 5 mm. long; calyx lobes ovate-lanceolate, 3.5 to 4 mm. long, equal, twice the length of the calyx tube; corolla white, about 8 mm. long, the stamens about 5 mm. long.—Widely spread in the Caribbean region, with allied species in both North and South America.

YUCATAN: Near station at Dzitas, *Steere* 1648. Chichen Itza, in clearing, *Steere* 1338. Without locality, *Valdez* 36. Izamal, *Gaumer* 590.

2. *T. VESICARIUM* Miller, Gard. Dict. ed. 8, sub *Teucrio* no. 17. 1768.

T. inflatum Sw., Prodr. Veg. Ind. Occ. 88. 1788.

T. palustre Kunth in Humboldt & Bonpland, Nov. Gen. et Sp. Pl. 2: 306. 1817.

T. vesicarium var. *palustre* Epl. in Fedde, Rep. Spec. Nov., Beiheft 85: 3. 1936.

A perennial herb as much as a meter tall with spreading rhizomes, hirtellous in the upper parts with curved hairs and softly pilose with longer spreading ones; leaf-blades ovate, commonly 6 to 8 cm. long, rather obtuse at the apex, rounded-truncate at the base, their margins irregularly crenate-serrate, the upper surfaces sparingly hirtellous, the lower softly pubescent with both curled and straight hairs, the latter especially on the veins, borne on slender petioles 1 to 3 cm. long; flowers disposed in slender terminal spikes 5 to 15 cm. long, each subtended by an ovate-lanceolate persistent bract usually 5 to 8 mm. long or more, pubescent with short usually curled hairs and pilose with longer straight ones; mature calyces similarly clothed, 6 to 7 mm. long, saccate, but holding the nutlets rather loosely; corolla violet, its tube 5 to 7 mm. long, the lower lip 5 mm. long.

YUCATAN: Chichen Itza, *Steere* 1561. QUINTANA ROO: Coba, *Lundell & Lundell* 7703. BRITISH HONDURAS: Corozal District—Corozal—Orange Walk road, *Lundell* 4811. El Cayo District—Cohune Ridge, *Lundell* 6455. GUATEMALA: Dept. Peten, Lake Yaxha, *Lundell* 2209. Nictun, Lake Peten, *Lundell* 3148. Uaxactun, *Bartlett* 12120.

The form described here is *T. palustre*, described originally from Colombia. It seems clearly to be confluent with *T. vesicarium*, more common in South America, distinguishable chiefly by differences in pubescence and flower size.

2. SCUTELLARIA L.

Small perennial herbs with oval or ovate petiolate leaves; flowers solitary in the axils of upper diminished leaves or bracts, or disposed in short irregular racemes, the bracts then caducous; calyx 2-lipped, the lips even, entire, the upper at length deciduous, bearing a small appendage which enlarges and becomes erect at maturity; corolla blue or white, tubular, the upper lip strongly galeate, the lower more or less closing the throat, its lateral lobes not free but joined to the upper lip along one margin; stamens 4, ascending and concealed within the galea, one theca of each of the upper pair of stamens abortive; nutlets roughened, borne on a short gynophore.

Corolla blue or white, the galea and tube combined 12 to 24 mm. long.

Corolla blue, the galea and tube 12 to 15 mm. long, the lower stamens seated 5.5 to 7.5 mm. above the base 1. *S. Gaumeri*

Corolla white, the galea and tube 19 to 24 mm long, the lower stamens seated 10 to 18 mm. above the base 2. *S. orichalcea*

Corolla bright red, the galea and tube combined 40 mm. long.

Galea and tube 30 to 31 mm. long, the galea about 4 mm. tall, the lower stamens seated 17 to 18 mm. above the base of the tube 3. *S. isocheila*

Galea and tube 40 mm. long, the galea 8 mm. tall, the lower stamens seated 26 mm. above base of the tube 4. *S. Lundellii*

1. *S. GAUMERI* Leonard, Contrib. U. S. Nat. Herb. 22: 742. 1927.

A perennial herb 15 to 25 cm. tall, evidently procumbent and weak, its stems branched in the upper parts, clothed with spreading or somewhat decurved hairs as much as 1 mm. long; leaf-blades rhomboid-ovate or ovate, commonly about 2 cm. long, hirsute on both surfaces, less evenly beneath, their margins rather coarsely crenate-serrate; flowers borne in crowded racemes 3 to 8 cm. long, or sometimes axillary; calyces bristling like the stems, 2.5 mm. long at anthesis, 3.5 mm. long at maturity; corolla tube and galea 12 to 15 mm.

long, the lower stamens seated 5.5 to 7.5 mm. above the base of the tube; nutlets black, papillose.

YUCATAN: Piste-Libre Union road, *Lundell & Lundell 7579*. Pocoboch, *Gaumer 2392* (type coll.). Chichen Itza, *Steere 1453*. Muna, *Steere 2145*. QUINTANA ROO: Lake Chichankanab, *Gaumer 1435*.

A specimen from the Department of Peten, Guatemala (*Lundell 3614*) appears to be a variant of the complex which is known as *S. havanensis*. It has much the same habit of *S. havanensis* but suggests also the habit of *S. Gaumeri*. The flowers are similar to the latter, the galea and tube being barely 11 mm. long, the stamens seated 5 mm. above the base of the tube.

2. *S. ORICHALCEA* J. D. Smith, Bot. Gaz. **14**: 29. 1889.

S. pedicularis Fern., Proc. Am. Acad. **35**: 563. 1900.

A perennial herb 15 to 50 cm. tall, with slender stems which are apparently solitary or usually so, and arise from a short rootstock with fleshy roots, hirtellous throughout with short upwardly curling or spreading hairs; leaf-blades varied, 2 to 8 cm. long, 1 to 2.5 cm. broad, now elliptical and entire or ovate, now broadly lanceolate and coarsely sinuate-dentate, the upper surfaces sparingly appressed-hirsute, the lower hispidulous especially along the veins, commonly purple, borne on petioles 1 to 3 cm. long; flowers in racemes 2 to 5 cm. long; flowering calyces sparsely hispidulous, 3 to 4 mm. long; lower lip 5 mm. long at maturity, the squama then 5 mm. tall; corolla white (or the lower lip marked with purple), the galea and tube 19 to 24 mm. long, the galea about 4.5 mm. long, the tube slender, equal nearly to the lips where it is abruptly expanded, the lower stamens seated 10 to 18 mm. above the base of the tube.

BRITISH HONDURAS: El Cayo District—Vaca, *Gentle 2403*; Valentin, *Lundell 6218*.

3. *S. ISOCHEILA* J. D. Smith, Bot. Gaz. **57**: 426. 1914.

A perennial herb as much as a meter tall, its branches pubescent with upwardly curled hairs; leaf-blades mostly 5 to 8 cm. long, 2 to 3.5 cm. broad, prevailingly elliptical or oblong-elliptical, acuminate, usually cuneate at the base, borne on petioles 1 to 2 cm. long, subentire or shallowly sinuate-serrate, the upper surface glabrous or nearly so, the lower notably paler and minutely hirtellous along the veins; flowers in racemes 2 to 5, rarely 10 cm. long; calyces minutely hirtellous, the lower lip 3.5 to 4 mm. long at flowering, about 6 mm. long at maturity, the squama then 7 to 8 mm. tall; galea and tube bright rose-colored (the lower lip white ?) 30 to 31 mm. long, the galea about 4 mm. long, the tube clearly arcuate, the lower stamens seated 17 to 18 mm. above the base of the tube; nutlets tan-colored, smoothish and sparingly roughened.

May be expected in southern British Honduras or southern Peten.

4. *S. LUNDELLII* Epl., Lilloa **4**: 267. 1939.

A pretty perennial herb about 50 cm. tall, its stems more or less hirsute on all sides with short spreading or subascendant hairs and, particularly in the inflorescence, with longer, even glandular ones; leaf-blades ovate, 2.5 to 3.5 cm. long, borne on petioles 3 to 8 mm. long, remotely crenate-serrate above the middle, both surfaces sparingly hirsute with rather long hairs; flowers produced in racemes about 5 cm. long; lower calyx lip 5 mm. long at flowering, not seen at maturity; galea and tube bright red, 40 mm. long, the galea 8 mm. tall, the tube hardly arcuate but straight, gradually enlarged upward; longer stamens seated 26 mm. above the base of the tube; nutlets unknown.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, Vaquero, in sandy pine uplands, *Lundell 6867* (type, University of Michigan Herb.).

3. LEONOTIS R. Br.

Coarse herbs with simple ovate leaves; flowers in dense, globose, remote glomerules 4 to 6 cm. in diameter at maturity, many-flowered, subtended by spinose reflexed bracts; calyces broadly tubular, decurved near the apex, the orifice oblique, unequally 5-toothed with some supernumerary teeth, the teeth spinose, the middle posterior one largest; corolla showy, bright orange, very hairy, the tube 1- to 3-annulate within near the base, the upper lip erect, cupped; stamens 4, in two pairs, lightly exerted from the galea; nutlets 3-angled, obliquely truncate at the apex.

1. *L. NEPETAEFOLIA* R. Br., Prodr. 504. 1810.

Coarse herbs 1 to 2 m. tall as described above, the leaf-blades as much as 10 cm. long or more, subcordate and borne on subequal petioles; flowering calyces about 12 mm. long, becoming 20 to 25 mm. long at maturity, densely hirtellous throughout; corolla 20 to 25 mm. long, arcuate.—A tropical weed of African origin, widely distributed.

YUCATAN: Chichen Itza, *Steere 1103*. MUNA, *Steere 2119*. GUATEMALA: Dept. Peten, La Libertad, *Lundell 2174*; *Aguilar 139*.

4. LEONURUS L.

Erect herbs with deeply lobed, even pinnatifid, petiolate leaves which diminish gradually into the inflorescence; flowers in dense sessile verticils forming a leafy, interrupted spike, subtended by setaceous bractlets; calyx top-shaped, with 5 principal veins, the remainder obscure, teeth 5, spinose but deltoid at the base; corolla strongly bilabiate, the upper lip cupped, the tube obliquely annulate within near the base; stamens in two pairs, erect; nutlets sharply 3-angled, truncate at the apex.

1. *L. SIBIRICUS* L., Sp. Pl. 584. 1753.

An erect herb 40 to 60 cm. tall with deeply lobed or pinnatifid leaves, attenuate at the base to petioles as long or longer, diminished upward into the leafy inflorescence; corolla pink, about 12 to 15 mm. long.—A tropical weed of wide distribution; Eurasian in origin.

YUCATAN: Chichen Itza, *Steere 1601*; *1649*. TIZIMIN, *Swallen 2528*. BRITISH HONDURAS: Corozal District—*Gentle 185*.

5. SATUREJA L.

Perennial creeping herbs which root at the nodes; leaves ovate, petiolate; flowers axillary on pedicels sometimes as long as the calyces; calyces tubular, the teeth deltoid, the upper three connate to the middle; corolla tubular, gradually enlarged upward, the upper lip erect, emarginate, the lower subequal, spreading; stamens 4, seated above the middle of the tube, in two pairs; nutlets smooth.

1. *S. BROWNEI* Briq. in Engl. u. Prantl, Die Nat. Pflanzenf. ed. 1. 4^{3a}: 300. 1897.

Thymus Brownei Sw., Prodr. Veg. Ind. Occ. 89. 1788.

Micromeria Brownei Benth., Lab. Gen. et Sp. 372. 1834.

Low prostrate creeping herbs with slender acutely angled stems; leaf-blades membranous, glabrous, generally 0.5 to 1 cm. in diameter, sometimes broadly deltoid, sometimes ovate-

rotund, subentire, subtruncate at the base and borne on petioles 1 to 8 mm. long; flowers solitary in the axils, borne on pedicels about as long as the calyces; calyx tube glabrous, 2.5 to 3 mm. long, the lower teeth deltoid-ovate, about 1 mm. long, the upper about half as long; corolla violet, its tube 3.5 mm. long.—Widely distributed in the American tropics.

YUCATAN: Without locality, *Valdez* 35.

6. SALVIA L.

Herbaceous plants, either annual or perennial, with ovate petiolate leaves; flowers in interrupted, sometimes moniliform spikes, subtending bracts rarely deciduous; calyx bilabiate, the three upper teeth completely connate, the upper lip 3- to 7-veined, the two lower teeth free, the whole usually laterally compressed; corolla strongly bilabiate, the upper lip galeate, the lower spreading, the lateral lobes small; stamens 2, seated in the throat, enclosed in the galea but sometimes exerted from it, the connective much developed at the expense of the filament, articulate with it and thrust down into the tube, the lower anther wholly aborted; nutlets smooth.

Corolla tube 20 to 25 mm. long.

Corolla crimson.

Leaves deltoid-ovate, rarely as much as 8 cm. long, cordate at the base, hairy 8. *S. coccinea*

Leaves elliptical, 8 to 15 cm. long, attenuate or cuneate at the base, glabrous 10. *S. Lundellii*

Corolla blue 9. *S. Urica*

Corolla tube 5 to 6 mm. long at most, blue or white.

Upper calyx lip clearly 3-veined 7. *S. albiflora*

Upper calyx lip 5- to 7-veined.

Flowers numerous in globose compact glomerules which form a moniliform spike 6. *S. hyptoides*

Flowers 6 to 12 in a whorl, not at all compacted, forming slender interrupted spikes.

Upper style branch minute or even wanting, the lower branch little or or not at all flattened, obtuse; stamen connective straight or but little arcuate, not at all abruptly geniculate.

Calyces clothed with spreading capitate-glandular hairs 4. *S. micrantha*

Calyces hirtellous chiefly along the veins with small eglandular curved hairs 5. *S. Fernaldii*

Upper style branch conspicuous, attenuate, as long as or longer than the lower branch which is concave and rotund-truncate in outline; stamen connective abruptly geniculate, the lower part assurgent into the throat.

Mature calyces scarcely 3 mm. long; the upper lip obscurely trimucronate, rotund-truncate, the lower teeth acute or mucronate but scarcely spinulose 1. *S. occidentalis*

Mature calyces 3.5 to 7 mm. long, the upper lip and lower teeth clearly spinulose at the tip.

Mature calyces 3.5 to 5 mm. long 2. *S. misella*

Mature calyces 5.5 to 7 mm. long 3. *S. riparia*

1. *S. OCCIDENTALIS* Sw., Prodr. Veg. Ind. Occ. 14. 1788.

A diffuse sprawling annual herb, thinly hirtellous in the inflorescence with fine spreading or upwardly directed hairs, thinly hirtellous below with downwardly curled coarse hairs, glabrous in the lower parts; leaf-blades 2 to 6 cm. long, broadly ovate or somewhat rhomboid, rather acute, cuneately narrowed at the base, the upper surface sprinkled with appressed rather coarse hairs, the lower hirtellous, both sometimes glabrous, borne on petioles about 1 cm. long; verticils usually 6-flowered, the subtending bracts persistent, 2 to 2.5 mm. long, disposed in slender interrupted spikes, the verticils 1 to 3 cm. distant; flowering calyces 2 mm. long, glandular, hispid with short hairs, the upper lip rotund-truncate, entire or obscurely trimucronate, the lower teeth ovate-acuminate, 0.5 mm. long, not at all spinulose, the mature calyces scarcely 3 mm. long, the teeth connivent, the limb

laterally compressed, borne on pedicels 1.5 to 2 mm. long; corolla bright blue, its tube 2.5 mm. long, the lower lip subequal; stamen connective abruptly geniculate; upper style branch attenuate, as long as or longer than the lower branch which is concave and rotund-truncate.—A plant of wide distribution in the American tropics.

YUCATAN: Merida, *Rivas* 5. Izamal, *Gaumer*. Without locality, *Valdez* 55. QUINTANA ROO: Lake Chichankanab, *Gaumer* 1703. Cozumel Island, *Gaumer*. BRITISH HONDURAS: Stann Creek District—Stann Creek, *Schipp* 840.

2. *S. MISSELLA* Kunth in Humb. & Bonpl., Nov. Gen. et Sp. Pl. 2: 290. 1817.

S. obscura Benth., Lab. Gen. et Sp. 245. 1833.

A diffuse sprawling annual herb 30 to 40 cm. tall, thinly hirtellous in the inflorescence with fine spreading or upwardly directed hairs, thinly hirtellous below with coarse downwardly curled hairs, glabrous in the lower parts; leaf-blades 1.5 to 3.5 cm. long, 1 to 2 cm. broad, broadly ovate or subrhomboid, rather acute, cuneately narrowed at the base or even extenuate to petioles as much as 1 cm. long, both surfaces sprinkled with hairs similar to those on the stem or glabrous; verticils 1- to 12-flowered, subtended by broadly ovate persistent bracts 2 to 4 mm. long, disposed in slender interrupted spikes 10 to 30 cm. long; flowering calyces 2 to 2.5 mm. long, glandular hispid with stout hairs, the upper lip rounded-acuminate, commonly shortly spinose, the lobes of the lower tipped with a spine, the mature calyces 3.5 to 5 mm. long, laterally compressed but the lips yawning, borne on pedicels 1 to 2 mm. long; corolla bright blue, its tube 2.5 mm. long, the lower lip about 3 mm. long, twice as long as the upper or longer; stamen connective abruptly geniculate; upper style branch attenuate, as long as or longer than the lower, which is concave and rotund-truncate.—A plant of wide distribution in the Caribbean region, in western Mexico and in Lower California.

YUCATAN: Pocoboch, *Gaumer* 2391. Xnocac, *Gaumer* 23506. Road to Tepakaam, *Mills-paugh* 90. Without locality, *Gaumer* 394 in part. CAMPECHE: Tuxpeña, *Lundell* 1010. QUINTANA ROO: Lake Chichankanab, *Gaumer* 1434.

3. *S. RIPARIA* Kunth in Humb. & Bonpl., Nov. Gen. et Sp. Pl. 2: 300. 1817.

S. privoides Benth., Bot. Voy. Sulph. 150. 1844.

S. viscosa Sesse et Moç., Pl. Nov. Hisp. ed. 2. 8. 1893; Fl. Mex. ed. 2. 7. 1894.

A diffuse annual herb often procumbent, 20 to 50 cm. tall or more, usually much branched, viscid in the inflorescence with short-spreading or upwardly directed hairs, thinly sprinkled below with coarser downwardly curled hairs; leaf-blades 2 to 3 cm. long, broadly ovate, subrhomboid, acute, cuneately narrowed or extenuate to petioles as much as 1 cm. long, both surfaces thinly clothed with hairs similar to those of the stem, the lower surface sometimes canescent, or both glabrate; verticils 1- to 12-flowered, subtended by ovate persistent bracts 3 to 3.5 mm. long, disposed in rather stiffish slender interrupted spikes 10 to 20 cm. long; flowering calyces 3 to 3.5 mm. long, hispid-glandular with stout hairs, 5.5 to 7 mm. long at maturity, the lips yawning, the upper 1- to 3-mucronate, the lobes of the lower tipped with short spines, borne on pedicels 2 to 3 mm. long; corolla bright blue, its tube 2.5 to 3 mm. long, the upper lip scarcely 2 mm. long, the lower about 3 mm.; stamen connective abruptly geniculate; upper style branch attenuate, as long as or longer than the lower which is concave and rotund-truncate.—A plant of wide distribution in the Caribbean region, in western Mexico, and extending southward to Peru; perhaps not native to this whole region.

YUCATAN: Izamal, *Gaumer* 394. GUATEMALA: Dept. Peten, El Paso, *Lundell* 1545. La Libertad, *Aguilar* 298.

4. *S. MICRANTHA* Vahl, Enum. **1**: 235. 1805.

S. orbicularis Benth., Bot. Voy. Sulph. 151. 1844.

A small annual herb commonly 20 to 40 cm. tall, sparingly branched above, hirtellous on the stems with small downwardly curled hairs and usually with stubby glandular ones in the inflorescence; leaf-blades 1.5 to 4.5 cm. long, deltoid-ovate, obtuse or rounded at the apex, truncate-cordate at the base, crenate, both surfaces glabrate, the lower surface hirtellous along the veins, borne on slender petioles as long as 2 cm.; verticils 3- to 6-flowered, subtended by persistent or tardily deciduous bracts about equal to the pedicels; flowering calyces 3.5 to 5.5 mm. long, 6 to 8 mm. at maturity, thinly glandular-hispid with coarse capitate hairs; corolla bright blue (or white), its tube 4 to 6 cm. long, the upper lip 1 to 1.5 mm. tall, the lower 3 to 4 mm. long; stamen connective straight or somewhat curved at the tip, thrust back into the tube; upper style branch minute, the lower cylindrical and blunt.—A plant of wide distribution in the Caribbean islands, in Yucatan, and in Panama.

YUCATAN: Izamal, *Gaumer* 394 in part. Without locality, *Valdez* 31; *Stewart* 62, 767. QUINTANA ROO: San Miguel, Cozumel Island, *Steere* 2948. Lake Chichankanab, *Gaumer* 1434 in part. BRITISH HONDURAS: Corozal District—*Gentle* 375A.

5. *S. FERNALDII* Standl., Field Mus. Publ. Bot. **8**: 41. 1930.

A small annual herb commonly 30 to 40 cm. tall, branching mostly near the base, sparingly hirtellous with small downwardly curled hairs in the upper parts and sprinkled below with slender spreading bristle-like hairs; leaf-blades deltoid, commonly 1.5 to 3 cm. long, acute or obtuse at the apex, truncate-cordate at the base, crenate, borne on slender petioles as much as 1.5 cm. long, both surfaces hirtellous with small curled hairs; verticils mostly 3-flowered, subtended by persistent or tardily deciduous bracts about as long as the pedicels; flowering calyces 4 to 5 mm. long, 5.5 to 6 mm. at maturity, sparingly hirtellous with upwardly curled hairs, not at all glandular; corolla blue, its tube 4 mm. long, the upper lip 1.5 mm. tall, the lower 3.5 to 4 mm. long; stamen connective straight or somewhat curved at the tip, thrust back into the tube; upper style branch much shorter than the lower which may be flattened at the tip.—Known only from Yucatan and Quintana Roo.

YUCATAN: Buena Vista, *Gaumer* 1333. Pocoboch, *Gaumer* 1333. Izamal, *Gaumer*. Calotmul, *Gaumer* 2317. Chichen Itza, *Millspaugh* 1634 (type coll.); *Lundell & Lundell* 7361, 7426, 7456; *Steere* 1327. Tizimin, *Swallen* 2529. QUINTANA ROO: Coba, *Lundell & Lundell* 7708, 7811.

6. *S. HYPTOIDES* M. & G., Bull. Acad. Brux. **11**²: 74. 1844.

S. elscholtzioides Benth., Bot. Sulph. 152. t. 50. 1844.

S. hyptoides var. *subspicata* Fern., Proc. Am. Acad. **35**: 498. 1900.

An annual 60 cm. tall or more, with rather strictly ascendant slender branches, thinly hirtellous in the upper parts with appressed hairs, appearing glabrous; leaf-blades 3 to 6 cm. long, 2 to 4 cm. broad, deltoid-ovate, acuminate, rounded-truncate at the base and abruptly narrowed to slender petioles 3 to 4 cm. long, sparingly pubescent along the veins beneath, crenate-serrate; flowers disposed in moniliform spikes, the glomerules globose, at length 12 to 15 mm. in diameter, distant, subtended by persistent erose-denticulate sheathing bracts 8 to 10 mm. broad; flowering calyces 3.5 to 4.5 mm. long, villous with rather coarse hairs at the apex, somewhat enlarged at maturity, the limb then deflexed; corolla blue, its tube 2.5 to 3.5 mm. long, bearing two papillae within near the base, the upper lip scarcely 1 mm. tall, the lower 2.5 to 4.5 mm. long; stamens included in the galea, the connective provided near the middle with a retrorse tooth; style glabrous, the upper branch longer.

BRITISH HONDURAS: Belize District—Gracie Rock, Sibun River, *Gentle* 1595.

7. *S. ALBIFLORA* M. & G., Bull. Acad. Brux. **11**²: 76. 1844.

S. Jurgenseni Briq., Ann. Conserv. et Jard. Bot. Genève **2**: 144. 1898.

An herb as much as a meter tall, glabrous unless sparingly pubescent in the channels of the stem; leaf-blades commonly 5 to 8 cm. long, usually rhomboid-ovate, acuminate at the apex, cuneate at the base, rarely subtruncate, borne on slender petioles usually 2 to 4 cm. long, their margins crenate-serrate, both surfaces glabrous; flowers 3 to 6 in verticils which are subtended by small membranous persistent deltoid-lanceolate bracts, the glomerules generally 1 to 1.5 cm. distant, disposed in slender interrupted spikes 15 to 30 cm. long; flowering calyces glabrous unless hispidulous along the veins, 4 to 5.5 mm. long, the upper lip 3-veined; corolla white, its tube 3.5 to 6 mm. long, epapillate within, the upper lip 3 to 4.5 mm. tall; stamens included in the galea, the connective bearing a retrorse tooth near the middle; style pubescent, the upper branch longer.

The species has been collected in adjacent Guatemala, and Tabasco; it doubtless occurs in the peninsula.

8. *S. COCCINEA* JUSS. ex Murr., Comm. Goett. **1**: 86. *t. 1*. 1778.

S. pseudococcinea Jacq., Coll. **2**: 302. 1786.

An annual herb, commonly less than a meter tall, pubescent with short curled hairs and usually with longer spreading bristle-like hairs; leaf-blades deltoid-ovate, commonly 5 to 6 cm. long in the upper parts of the plant, generally obtuse, either truncate at the base or cordate, borne on petioles 1 to 3 cm. long, both surfaces more or less pubescent with short hairs and frequently sprinkled like the stems with longer bristles, the lower surface often incanous; flowers 3 to 6 or more in verticils which are subtended by tardily deciduous whitish bracts, disposed in interrupted spikes; flowering calyces about 7 mm. long, hirtellous with curled hairs or hispidulous and often bristly towards the base, frequently reddish, the upper lip 5- to 7-veined; corolla bright red, its tube 13 to 17 mm. long, epapillate within, the upper lip 3.5 to 5 mm. long, the lower twice as long, ample and spreading; stamens exerted 3 to 4 mm.; style hirtellous, the upper branch shorter.—Common as a weed around dwellings and in clearings in the American tropics and Polynesia; probably Brazilian in origin.

9. *S. URICA* Epl., Rep. Spec. Nov., Beiheft **110**: 175. 1939.

A rather coarse perennial herb as much as a meter tall or more, its branches hispid with spreading glandular hairs and eglandular bristles of varied lengths; leaf-blades generally cordate, sometimes deltoid-cordate, the larger ones usually about 10 cm. long, acuminate at the apex and usually cordate at the base, borne on glandular hispid petioles commonly 5 to 6 cm. long, the upper surface usually hispid, the lower pubescent, often incanous, both more or less glandular, their margins crenate-serrate; flowers 3 to 6 in verticils subtended by subrotund glandular-hispid caducous bracts, the glomerules at length 1 to 3 cm. distant, disposed in often paniculate interrupted viscid spikes 15 to 25 cm. long; flowering calyces viscid-hispid, 7.5 to 12 mm. long, the upper lip 5-veined; corolla bright blue, its tube 8 to 18 mm. long, invaginate toward the base and bearing a pair of wrinkles within, the upper lip 4.5 to 9 mm. tall, the lower often twice as long, ample and spreading; stamens included in the galea, the connective bearing a small tooth near the middle or nearly entire; style pilose, the upper branch longer.

BRITISH HONDURAS: El Cayo District—Vaca, *Gentle* 2208.

10. *S. Lundellii* Epl., sp. nov.

Frutex gracilis altitudine ad 2 m. utrimque glaber internodiis ad 10 cm. longis; foliorum lamina magna parte 10–15 cm. longis 3–5 cm. latis, modo ellipticis modo ovatis utrimque angustatis vel in basi cuneatis et supra medium acuminatis, marginibus serrulatis, paginis ambabus glabris, petiolis 1–2 cm. longis elatis; floribus 1–3 in verticillastris bracteis roseis acuminatis caducis circiter 1 cm. longis subtentis, in racemis 15–30 cm. longis dispositis; calycibus florentibus 11–14 mm. longis, labia superiore 3- (5-) venis, glabris, in maturitate paulo auctis; corollarum pulchre coccinearum tubo 20–27 mm. longo, intus nudo, labia superiore 8–15 mm. alta, inferiore ut videtur subaequilonga; staminibus ut videtur e galea circiter 1–2 mm. exsertis in faucibus circiter 4 mm. positis; styli glabri ramo postico longiore.

BRITISH HONDURAS: El Cayo District—Arenal, in clearing on bank of Mopan River, *Lundell 6165* (type, University of Michigan Herb.); Cohune Ridge—Chalillo Crossing trail, in high forest, *Lundell 6527*. Toledo District—Camp 32, British Honduras—Guatemala boundary survey, 2700 ft., *Schipp S-632*.

Apparently referable to the section *Iodophyllae*.

7. OCIMUM L.

Annual herbs with glabrate oval petiolate leaves; flowers 6 in the axils of persistent or tardily deciduous bracts, the verticils disposed in interrupted spikes; calyces strongly bilabiate, the upper tooth oval, concave, decurrent to the base of the calyx, the laterals acuminate, the lower pair similar to these but more spinose and larger; corolla tube included within the calyx, the lobes of the upper lip rounded and similar in size and shape to the laterals, the middle lobe of the lower lip oval, twice as long, lightly cupped; stamens 4, in two pairs, more or less declined along the lower lip; nutlets smooth.

1. *O. MICRANTHUM* Willd., Enum. Hort. Berol. 630. 1809.

An annual herb commonly 30 to 50 cm. tall, with glabrate oval petiolate leaves generally about 4 cm. long, the margins subentire; flowering calyx about 2.5 mm. long, borne on pedicels somewhat longer, becoming deflexed at maturity, the upper lip then 7 to 8 mm. long, decurrent its full length, its margins turned upward; corollas pink, 3 to 4 mm. long.—Widely distributed in the American tropics.

YUCATAN: Chichen Itza, *Steere 1123*. Progreso, *Lundell & Lundell 8034*. BRITISH HONDURAS: Corozal District—*Gentle 269*. El Cayo District—*Bartlett 12003*. GUATEMALA: Dept. Peten, La Libertad, *Lundell 2370*.

O. Basilicum L., used as a condiment, may be expected as an escape. It may be distinguished by the fact that the stamens are appendaged near the base, by the smaller upper lip of the calyx, which is 5 to 6 mm. long at maturity, and by the larger corollas which are 7 to 8 mm. long.

8. COLEUS Lour.

Herbaceous plants with ovate petiolate leaves; flowers in loose glomerules which are borne in the axils of deciduous bracts, forming terminal interrupted spikes which are sometimes paniced; calyces strongly bilabiate, the upper three teeth diverse, rounded or truncate, the middle largest, the lower pair longer, joined nearly to the tip, boat-shaped; corolla tube gradually enlarged upward, about equal to the limb, the upper lip short,

emarginate, the lower equaling the tube, boat-shaped; stamens 4, in two pairs, declined within the boat-shaped lower lip and lightly exerted from its tip; nutlets smooth.

1. *C. BLUMEI* Benth., Lab. Gen. et Sp. 56. 1832.

A herbaceous plant as much as a meter tall, usually with variegated, sometimes with lacinate leaves as much as 15 cm. long, highly variable; spikes rather slender, 15 to 30 cm. long, the flowers 6 to 12 at a node on slender pedicels often longer than the calyces; flowering calyces about 2 mm. long, becoming about 5 mm. long at maturity and veiny, the upper lip recurved, the lateral lobes oblong and truncate, the lower lip 4 mm. long, twice the length of the tube.—A plant, evidently of hybrid origin, which is frequently collected as an escape throughout the tropics. It appears to be established in some localities.

BRITISH HONDURAS: Belize District—Belize, *Lundell* 1916. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2167.

9. *ASTEROHYPTIS* Epl.

Shrubs or half-shrubs with ovate petiolate leaves and slender divaricate-ascending branches; flowers in dense globose cymules, subtended by inconspicuous linear bractlets and disposed in the axils of the upper diminished leaves or bracts, disposed along the branchlets in usually moniliform fashion and forming ample panicles, less often congested into slender paniced spikes; calyx tube campanulate in flower, 10-veined, the orifice hirsute or naked, the teeth subulate, recurved or spreading and star-shaped, subequal, the tube somewhat enlarged at maturity; corolla tube cylindrical, somewhat enlarged above, hirtellous within, the lobes subequal, rounded, the middle lobe of the lower lip somewhat cupped, but not saccate nor defined at its base by a transverse ridge as in *Hyptis*; stamens 4, in two pairs, somewhat declined above the lower lip; style jointed at the base between the nutlets; nutlets minutely punctate-wrinkled.

1. *A. MOCINIANA* (Benth.) Epl., Bull. Torr. Bot. Club **60**: 19. 1932.

For synonymy see the above reference.

A shrub 1 to 3 m. tall, its branchlets clothed with short spreading hairs; leaf-blades thin, narrowly ovate, 3 to 8 cm. long, 1.5 to 3.5 cm. broad, acute or lightly acuminate usually rounded or somewhat truncate at the base, borne on petioles 3 to 12 mm. long, the upper surface hirtellous, the lower thinly pubescent; verticils 8 to 12 mm. in diameter at maturity, sometimes moniliform, but more often crowded into dense but slender spikes; tube of flowering calyx 1.2 to 1.5 mm. long, the teeth 2.5 to 3.5 mm. long, narrowly marginate and pectinate-hirtellous along the margins, the tube 1.5 to 2 mm. long at maturity; corolla tube about 3 mm. long.—Ranges from Guerrero and Veracruz to Nicaragua and Costa Rica.

Not recorded from the peninsula, but found to the south at Gualan, Guatemala.

10. *MARSYPIANTHES* Mart.

Sprawling or prostrate perennial herbs sometimes from a thickened caudex, with usually elliptical or ovate short-petiolate leaves; flowers in axillary capitula subtended by lanceolate bracts; calyx turbinate-campanulate, the teeth 5, equal, deltoid-ovate, connivent after flowering, bent and spreading at maturity, the orifice naked; corolla that of *Hyptis*, the middle lobe of the lower lip deeply saccate; stamens 4, in two pairs, scarcely exerted from the throat; nutlets hemispheric, concave-cymbiform, their margins membranous, strongly incurved and more or less lacerate.

I. *M. CHAMAEDRYS* (Vahl) Kuntze, Rev. Gen. 2: 524. 1891.

For synonymy see Rep. Spec. Nov., Beiheft 95: 102. 1937.

A polymorphic species, apparently sometimes annual, with viscid stems and ovate or oblong leaves commonly 2 to 4 cm. long, usually narrowed at the base or cuneate, borne on petioles 0.5 to 1.5 cm. long; capitula hemispheric, sometimes almost sessile, sometimes on peduncles 1 to 3 cm. long; flowering calyces 4 to 5 mm. long, the teeth deltoid-ovate, acuminate, 1.5 to 4 mm. long, the tube broadly turbinate at maturity, 3 to 5 mm. long, rather thin; corolla tube 4 to 6 mm. long.—A plant of wide distribution in the American tropics.

BRITISH HONDURAS: Belize District—pine ridge north of abandoned aviation field, *Bartlett* 11223; Manatee Pine Ridge, *Gentle* 88. El Cayo District—Vaca, *Gentle* 2203; Mountain Pine Ridge, *Lundell* 6893. Stann Creek District—All Pines, *Schipp* 618. GUATEMALA: Dept. Peten, Chiche, *Lundell* 3699.

The nutlets are unique within the family.

II. *HYPTIS* Jacq.

Plants of varied habit, those of our region principally coarse herbs of weedy habit; flowers either in axillary cymules which are usually disposed in crowded panicles or spikes, or in compact globose or hemispheric pedunculate capitula, subtended by bracts which in the first case are linear and not very conspicuous and in the second case form a conspicuous involucre at the base of the capitula; calyces predominantly 10-veined, the flowering tube usually top-shaped, the lower part becoming enlarged at maturity and sometimes flexuose, glabrous within or sometimes pilose annulate above the nutlets, both inside and out, the teeth subequal, linear or acicular, less often deltoid; corolla tube cylindrical or funnellform, naked within, the upper lip emarginate, the middle lobe of the lower lip deeply saccate; stamens 4, in two pairs, declined along the lower lip; style bifid at the apex, glabrous; nutlets smooth or sometimes roughened.—The species of *Hyptis* found in Yucatan are, with the exception of *H. scandens*, tropical plants of wide dispersion, some of them weeds which have become widely established in the tropics of the Old World.

- Calyx teeth deltoid, about 1 mm. long, herbaceous, their margins thin 1. *H. verticillata*
 Calyx teeth linear or acicular, deltoid only at the base (but see 2. *H. scandens* if the teeth are 0.5 mm. long).
 Flowers subtended by linear bracts, borne in small cymules which are usually pedunculate, sometimes scorpioid and all disposed in panicles or spikes.
 Leaves ovate, rounded or slightly cordate at the base; flowers in panicles which are sometimes dense, often open and leafy.
 Corolla tube 4 to 6 mm. long; mature calyx tube 5 to 7 mm. long 6. *H. suaveolens*
 Corolla tube 1.5 to 4 mm. long, mature calyx tube 1.5 to 4 mm. long (see 2. *H. scandens*).
 Cymules sessile or nearly so, pectinate; calyx teeth equal, 1 to 1.5 mm. long, the tube 1.5 to 2.5 mm. long at maturity 4. *H. pectinata*
 Cymules on peduncles 1 to 3 cm. long, often scorpioid; calyx teeth somewhat unequal, the two lower teeth 1.5 to 2.5 mm. long at maturity, the tube then 2 to 4 mm. long 5. *H. urticoides*
 Leaves narrowly ovate or elliptical-ovate, cuneately narrowed at the base; flowers in dense cylindrical spikes 14 to 18 mm. in diameter at maturity 3. *H. spicigera*
 Flowers subtended by ovate or ovate-lanceolate bracts which form an involucre at the base of the pedunculate hemispheric or globose capitula in which they are disposed.
 Capitula borne on peduncles 2 to 5 mm. long, disposed in paniculate spikes or racemes, the bracts not spreading but enclosing the calyces 7. *H. mutabilis*
 Capitula borne on peduncles 0.5 to 7 cm. long, rarely shorter, disposed in the axils of the upper leaves, the bracts usually spreading at the base of the capitulum, or reflexed at maturity.

- Nutlets roughened; style jointed, the basal portion about equal to the nutlets; calyx tube glabrous within; prostrate trailing herbs . . . 8. *H. atrorubens*
- Nutlets smooth; style not apparently jointed, seated directly upon the pyramidal gynobase between the nutlets; calyx tube glabrous within or pilose-annulate; erect herbs except *H. lantanaefolia* which may be decumbent but hardly trailing and prostrate.
- Calyx tube pilose-annulate within and without above the nutlets, this pilose ring being about midway of the mature tube.
- Leaves usually 2.5 to 3.5 cm. long, rarely as much as 6 cm.; herbs with decumbent sprawling stems, sometimes rooting at the nodes 11. *H. lantanaefolia*
- Leaves usually 5 to 12 cm. long; erect coarse herbs.
- Stem glabrous save in the upper parts where it is thinly hirtellous; calyx teeth about 1.5 mm. long; bracts glabrate 12. *H. capitata*
- Stems softly appressed-hirsute, canescent; calyx teeth 2.5 to 4 mm. long; bracts canescent or at any rate pubescent with fine curled hairs 13. *H. conferta*
- Calyx tube hirtellous within, but not at all pilose-annulate.
- Upper leaf surfaces glabrous, the lower hirtellous along the veins 9. *H. lanceolata*
- Both leaf surfaces sprinkled with rather crinkly hairs 10. *H. brevipes*

1. *H. VERTICILLATA* Jacq., Ic. Rar. II. t. 113; Coll. 1: 101. 1786.

H. parviflora M. & G., Bull. Acad. Brux. 11²: 186. 1844.
Mesosphaerum verticillatum Kuntze, Rev. Gen. 2: 525. 1891.
H. axillaris Fern., Proc. Am. Acad. 35: 565. 1900.
H. Pringlei Fern., loc. cit.

A perennial herb usually 1 to 2 m. tall, its stems hirtellous in the upper parts with upwardly directed or appressed hairs; leaf-blades elliptical or lanceolate, the upper mostly 2 to 8 cm. long, acute, narrowed or subcuneate at the base, irregularly serrate, hirtellous, borne on petioles mostly 5 to 8 mm. long; flowers subsessile in axillary clusters of usually 6 to 12, borne in the axils of the upper diminished leaves or bracts, thus forming a leafy panicle, subtended by inconspicuous setaceous bracts, the glomerules at length globose, 0.5 to 1.5 cm. distant; tubes of the flowering calyces about 1 mm. long, glabrous within and without, subcostate, the teeth somewhat shorter, the mature tubes about 2 mm. long, distended by the nutlets, the teeth then about 1 mm. long, connivent, deltoid, herbaceous, their margins thin; corollas white or violet, about 3 mm. long; nutlets oblong, rounded truncate at the apex, minutely reticulate.—Widely distributed throughout the American tropics. The following specimens are illustrative:

BRITISH HONDURAS: Corozal District—*Gentle* 509. Belize District—Belize River, *Lundell* 4147; Belize, *Lundell* 1814; Belize—Sibun River road, *Gentle* 67. El Cayo District—El Cayo, *Bartlett* 12911, 12917; San Antonio, *Bartlett* 13041. GUATEMALA: Dept. Peten, El Paso, *Lundell* 1454. La Libertad, *Lundell* 2173, 3525.

2. *H. scandens* Epl., sp. nov.

Frutex scandens ramis molliter villosis; foliorum laminis ovatis 2–3.5 cm. longis, in apice abrupte acuminatis, in basi rotundatis, petiolis 3–10 mm. longis elatis, marginibus irregulariter serrulatis, pagina superiore glabra, inferiore molliter pubescente; floribus 6–12 in verticillastris bracteis parvis ovatis subtentis, in spicis cylindratis brevibus 2–3 cm. longis approximatis; calycibus maturis cylindratis circiter 4 mm. longis, ore obliquo, faucibus nudis, dentibus parvis debilibus deltoideo-acuminatis 0.5 mm. longis; corollis non visis; nuculis omnino per dorsum gibbis duobus ornatis; gynobase pyramidali-truncato.

GUATEMALA: Dept. Peten, El Paso, a woody vine in *acahual*, *Lundell* 4421 (type, University of Michigan Herb.).

Apparently referable to the section *Minthidium*.

3. *H. SPICIGERA* Lam., *Encycl.* **3**: 185. 1789.

Nepeta americana Aubl., *Hist. Pl. Guiane Fr.* **2**: 623. 1775.

Hyptis lophantha Mart. ex Benth., *Lab. Gen. et Sp.* **78**. 1833.

H. Pohliana Jacq. ex Benth., *op. cit.* **141**. 1833.

H. subverticillata Anderss., *Vet. Acad. Hand. Stockh.* **1853**: 197. 1855.

H. gonocephala Wright ex Griseb., *Cat. Pl. Cub.* **212**. 1866.

Mesosphaerum spicigerum, *lophanthus*, *subverticillatum*, and *gonocephalum* Kuntze, *Rev. Gen.* **2**: 526, 527. 1891.

H. americana Urb., *Rep. Spec. Nov.* **25**: 322. 1918. (non Briq. in Engler & Prantl, *Nat. Pflanzenf. ed. i.* **4**^{3a}: 338. 1897.)

A weedy herb apparently annual, as much as 3 m. tall but usually less, sometimes markedly depauperate, hirtellous in the upper parts, scabrous along the angles; leaf-blades narrowly ovate or elliptical-ovate, 3 to 8 cm. long, acute at the apex, cuneately narrowed at the base to petioles 1 to 3 cm. long, irregularly serrate, both surfaces essentially glabrous but hirtellous on the veins; flowers in slender dense spikes usually 4 to 8 cm. long, subtended by linear pectinate-ciliate bracts 3.5 to 4 mm. long, forming a dense spike 14 to 18 mm. in diameter at maturity; tubes of flowering calyces hispidulous, 1.5 mm. long, the teeth linear, acute, erect, nearly 2 mm. long, the tube 5 mm. long at maturity, tumid, the orifice squared, erect-hirsute; corollas usually violet, the tube 4 mm. long; nutlets smooth.—Widely distributed throughout the tropics but apparently not abundant.

GUATEMALA: Dept. Peten, La Libertad and vicinity, *Aguilar* 227.

4. *H. PECTINATA* Poit., *Ann. Mus. Par.* **7**: 474. *t.* 30. 1806.

Nepeta pectinata L., *Sp. Pl.* 799. 1753.

Mesosphaerum pectinatum Kuntze, *Rev. Gen.* **2**: 525. 1891.

A weedy perennial herb as much as 3 m. tall, its branches rather scabrous, finely pubescent with downwardly curled hairs; leaves variable in form and size, commonly 4 to 6 cm. long, ovate, either acute or acuminate, rounded at the base or even subcordate, the upper surface usually thinly hirtellous, the lower densely so and usually incanous, their margins irregularly crenate-serrate, petioles 1 to 3 cm. long; cymules lax, especially in age, subsessile, pectinate, commonly forked, subtended by inconspicuous linear-setaceous bracts; tubes of the flowering calyces scarcely 1 mm. long, the teeth 1 to 1.5 mm. long, erect and setaceous, the orifice hispid, the tube 1.5 to 2.5 mm. long at maturity, the orifice then slightly constricted, the hairy annulus conspicuous; corolla tubes 1.5 mm. long; nutlets black, smooth.—Widely distributed throughout the tropics. The following are illustrative:

BRITISH HONDURAS: El Cayo District—El Cayo, *Bartlett* 11480. Stann Creek District—Stann Creek, *Schipp* 946. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2489; *Aguilar* 393.

5. *H. URTICOIDES* Kunth in Humboldt and Bonpland, *Nov. Gen. et Sp. Pl.* **2**: 320. 1817.

H. lilacina Cham. & Deppe, *Linnaea* **5**: 101. 1830.

Mesosphaerum lilacinum and *urticoides* Kuntze, *Rev. Gen.* **2**: 526, 527. 1891.

H. lilacina var. *epimallota* Briq., *Ann. Conserv. et Jard. Bot. Genève* **2**: 204. 1898.

A perennial herb as much as 2 m. tall, its stems downwardly pubescent in the upper parts and usually with a few longer spreading pili; leaf-blades commonly 3 to 8 cm. long, usually ovate, tending to obtuse at the apex, rounded at the base, irregularly serrate, green but hirtellous on both surfaces, borne on petioles 0.5 to 2 cm. long or more; cymes sufficiently lax, few-flowered, often subscorpioid, borne on slender peduncles 1 to 3 cm. long, sometimes

two or more in the same axil, these disposed in loose leafy panicles; flowering calyces 2.5 to 3 mm. long, villous, the teeth subulate, equaling the tube, the three posterior 1 to 1.5 mm. long at maturity, somewhat recurved, the two anterior narrower and longer, 1.5 to 2.5 mm. long, the calyces therefore suggesting those of *Hedeoma*; corolla tube 3.5 to 4 mm. long; nutlets smooth.—Widely distributed from central Mexico through Guatemala, El Salvador and Costa Rica.

BRITISH HONDURAS: El Cayo District—near Vaca, *Gentle* 2338.

6. *H. SUAVEOLENS* Poit., Ann. Mus. Par. **7**: 472. *t.* 29. *fig.* 2. 1806.

Ballota suaveolens L., Syst. ed. 10. 1100. 1759.

Mesosphaerum suaveolens Kuntze, Rev. Gen. **2**: 525. 1891.

H. Plumieri Poit., Ann. Mus. Par. **7**: 473. 1806.

H. congesta Leonard, Journ. Wash. Acad. Sci. **17**: 70. 1927.

A weedy annual herb as much as 3 m. tall, its stems glandular-villous in the upper parts and hirsute-pilose with spreading hairs; leaf-blades 3 to 10 cm. long, ovate, generally acute, rounded or lightly cordate at the base, their margins convex, irregularly serrate, frequently doubly serrate or sinuate and ragged, the lower surfaces pubescent, the upper thinly hirsute with rather long hairs, the petioles rarely as long as the blades; flowers usually 3 to 5 in cymules which are borne on peduncles about equal to the mature calyces in the axils of the uppermost leaves, thus forming a leafy panicle, or sometimes congested into a leafy spike; flowering calyces 4 to 5 mm. long, villous or hirsute at the base, the teeth subulate, equal to the tube, the orifice somewhat oblique, hispid, the tube 5 to 7 mm. long at maturity, declined on the pedicel, lightly bilabiate, suggesting the mature calyces of *Lepechinia*, the teeth then rigid, acute, somewhat spreading; corolla usually blue, its tube 4 to 6 mm. long; nutlets 2.5 to 4 mm. long, compressed, truncate or emarginate at the apex.—Widely distributed in the tropics of both hemispheres, doubtless having been introduced into the Old World. The following are illustrative:

CAMPECHE: Tuxpeña, *Lundell* 961. QUINTANA ROO: Lake Chichankanab, *Gaumer* 2076.

BRITISH HONDURAS: Corozal District—San Antonio, *Lundell* 4988; Calcutta, *Lundell* 4999.

GUATEMALA: Dept. Peten, La Libertad, *Aguilar* 85.

7. *H. MUTABILIS* Briq., Bull. Herb. Boiss. **4**: 788. 1896.

Nepeta mutabilis Rich., Actes de la Soc. Hist. Nat. de Paris **1**: 110. 1792.

For further synonymy see Rep. Spec. Nov. **34**: 103–106. 1936.

A coarse herb apparently annual, as much as 2 m. tall, its branches glabrous or villous, the angles usually scabrous; leaf-blades mostly 3 to 6 cm. long, generally rhomboid-ovate or ovate, usually shortly acuminate at the apex and rounded or subcuneate at the base, the upper surface hirtellous or glabrate, the lower usually hirtellous along the veins, less often softly pubescent throughout, petioles 1 to 4 cm. long; flowers few or many in small subglobose glomerules which are subtended by and more or less ensheathed by small ovate or elliptical erect bracts, borne on peduncles 1 to 4 mm. long, the glomerules disposed in ample panicles; flowering calyces 1.5 to 2 mm. long, somewhat hairy toward the base, tubular, the teeth 0.8 to 1.2 mm. long, equal, usually subulate, erect, rarely longer than the diameter of the tube, the tube 4 to 6 mm. long at maturity; corolla usually blue, its tube 3 to 4 mm. long; nutlets black, smooth.

A weed of wide distribution in the American tropics which is to be expected in the peninsula. The form usually found in the Caribbean region was described as *H. spicata* by Poiteau.

8. *H. ATRO RUBENS* Poit., Ann. Mus. Par. 7: 466. fig. 3. 1806.

H. procumbens Cham. & Schlecht., Linnaea 5: 101. 1830.

Mesosphaerum atrorubens Kuntze, Rev. Gen. 2: 525. 1891.

A prostrate creeping or subsucculent herb rooting at the nodes and with slender stems as much as 3 m. long, more or less hirsute along the angles; leaf-blades 1.5 to 3 cm. long ovate, obtuse, rounded at the base and cuneately narrowed to petioles 0.5 to 1.5 cm. long, their margins rather convex, crenate-serrate, both surfaces sparingly hirsute with rather coarse hairs; flowers in hemispheric capitula 8 to 10 mm. in diameter, borne on slender peduncles 0.5 to 1 cm. long in the axils of the upper leaves, subtended by ovate, ciliate or hirsute bracts 4 to 6 mm. long; flowering calyces 4 mm. long, the orifice squared, the teeth equal, setaceous, acute, somewhat shorter than the diameter of the tube, the tube 4 to 4.5 mm. long at maturity, somewhat dilated and thin, slightly constricted at the orifice; corolla white or rose, its tube 4 to 5 mm. long; nutlets ovate-rotund, alveolate.—Widely distributed throughout the tropics, one form appearing in Africa.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Bartlett 11619*.

9. *H. LANCEOLATA* Poir., Encycl. Suppl. 3: 114. 1813.

For synonymy see Rep. Spec. Nov. 34: 113-114. 1936.

A weedy herb, possibly perennial, 0.5 to 1.5 m. tall, its stems nearly glabrous, shortly appressed-hirtellous; leaf-blades usually lanceolate or ovate-lanceolate, even subrhomboid or sublinear, usually 6 to 12 cm. long, 1.5 to 3 cm. broad, usually acute at the apex, usually cuneately-attenuate at the base to obscure petioles, their margins irregularly serrate, both surfaces frequently glabrous, usually hirtellous beneath along the veins; flowers disposed in globose echinate capitula 10 to 16 mm. in diameter at maturity, subtended by lanceolate spreading or reflexed bracts 4 to 10 mm. long, the peduncles appressed-hirtellous 0.5 to 3.5 cm. long; flowering calyces 3 mm. long, tubular at maturity, the tube then 3.5 to 4 mm. long, nearly glabrous, the teeth subulate, erect, 2.5 mm. long; corolla white, its tube 2.5 to 3 mm. long; nutlets smooth.—A South American species which is widely distributed throughout Africa, but seldom found in the Caribbean region.

BRITISH HONDURAS: Belize District—Maskall Pine Ridge, *Gentle 1049*; Cornhouse Creek, in pine ridge, *Bartlett 11318*. Stann Creek District—All Pines, *Schipp 696*.

The specimens which are cited here seem to fall within the limits of this variable species. The calyx teeth, however, are longer and more acute than is generally true of that complex and the leaves are unusually narrow.

10. *H. BREVIPES* Poit., Ann. Mus. Par. 7: 465. 1806

H. acuta Benth., Linnaea 6: 82. 1831.

H. melanosticta Griseb., Fl. Br. W. Ind. 488. 1861.

Mesosphaerum brevipes and *melanostictum* Kuntze, Rev. Gen. 2: 526. 1891.

H. brevipes var. *serrata* and *vulgaris* Briq., Ann. Conserv. et Jard. Bot. Genève 2: 226. 1898.

An annual slender herb 30 to 60 cm. tall or more, appressed-hirtellous in the upper parts; leaf-blades usually elliptic-lanceolate or rhomboid-ovate, commonly 4 to 6 cm. long, 1 to 2 cm. rarely 3 cm. broad, acute at the apex, cuneate-attenuate at the base to obscure petioles, their margins irregularly serrate, both surfaces sparingly hirsute with rather coarse hairs; flowers disposed in globose echinate capitula 10 to 12 mm., rarely 15 mm. in diameter at

maturity, subtended by lanceolate spreading or reflexed bracts 4 to 6 mm. long, nearly hidden at maturity, the peduncles appressed-hirtellous, 3 to 15 mm. long; flowering calyces 2.5 to 3 mm. long, tubular at maturity, the tube then 2 to 3.5 mm. long, slightly constricted at the orifice, the teeth setaceous, very slender, erect, 1.5 to 2.5 mm. long; corolla white, its tube 2.5 to 3 mm. long; nutlets smooth.—A widespread weed in the American and Malayan tropics, apparently a native of Brazil; common in the Caribbean region.

Collected at Puerto Barrios, Guatemala, but not recorded for the peninsula.

11. *H. LANTANAEFOLIA* Poit., Ann. Mus. Par. **7**: 468. *t.* 29. *fig.* 1. 1806.

Mesosphaerum lantanaefolium Kuntze, Rev. Gen. **2**: 525. 1891.

H. lantanaefolia var. *costaricensis* Briq., Ann. Conserv. et Jard. Bot. Genève **2**: 222. 1898.

H. madrensis Fern., Proc. Am. Acad. **35**: 565. 1900.

A perennial herb decumbent and sprawling, sometimes rooting at the nodes; leaf-blades 1.5 to 3 cm., less often as much as 6 cm. long, 0.8 to 2.5 cm. wide, ovate or elliptical, rounded and narrowed at the base, or cuneate, nearly sessile, their margins crenate-serrate, the upper surface hirtellous or hirsute, the lower hirsute especially along the veins, even silky, sometimes incanous, both rarely glabrate; mature capitula 12 to 20 mm. in diameter, subtended by ovate or obovate subfoliar bracts 5 to 8 mm. long sometimes serrate, borne on appressed-hirsute peduncles 2 to 7 cm. long; tubes of the flowering calyces 1.5 to 2.5 mm. long, pilose near the base, the teeth subulate, acute, puberulent or glabrous, 1.5 to 3.5 mm. long, the tube 4 to 5 mm. long at maturity, hairy-annulate within near the middle; corolla white or rose, its tube 4 to 4.5 mm. long; nutlets smooth.—Widely distributed in the American tropics.

BRITISH HONDURAS: Belize District—Butcher Burn, Sibun River, in pine ridge, *Bartlett 11410*. El Cayo District—Mountain Pine Ridge, *Bartlett 11587*. Stann Creek District—All Pines, *Schipp 688*.

12. *H. CAPITATA* Jacq., Coll. **1**: 102. 1786.

Clinopodium capitatum Sw., Prodr. Fl. Ind. Occ. 88. 1788.

Hyptis macrochila Mart. ex Steud., Nom. ed. 2. 794. 1840.

Mesosphaerum capitatum Kuntze, Rev. Gen. **2**: 525. 1891.

A perennial herb commonly 1 to 2 m. tall, its stems glabrous save in the upper parts where it is hirtellous on all sides with short subappressed hairs; leaf-blades membranous, 4 to 12 cm. long, 2.5 to 6 cm. broad, ovate, somewhat acute or obtuse at the apex, more or less rounded at the base and acuminate to petioles 1 to 3 cm. long, their margins rather convex, irregularly serrate, both surfaces sparingly appressed-hirsute; mature capitula globose, 2 to 2.5 cm. in diameter, subtended by ovate-lanceolate bracts 5 to 7 mm. long, completely hidden at maturity, borne on appressed-hirtellous peduncles 2.5 to 6 cm. long, usually 3 to 4 cm.; tubes of the flowering calyces about 1.5 mm. long, the teeth linear-subulate, the tube 8 to 10 mm. long at maturity, sparingly hairy without, hairy-annulate within near the middle, the teeth about 1.5 mm. long; corolla white, its tube 2.5 to 3 mm. long; nutlets smooth.—Widely distributed in the Caribbean and in the Old World tropics.

BRITISH HONDURAS: Belize District—near Belize River, *Lundell 1960*. El Cayo District—Little Coquericot, *Lundell 4287*. GUATEMALA: Dept. Peten, El Paso, *Lundell 1453*. Santa Teresa, Subin River, *Lundell 2764*.

13. *H. CONFERTA* Pohl ex Benth., Lab. Gen. et Sp. 112. 1833.*H. ferruginea* Benth., Lab. Gen. et Sp. 113. 1833.*H. excelsa* M. & G., Bull. Acad. Brux. 11²: 188. 1844.*H. conferta* var. *angustifolia* Benth., DC. Prodr. 12: 112. 1848.*H. Lundii* Benth., op. cit. 111. 1848.*H. radula* Mart. ex Schmidt in Mart., Fl. Bras. 8: 121. 1858.*Mesosphaerum ferrugineum, excelsum, and Lundii* Kuntze, Rev. Gen. 2: 526. 1891.*H. constricta* Briq., Ann. Conserv. et Jard. Bot. Genève 2: 217. 1898.*H. Jurgenseni* Briq., op. cit. 219. 1898.*Mesosphaerum constrictum* Briq., op. cit. 217. 1898.*M. Jurgenseni* Briq., op. cit. 219. 1898.

Perennial herbs usually less than a meter tall, their stems softly appressed-hirsute, canescent; leaf-blades prevailingly elliptical, narrowed from the middle and acute at both ends, 6 to 9 cm. long, the petioles obscure, their margins serrate, the upper surfaces usually softly hirtellous, or glabrate, the lower hairy with longer hairs especially along the veins, which are rather prominent; mature capitula hemispheric or subglobose, 18 to 25 mm. in diameter, subtended by cinereous ovate-lanceolate bracts 7 to 8 mm. long which become recurved above the middle at maturity and not strictly reflexed, borne on stout hairy peduncles 1 to 5 cm. long; tube of flowering calyces 2 to 2.5 mm. long, the teeth subulate, the tube 5 to 6 mm. long at maturity, hairy annulate within near the middle, the mature teeth 2.5 to 3.5, rarely 4 mm. long, hirtellous; corolla white, its tube 4 to 5.5 mm. long; nutlets smooth.

BRITISH HONDURAS: El Cayo District—Little Cocquericot, *Lundell* 4286; Rio Privacion, Mountain Pine Ridge, *Bartlett* 11789. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2279, 2568; *Aguilar* 88, 404.

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XIX

The Sedges of the Yucatan Peninsula

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With three text figures
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THE SEDGES OF THE YUCATAN PENINSULA

The Yucatan Peninsula is here meant to include the states of Yucatan, Campeche, the territory of Quintana Roo, the colony of British Honduras, and the Department of Peten, Guatemala. The collections of Aguilar, Bartlett, Gaumer, Gentle, Lundell, Millspaugh, Peck, Schipp, Schott, Steere, Swallen, and a few others together with the material collected by the author (3000 sheets of Cyperaceae) in British Honduras in the summer of 1936 form the basis for this study.

Charles F. Millspaugh and Agnes Chase wrote the first paper on the sedges of Yucatan (*Plantae Yucatanae*, Field Mus. Bot. **3**: 67-84. 1903), describing 25 species in 9 genera. Continued collecting since then in an extended area has resulted in enlarging the number of species to 95 (and 3 varieties) and the genera to 17, exclusive of about 15 to 20 species of *Rhynchospora*, not treated here because of the lack of any recent monograph on the genus at this date. It is hoped that two or three authors now at work on *Rhynchospora* will soon publish their findings.

Continued collecting in this region seems certain to increase still further the number of species and genera because much of the country is difficult of access.

The relationship of the flora of the states of Yucatan, Campeche, and the territory of Quintana Roo to that of the surrounding regions has been discussed by Jason R. Swallen (*Carnegie Inst. Wash. Publ. No. 436*: 325. 1934) from the viewpoint of the grass family.

A comparison from the viewpoint of the Cyperaceae points to somewhat different conclusions. The following table compiled from the known distribution of the species under consideration lists in the column to the extreme right the total number of species in the Yucatan Peninsula. In the first column the number of species which occur in the West Indies as well as in Yucatan are listed; in the second column, the numbers that occur in Texas and in Yucatan as well. The other columns express the same with regard to the area indicated.

TABLE I

Genera	West Indies	Texas	Florida Alabama Georgia	Mexico	South America	Pantropics	Total
<i>Bulbostylis</i>	2	1	1	2	4	...	5
<i>Calyptrocarya</i>.....	...	...	...	...	1	...	1
<i>Carex</i>.....	...	...	...	...	...	...	1
<i>Cladium</i>	1	1	1	1	1	...	1
<i>Cyperus</i>	28	18	18	35	31	11	38+
<i>Dichromena</i>	3	1	1	2	2	...	4
<i>Fimbristylis</i>	8	3	4	2	8	7	8
<i>Fuirena</i>	1	1	...	1	1	1	3
<i>Heleocharis</i>	12	5	5	9	12	2	14
<i>Hemicarpha</i>	1	1	1	1	1	...	1
<i>Hypolytrum</i>.....	...	...	...	...	1	...	1
<i>Lagenocarpus</i>	1	...	...	...	1	...	1
<i>Lipocarpha</i>	1	...	1	1	1	1	1
<i>Remirea</i>	1	...	1	?	1	1	1
<i>Scirpus</i>	2	2	2	2	1	...	3
<i>Scleria</i>	15	3	6	7	12	2	15
TOTAL.....	76	36	41	63	78	25	98

Table 1 indicates that the greatest similarity, as shown by the greatest number of species, exists between the flora of the Yucatan Peninsula and that of the West Indies (especially Cuba). The sedge flora of South America is the next most closely related flora to that of Yucatan while the sedge flora of Mexico proper would rank only third in such a comparison. Another inference is that the flora of tropical Florida is closer to that of Yucatan than is that of Texas. The general appearance of the "pine ridges" in British Honduras is strikingly similar to the "tropical pinelands" of the eastern coast of Florida south of Miami. *Pinus caribaea* is the dominant tree in both. *Rhynchospora* species constitute the bulk of the prairie-like growth in these open pinelands where the abundant sunlight and the sandy soil of low fertility and high acidity (pH 4.0-6.0) favor the dominating growth of Cyperaceae. Since the flora of Florida is an extension of the West Indian flora, there is here additional evidence of the closer relationship existing between the West Indian flora and that of Yucatan than between the Mexican flora and that of Yucatan.

Analysis of the table from the viewpoint of genus contrasted with genus shows that *Fimbristylis* is unique in the large number of pantropical species, i.e., 7 out of 8. It is a genus of the tropical strand. Although it has gone farther inland and has many more species in the Old World, in the American tropics it has remained near the coast. The continuity of the tropical coasts is closer than that of any belts of vegetation farther inland. This may help to explain the very high percentage of pantropical species of *Fimbristylis* in Yucatan.

The genus *Scleria* is unique in that all the 15 species found in Yucatan are also found in the West Indies. This genus is a genus not of the strand but of pinelands and forests farther inland, and is a much more useful basis for comparison. It points overwhelmingly to the West Indian flora as the closest relative of the Yucatan flora.

Heleocharis also points to a closer relationship to the West Indian (and South American) flora than to the Mexican flora.

With the smaller genera omitted, there is left for comparison the genus *Cyperus*, which points to a closer relationship of the Yucatan flora with the Mexican flora than with the flora of the West Indies.

Through the kindness of Dr. H. K. Svenson, the synonymy and descriptions of *Heleocharis* have been taken verbatim from his recently completed monograph. Similarly Dr. Earle C. Core has given permission to make use of the synonymy of *Scleria* as published in his monograph. To Dr. George Kükenthal's monograph on *Cyperus* (Pflanzenreich 4²⁰, 1936) the author is indebted for much of the synonymy of this genus. To Reverend John A. Kuhn, the author is indebted for the plates of *Carex Bartlettii* and *Fuirena*; to Sister Teresita Kittell, O.S.F., for the plate of *Cyperus Lundellii*.

Through the courtesy of the directors, specimens from the University of Michigan, United States National Herbarium, the New York Botanical Garden, Field Museum and the Gray Herbarium have been examined. In this respect the author is particularly indebted to Dr. C. L. Lundell for sending such a large number of excellent specimens.

The word *glume* has been used instead of *scale* because this latter term leads to some confusion, used as it is to mean: (1) scales of the perianth, (2) scales of the rhizome, (3) scales of the culm (shortened sheaths), (4) scales of the lepidote covering of the leaves, (5) a bractlet subtending a floret, (6) a bractlet subtending a spikelet, and (7) a wing (or decurrent base of the glume) on the rhachilla of the spikelet (Nees).

Glume means only one thing, the bractlet subtending either a floret or the place where a floret has failed to develop.

1. Achene enclosed in a perigynium, trigonous. Perianth wanting; flowers never hermaphrodite; culms leafy, 90 to 110 cm. tall *Carex Bartlettii*
 Achene not enclosed but merely subtended by a glume (2).
2. Hermaphrodite flowers wanting. Pistillate spikelets 1-flowered (or many-flowered in *Cyperus canus*); perianth bristles wanting; plants dioecious (3).
 Hermaphrodite flowers present (7).
3. Spikelets all alike, 3-flowered, the terminal floret bractless and pistillate, each of the lateral, opposite pair represented by a solitary stamen, the trio appearing as a single, hermaphrodite floret. Leaves 3 cm. wide, the margins very scabrous; culms 80 to 120 cm. tall; stigmas 2; achene lenticular, light gray, ovoid, 2 mm. long *Hypolytrum nicaraguense*
 Spikelets of 2 kinds (4).
4. Stigmas 2; achene brown, surfaced by a puberulent membrane, 1 mm. long; leaves 4 to 6 mm. wide *Calyptrocarya glomerulata*
 Stigmas 3; achene not covered by a membrane, 0.4 to 4.0 mm. long; leaves 1 to 35 mm. wide (5).
5. Achene 0.4 to 0.6 mm. long; inflorescence umbel-like, the conspicuous 10 to 18 bracts equal, 20 to 30 cm. long, 5 to 12 mm. wide, clustered at apex of stem; spikelets 10- to 40-flowered, the glumes strictly distichous; flowering culms leafless *Cyperus canus*
 Achene 1 to 4 mm. long; inflorescence paniculate, the bracts scattered; pistillate spikelets 1-flowered; glumes spirally imbricate; flowering culms leafy (6).
6. Achene 3.5 to 4 mm. long, brown, lanceolate-ovoid, the beak confluent and completely fused with the body; the upper 6 to 10 panicles strictly pistillate, the lower strictly staminate. Culms 100 to 200 cm. tall, glabrous
 Achene 1 to 3 mm. long, white, purple, black or pale brown, the beak short, abrupt, never confluent; the panicles containing both staminate and pistillate spikelets (or the terminal panicle all staminate in *Scleria bracteata*) *Scleria*
Lagenocarpus guianensis
7. The lowest 3 or more glumes of the spikelet empty or with merely a staminate floret, never bearing achenes; spikelets bearing 1 to few achenes (8).
 The lowest 1 or 2 glumes empty or fertile, the third glume always fertile; spikelets bearing 1 to many achenes (11).
8. Stigmas 3; achenes trigonous or terete; only the uppermost glume fertile (9).
 Stigmas 2; achenes lenticular; the uppermost glumes sterile (10).
9. Culm 100 to 300 cm. tall, rooting under fresh or brackish water; leaves deeply scabrellate on the margin; stamens 2; glumes 6 to 8 to a spikelet *Cladium jamaicense*
 Culm 3 to 30 cm. tall, rooting in coastal sand; leaves smooth on the margin; stamens 3; glumes 4 to a spikelet *Remirea maritima*
10. Spikelets compressed, often white, forming a solitary, terminal head; perianth-bristles wanting; bracts often white at the base; stamens 3 *Dichromena*
 Spikelets terete, paniculate or capitate; perianth bristles wanting or present; bracts green at the base; stamens commonly 3 to 6 *Rhynchospora*
11. Glumes of the glabrous spikelets 2-ranked. Perianth-bristles and scales wanting; style-base not persistent as a tubercle (12).
 Glumes of the spikelets spirally imbricate (13).
12. Spikelets 5 mm. wide, solitary and terminal or occasionally 1 to 3 additional lateral spikelets; glumes 5 to 7 mm. long, 1-ribbed, essentially nerveless; style swollen at the base, conspicuously fimbriate, trifid *Fimbristylis monostachya*
 Spikelets 0.5 to 4 mm. wide, several to very numerous; glumes 1 to 5 mm. long; style neither swollen at the base, nor fimbriate *Cyperus*
13. Base of the style persistent as a tubercle on the achene. Perianth represented by bristles or wanting (14).
 Base of style deciduous (15).
14. Leaf-blades well-developed, their sheaths pubescent at least at the apex; perianth-bristles wanting; stigmas 3; achene trigonous, smooth; spikelets several to numerous (solitary in *B. spadicea* or depauperate specimens) *Bulbostylis*
 Leaves reduced to glabrous sheaths; perianth bristles present in most species; stigmas 2 or 3; achene trigonous or lenticular, smooth or reticulate or trabeculate; spikelet solitary *Heleocharis*

15. Style and its branches flat, often fimbriate, its base swollen. Perianth none; achene obovoid; stigmas 2 or 3 *Fimbristylis*
 Style and its branches subterete, not fimbriate, its base not swollen (16).
16. Perianth wanting or of 1 minute scale (easily overlooked). Achene lenticular; spikelets in heads; stigmas 2 (17).
 Perianth present, of bristles or scales or both (18).
17. Culms less than 12 cm. tall, filiform; spikelets 3 mm. long, 2 to 4 in a head, loose; head solitary; perianth a minute, hyaline scale 0.1 mm. long; stamens 1; achene 0.5 mm. long, purplish brown; leaves filiform, not septate *Hemicarpha micrantha*
 Culms 30 to 90 cm. tall, stout; spikelets 4 to 8 mm. long, about 20 to 30 in a dense head; heads about 5 to 20; perianth wanting; stamens 3; achenes 2 mm. long, pale yellow; leaves and sheaths conspicuously septate-nodulose *Scirpus cubensis*
18. Perianth of 4 to 6 retrorsely barbellate bristles; leaves and sheaths conspicuously septate-nodulose; spikelets 5 to 12 in a solitary head, appearing lateral at the base of the solitary, erect bract; achene 2 mm. long; plant entirely glabrous *Scirpus*
 Perianth of scales or of 3 scales and 3 bristles; leaves not septate (the sheaths rarely so in *Fuirena*); spikelets paniculate or capitate; bracts 2 to numerous; achene 1.0 to 1.5 mm. long (19).
19. Perianth scales 2; perianth bristles wanting; stamen 1; inflorescence a solitary, terminal head; a glabrous annual 5 to 30 cm. tall *Lipocarpha maculata*
 Perianth scales 3; perianth bristles wanting or 3 in *F. simplex*; stamens 3; inflorescence paniculate; perennials 10 to 150 cm. tall, pubescent on the inflorescence and often on leaves and sheaths *Fuirena*

1. BULBOSTYLIS Kunth

Annuals or perennials. Culms leafy only at the base, wiry. Leaves filiform or narrowly linear, the sheaths generally pilose at the summit. Spikelets solitary or few in umbel-like or capitate clusters. Glumes spirally imbricate or subdistichous, readily deciduous. Flowers hermaphrodite, lacking perianth. Stamens 2 or 3, the connective not prolonged. Style 3-cleft, glabrous, the base swollen and persistent on the apex of the trigonous achene as a tubercle.

1. Spikelet solitary, terminal; culm simple; perennial with a thick (1 to 4 cm. in diameter) caudex *B. spadicca*
 Spikelets several to numerous on the branched culm; annuals (2).
2. Spikelets sessile in umbel-like fascicles; culms and leaves glabrous; leaf-sheaths very dark at the base *B. junciformis*
 Spikelets pedicelled, solitary on the rays of the umbel; culms and leaves often pubescent; leaf-sheaths sometimes darkened (3).
3. Culms, leaves, bracts and keels of the glumes densely pubescent; the keel prolonged as a long mucro *B. vestita*
 Culms, leaves and bracts pubescent or glabrate; keels of the glumes scarcely pubescent, not forming awns (4).
4. Body of achene 0.5 to 0.8 mm. long; culms 5 to 20 (rarely 30) cm. tall *B. capillaris*
 Body of achene 1.0 mm. long; culms 10 to 40 cm. tall *B. tenuifolia*

1. BULBOSTYLIS CAPILLARIS (L.) Clarke in Hook. Fl. Brit. Ind. 6: 652. 1893.

Scirpus capillaris L. Sp. Pl. 49. 1753.

Isolepis capillaris R. et S. Syst. 2: 118. 1817.

Isolepis ciliata Presl, Rel. Haenk. 1: 188. 1828.

Fimbristylis capillaris Gray, Man. 530. 1848.

Stenophyllus capillaris Britton, Bull. Torr. Bot. Club 21: 30. 1894.

Stenophyllus eucapillaris ciliata Pfeiff. Bot. Archiv. 6: 187-193. 1924.

Annual. Culms densely caespitose, 5 to 20 (rarely 30) cm. tall, 0.2 mm. thick, filiform, 4- to 6-striate, glabrous or minutely antrorsely scabrellate at the apex, not septate-nodulose. Leaves 3 to 15 cm. tall, 1 to 2 mm. wide, filiform, about 4-ribbed dorsally, ribless and coarsely cellular ventrally, canaliculate, becoming triquetrous at the apex, not septate, shorter

than the culms, forming dense tufts or mats, the margins antrorsely scabrellate, a tuft of very long hairs at the summit of the sheath, otherwise glabrous. Bracts 1 to 3, setaceous, the lower 1 to 15 mm. long, surpassing the inflorescence or much shorter. Spikelets oblong to linear, subquadrangular, 5 to 8 mm. long, 1.5 mm. thick, usually 6- to 14-flowered, long-pedicelled, few to several in simple or compound umbels, rarely reduced to a solitary spikelet. Glumes broadly ovate, about 1.4 to 1.8 mm. long, 1.2 mm. wide, rounded to emarginate, minutely puberulent, dark brown, thin-chartaceous, readily deciduous, the keel green, the sides veinless. Stamens 2; filaments 1 mm. long; anthers 0.2 mm. long. Style about 0.8 mm. long, trifid; the branches about 0.3 mm. long. Body of achene 0.5 to 0.8 mm. long, 0.5 to 0.6 mm. wide, trigonous, cuneate-obovoid, pale brown, transversely rugulose, slightly costate on the angles, truncate at the apex, the tubercle disk-like, about 0.1 mm. high.—Pinelands and sandy soil; Maine to California and south; pantropical.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Lundell 6679*.

2. *BULBOSTYLIS JUNCIFORMIS* (H. B. K.) Clarke, Urban, Symb. Antill. **2**¹: 88. 1900.

Isolepis junciformis H. B. K. Nov. Gen. et Sp. **1**: 179. 1815.

Scirpus junciformis Poir. in Lam. Encycl. Suppl. **5**: 105. 1817.

S. Humboldtii Spreng. Syst. **1**: 213. 1825.

S. rufescens Boeck. Linnaea **36**: 747. 1869-70.

Glabrous perennial. Roots fibrous. Culms caespitose, 12 to 60 cm. tall, filiform to 1 mm. wide, subcompressed, terete, multistriate, canaliculate. Leaves 1 to 3 on a culm, 6 to 30 cm. long, shorter than the culm, filiform to 1 mm. wide, flat on the top, canaliculate below, not septate-nodulose, sometimes scabrellate on the margins, the sheaths light reddish to dark grayish brown, smooth, long-pilose at the mouth. Bracts of the involucre shorter than (or sometimes the lower equaling or slightly exceeding) the compound umbel. Spikelets fasciculate, 3 to 5 in a fascicle, 4 to 8 mm. long, 0.5 to 1.5 mm. wide, 3- to 5-flowered. Glumes 1.5 to 2.2 mm. long, about 1.2 mm. wide, chartaceous, ovate, dehiscing along a curved line and thus becoming sagittate at the base, the sharp brown keel excurrent as an excurved mucro, 0.1 to 0.2 mm. long, the sides reddish brown, very minutely white-pubescent, the margins hyaline. Rhachilla about 0.3 mm. wide, showing the conspicuous saccate glume-bases. Stamens 3. Anthers 0.6 mm. long, yellow; connective red, prolonged about 0.2 mm., filaments 1.2 to 1.5 mm. long, about 0.1 mm. wide. Style 1 mm. long, the minutely fimbriate branches 1 to 1.5 mm. long. Achene 0.5 mm. long, 0.3 mm. wide, trigonous with sharp angles, obovoid-cuneate, tipped with a small, black tubercle, white or pale brown, purplish at the base, conspicuously cellular-reticulate.—Sandy soil and pine ridges; Mexico to Brazil.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Lundell 6696*.

3. *BULBOSTYLIS SPADICEA* (H. B. K.) Kük. in Fedde, Repert. **23**: 197. 1926.

Schoenus spadiceus H. B. K. Nov. Gen. et Sp. **1**: 183. 1815.

S. paradoxus Spreng. Syst. **1**: 190. 1823.

Isolepis paradoxa Kunth, Enum. Pl. **2**: 206. 1837.

Oncostylis paradoxa Nees in Fl. Bras. **2**¹: 81. 1842.

Scirpus paradoxus Boeck. Linnaea **36**: 739. 1869-70.

B. paradoxa Clarke, Kew Bull. Add. Ser. **8**: 109. 1908.

Perennial. Caudex vertical, thick-cylindric, often 4 to 5 cm. in diameter, crowned above by the densely tufted leaves and culms, often surrounded below by a dense mass of burnt-down, old leaves. Culms 5 to 22 cm. tall, about 1 mm. thick throughout, glabrous, terete to subcompressed, sulcate, multistriate, not septate-nodulose, not scabrellate. Leaves numerous, filiform, wiry, shorter than or about equaling the culms, 7 to 20 mm. long, 0.2 mm. wide,

triquetrous, ciliate, antrorsely scabrellate or glabrate on the angles, the bases yellowish green with bluish gray stripes, the short sheaths with long, woolly hairs at the mouth; the hairs about 5 mm. long. Bracts wanting. Spikelets solitary, terminal, obovoid, 6 to 10 mm. long, 3 to 5 mm. wide. Glumes lanceolate-subulate, 5 to 8 mm. long, 1 to 1.5 mm. wide at the base, 3-ribbed, long-ciliate on the indurated keel, the keel prolonged as a mucro about 2 mm. long, straw-colored, broadly hyaline on the margins, appressed. Rhachis about 5 mm. long, about 0.5 to 1.0 mm. thick. Stamens 3; anthers as long as 3 mm.; filaments 4 to 5 mm. long, 0.1 mm. wide. Style 3 mm. long, its branches 3, about 1 mm. long, not fimbriate. Achene 1.5 mm. long, 1 mm. wide, obovoid, pale brown, bluntly trigonous, transversely rugulose, the linear cells vertically disposed, the margins ribbed, the tubercle 0.1 mm. long, 0.2 mm. wide.—Pine ridges, sandy soil; British Honduras to Brazil and Cuba.

BRITISH HONDURAS: El Cayo District—*Bartlett 11895*; Mountain Pine Ridge, *Lundell 6919*.

4. *BULBOSTYLIS TENUIFOLIA* (Rudge) Macbr. Field Mus. Bot. **11**: 5. 1931.

Scirpus tenuifolius Rudge, Pl. Guian. 18. 1805.

Isolepis asperulus H. B. K. Nov. Gen. et Sp. **1**: 221. 1816.

Scirpus asperulus Poir. Dict. Suppl. **5**: 104. 1817.

Oncostylis tenuifolia Nees in Mart. Fl. Bras. **2**¹: 83. 1842.

Stenophyllus tenuifolius Britton, Bull. Torr. Bot. Club **43**: 448. 1916.

Annual. Culms tufted 5 to 40 cm. long, filiform, canaliculate, flat or somewhat trigonous, antrorsely scabrellate on the margins. Bracts 2, 5 to 20 mm. long, 0.5 mm. wide, the lower usually longer than the inflorescence. Spikelets 1 to 3 at the summit of the pedicels of the umbel-like inflorescence, 3 to 8 mm. long, 1.5 to 2 mm. thick, ovoid to oblong, 6- to 12-flowered. Glumes 1.5 to 1.8 mm. long, 1 to 1.2 mm. wide, broadly ovate, acute, slightly mucronulate, the sharp keel green, the sides reddish brown, the margins white-hyaline, chartaceous, minutely puberulent. Rhachilla 0.2 mm. wide, showing the conspicuous persistent glume-bases. Stamens 2 or 3. Anthers 0.3 mm. long, 0.1 mm. wide; connective slightly prolonged; filaments about 1.5 mm. long. Style about 0.5 mm. long; the branches 0.5 to 1.0 mm. long, minutely fimbriate. Achene 1.0 mm. long, 0.6 mm. wide, trigonous, grayish brown, the white-ribbed angles prominent, obovoid, with a small tubercle 0.2 mm. wide, 0.1 mm. high, stipitate, more or less transversely rugulose.—Pinelands and sandy soil; Mexico to South America.

BRITISH HONDURAS: Belize District—Boomtown, *O'Neill 9016, 9017*. Stann Creek District—Stann Creek, *Gentle 2625A*; Newtown, *Schipp 919*.

5. *BULBOSTYLIS VESTITA* Kunth, Enum. Pl. **2**: 210. 1837.

Scirpus vestitus Boeck. Linnaea **36**: 753. 1870.

Densely pubescent annual. Culms tufted, 15 to 30 cm. tall, slender, about 0.5 mm. thick, densely pubescent. Leaves setaceous, densely pubescent, 5 to 25 cm. long, about half as long as the culm. Bracts 1 to 2.5 mm. long, in other respects like the leaves. Spikes solitary or 1 to 6 in a simple umbel, 5 to 10 mm. in diameter, of 3 to 12 ovate or oblong-lanceolate spikelets, 3 to 10 mm. long, 1.5 to 2.0 mm. wide. Glumes 2 to 2.5 mm. long, 1.8 to 2.0 mm. wide, ovate, coriaceous, the sharp, green or brown, pubescent keel excurrent as a long mucro 0.1 to 0.5 mm. long, the sides reddish brown, pubescent, the margins white-hyaline. Rhachilla reddish brown showing the conspicuous, saccate glume-bases. Stamens 3; anthers 0.5 or 0.6 mm. long, yellow; the red connective prolonged about 0.2 mm.; filaments 2 mm. long, 0.2 mm. wide. Style about 0.5 mm. long, the 3, minutely fimbriate branches about 1.5 mm. long. Achene 0.8 mm. long, 0.5 mm. wide, obovoid-cuneate, trigonous, white to pale brown

with a small, flat tubercle about $\frac{1}{3}$ the width of the achene, conspicuously cellular-reticulate, not stipitate.—Pine ridges; British Honduras to Brazil.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Lundell 6698*. GUATEMALA: Dept. Peten, La Libertad, *Aguilar 43*; *Lundell 2340*.

2. CALYPTROCARYA Nees

CALYPTROCARYA GLOMERULATA (Brongn.) Urban, Symb. Antill. **2**: 169. 1900.

Becquerelia Calyptrocarya Brongn. in Duperrey, Voy. Coquille **2**: 163. 1829.

Calyptrocarya fragifera Kunth, Enum. Pl. **2**: 364. 1837.

C. Palmetto Nees in Mart. Fl. Bras. **2**¹: 195. 1842.

Monoecious, essentially glabrous perennial. Rhizome short. Culms 30 to 50 cm. tall, 1 to 2 mm. thick at apex, 2 to 3 mm. at base, glabrous, trigonous, not scabrellate, erect, not septate-nodulose, mostly concealed by the sheaths. Leaves 20 to 50 mm. long, 3 to 7 mm. wide, about 4 to 10 on a culm, subcoriaceous, not septate-nodulose, antrorsely scabrellate on the margins and on the three dorsal ribs. Sheaths purplish, much overlapping, sometimes puberulent. Bracts like the leaves. Inflorescence occupying $\frac{3}{4}$ of the culm, of 4 to 6 axillary, umbel-like panicles about 2 cm. in diameter. Peduncles 1 to 2 cm. long, each supporting about 6 to 10 pedicels, each in turn supporting a capitate cluster of about 3 to 6 false spikelets; each of these latter consisting of a terminal, 1-flowered, purplish, globose, pistillate spikelet, 1.5 mm. in diameter and several smaller, ovate, 1- to 4-flowered staminate spikelets, the flowers monandrous. Style branches 2. Achene about 1 mm. long, 1 mm. wide, 0.8 mm. thick, lenticular, flattened-globose, at first lustrous white, becoming dull brown, puberulent, umbonate at apex.—Margins of forests and in marshes; British Honduras to South America.

BRITISH HONDURAS: Stann Creek District—Big Creek, *Schipp 106*; Sarawee Pine Ridge, *Genile 2746*. Toledo District—Temash River, *Schipp 1380*.

3. CAREX L.

Carex Bartlettii O'Neill, sp. nov.

FIG. 1.

Rhizoma abbreviatum, crassum. Culmus ad 90–110 cm. altus, 1–1.5 mm. latus, pergracilis, triqueter, laevis, ad basin vaginis purpureo-brunneis dissolutis comose circumdatus. Folia 3–6, 50–75 cm. alta, 3–4 mm. lata, plana, subcoriacea, marginibus leviter revoluta, longe attenuata, nervis conspicuis, marginibus et nervis aspera. Inflorescentia paniculata, stricta, interrupta ad 60 cm. longa. Paniculae secundariae 4–8, 2–3 cm. longae, 1–1.5 cm. latae, pauciramosae vel spiciformes, singulae binaeve, ovato-triangularae, superiores approximatae, inferiores distantes, inaequaliter longe exserte pedunculatae, pedunculi plani, compressi, vix scabri. Rhachis angulis hispida vel glabra. Bractae foliaceae spicas suas superantes longe vaginantes. Spicae sessiles, oblongi ad lineares, 6–15 mm. longae, 2–3 mm. latae, androgynae, floribus masculinis 2–6, femininis 4–15, divaricatae, bracteola squamiformi aristata suffultae. Glumae feminae ovatae, 2 mm. longae, multistriatae, virides vel partim purpureae, acuminatae vel cum arista 1–10 mm. longa munitae. Utriculi 3–4 mm. longi, 1.2–1.4 mm. lati, trigoni, ovati, vix inflati, membranacei, subpatentes, conspicue scabrellati, virides, 9–15-nervi, stipitati, ad basin leviter spongiosi, in rostrum abrupte contracti. Rostrum 1 mm. longum, saepe marginibus et dentibus scabrellatum, rectum vel curvatum. Achenium 2 mm. longum, 1 mm. latum, ellipticum, trigonum, lateribus concavis, fuscum, breviter stipitatum, apiculatum. Stigmata 3.

Caespitose. Rhizome very short, thick. Culms 90 to 110 cm. tall, 0.5 mm. thick at apex, 1 to 1.5 mm. at base, very slender, erect, trigonous, smooth, purplish brown and fibrillose at the base. Leaves 3 to 6 on a fertile culm, chartaceous, light green, flat, the margins slightly revolute, prominently nerved, 50 to 75 cm. long, 3 to 4 mm. wide, long-attenuate, antrorsely scabrellate on the margins and on the ventral midrib and nerves, the sheaths rather close-fitting, scarcely hyaline, except at the mouth, the ligule very short. Spikes numerous, androgynous, in 4 to 8 panicles, 2 to 3 cm. long, 1 to 1.5 cm. wide, the uppermost often in pairs and approximate, the lower panicles remote and on very long, slender, smooth, compressed peduncles, supporting about 3 to 6 sessile spikes, the rachis sometimes antrorsely-scabrellate. Bracts like the leaves, long-sheathing, surpassing the inflorescence; spikes sessile, oblong to linear, 6 to 15 mm. long, 2 to 3 mm. wide, with 2 to 6 staminate flowers above and 4 to 15 ascending perigynia below, rather dense. Bracts short or with awns surpassing the spikes. Cladophyllum evident, like the perigynia. Glumes ovate, 2 mm. long, multistriate, acuminate or with an arista 1 to 10 mm. long, pale green or with some purple coloration. Perigynia 3 to 4 mm. long, 1.2 to 1.4 mm. wide, trigonous, ovoid, not inflated, membranaceous, conspicuously scabrellate, bright green, 3- to 5-nerved on each face, stipitate, somewhat spongy at the base, rather abruptly narrowed to the beak; beak 1 mm. long, more or less scabrellate on the margin and teeth, straight or curved, rather slender, greenish, obliquely cleft; the teeth hyaline, slender, 0.5 mm. long. Achenes ellipsoid, trigonous with concave sides and blunt, somewhat twisted angles, brown, short-stipitate, 2 mm. long, 1 mm. wide, apiculate, jointed to the style. Stigmas 3, slender, reddish brown.—Type specimen in Langlois Herbarium, Catholic University of America; duplicates in University of Michigan Herbarium, United States National Herbarium and Gray Herbarium: *Bartlett 11718A* "Jungle at edge of Mountain Pine Ridge," El Cayo District, British Honduras.

BRITISH HONDURAS: El Cayo District—River Bluffs, *Bartlett 11469*; Vaca, *Gentle 2321*.

In the treatment of *Carex* by Mackenzie (North American Flora 17: 226. 1931) this species should be inserted between *C. scabrella* Wahl. and *C. polystachya* Sw. In the natural key (p. 13) and the artificial key (p. 18) this species would fall in section 36 Scabrellae. In Kükenthal's monograph (Pflanzenreich 4²⁰. 1909) the species will find place in section 39 Indicae, subsection 1, Turgidulae. It is most closely related to *C. polystachya* from which it may be distinguished by its constantly and conspicuously scabrellate perigynium, the very long-awned glumes (as in *Carex indica*), etc. In *C. scabrella* the leaves are 0.5 to 1.5 mm. wide, 20 to 35 cm. long, the glumes are acute to short-awned, there are 3 to 6 perigynia on a spike and the achenes are 1.5 mm. long. In *C. Bartlettii* the leaves are 3 to 4 mm. wide, 50 to 75 cm. long; the glumes are acuminate and usually conspicuously long-awned; there are 4 to 15 perigynia on a spike; the achenes are 2.0 mm. long.

4. CLADIUM R. Br.

CLADIUM JAMAICENSE Crantz, Inst. 1: 362. 1766.

Schoenus Cladium Sw. Prodr. 19. 1788.

S. effusus Sw. Prodr. 19. 1788.

S. Mariscus β *effusus* (Sw.) Pers. Syn. 1: 58. 1805.

Cladium occidentale Schrad. Fl. Germ. 1: 76. 1806.

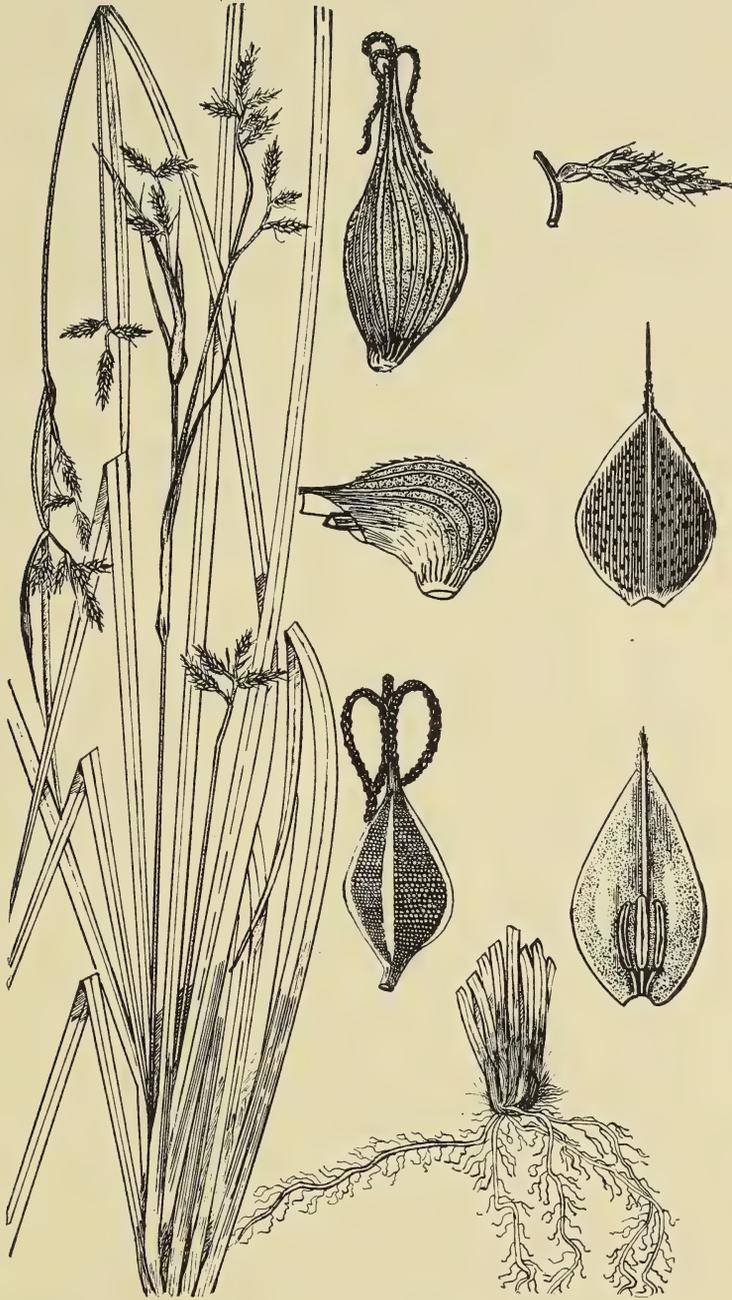
C. palustre Poir. in Schultes, Mant. 1: 229. 1822; syn.

C. effusum Torr. Ann. Lyc. N. Y. 3: 374. 1836.

Mariscus Cladium Kuntze, Rev. Gen. Pl. 1: 754. 1891.

M. jamaicensis Britton in Britton and Brown, Ill. Fl. 1: 348. 1913.

Schoenus Mariscus auct.; non L.

FIG. 1—*Carex Bartlettii*

Habit sketch $\times \frac{1}{2}$; spikelet $\times 5$; glumes, perigynia, and achene $\times 12\frac{1}{2}$. (Drawn by J. Kuhn.)

Perennial. Rhizome stout, very short. Roots coarse, spongy-inflated, 5 mm. in diameter. Culms 100 to 300 cm. tall, about 4 mm. at apex, 10 to 25 mm. at base, obscurely trigonous, glabrous, not scabrellate, not septate-nodulose, rigid. Leaves numerous on the culm, 60 to 120 cm. long, about 6 to 20 mm. wide, flat, very coriaceous, firm, often conspicuously septate-nodulose especially the submersed parts, antrorsely spinulose-scabrous on the margins and on the midrib dorsally and especially at the involute, triquetrous apex. Sheaths glabrous. Bracts like the leaves but shorter and narrower. Umbel-like panicles about 6 to 10, decomposed, lax, forming a long-peduncled cluster 10 to 15 cm. in diameter. Spikelets in clusters of 2 to 10 or solitary at the end of raylets, 4 to 5 mm. long, narrowly ovoid, acute, terete, rich brown. The lower 6 to 8 glumes sterile, the uppermost subtending an hermaphrodite flower. Perianth wanting. Stamens 2. Anthers 3 mm. long, the connective prolonged as a stout, conical, red awn. Style 2 mm. long, its branches 3 (occasionally 2 or 4) of the same length. Achene 2 mm. long, ovoid, acute, somewhat rugose, brown.—Rooting under water in brackish and fresh-water marshes; Virginia to Florida and Texas, British Honduras, Guatemala, and West Indies.

CAMPECHE: San Felipe, *Lundell 1439*. Champoton, *Steere 1839*. QUINTANA ROO: San Miguel, Cozumel Island, *Swallen 2836*. Lake Chichankanab, *Swallen 2760*; *Gaumer 1348*. BRITISH HONDURAS: Corozal District—Pueblo Nuevo, New River, *Lundell 4840*. Belize District—Maskall, *Gentle 1174*. GUATEMALA: Dept. Peten, Lake Peten, *Lundell 3119*.

5. CYPERUS (Tourn.) L.

Annuals or perennials. Culms simple, leafy near the base or leafless, not nodulose (in *C. articulatus* the pith in drying shrinks and leaves air spaces where the culm contracts and thus becomes falsely septate-nodulose). Bracts at apex of culm 1 to 20, subtending the umbel-like or capitate inflorescence. Spikelets 1- to many-flowered. Glumes distichous, the lower 1 or 2 sometimes empty, the succeeding with hermaphrodite flowers (except in the dioecious *C. canus*), the uppermost 1 to 3 glumes sometimes sterile or empty. Stamens 1, 2 or 3. Perianth none. Style bifid or trifid, not swollen at the base, readily caducous. Achene lenticular or trigonous.

1. Styles bifid; achenes lenticular with an angle facing the rhachilla; spikelets conspicuously compressed. Culms smooth, not septate (2).
 Styles trifid; achenes trigonous with a face towards the rhachilla; spikelets more or less trigonous or tetragonous (8).
2. Spikelets short, maturing one achene; glumes 2, unequal, persistent on the deciduous rhachilla; the keel more or less spinulose-scabrellate; inflorescence of 1 to 4 spikes, sessile in the solitary, dense, terminal head (sec. *Kyllinga*) (3).
 Spikelets long, maturing several to many achenes; glumes several to many, uniform, deciduous from the persistent rhachilla, the keel smooth; inflorescence not capitate, the spikes not dense (sec. *Pycurus*) (5).
3. Leaves reduced to scarious, colored sheaths or to a short lamina less than 1 cm. long; rhizome 10 to 30 cm. long, 5 mm. thick, ligneous; bracts less than 1 cm. long *C. peruvianus*
 Leaves with developed blades; rhizome 1 to 25 cm. long or wanting; bracts usually 3 to 8 cm. long (4).
4. Rhizome wanting; culms densely caespitose; the lowest glume 2.0 mm. long; the next glume 1.5 mm. long; achene oblong, 0.4 mm. wide *C. densicaespitosus*
 Rhizome present; culms more or less distant; glumes subequal; achene ellipsoid, 0.6 mm. wide *C. brevifolius*

- 5. Glumes 3 to 4 mm. long, nerveless; spikelets 3 to 5 mm. wide; stamens 3; achene orbicular, black *C. unioloides*
 Glumes 1.5 to 1.6 mm. long, 3-nerved; spikelets 1.5 to 2.0 mm. wide; stamens 2; achene oblong to ellipsoid, brown (6).
- 6. Rhachilla wingless; achene obovate, 0.6 mm. wide, rounded at the apex; spikelets about 2 mm. wide *C. lanceolatus* var. *compositus*
 Rhachilla with colorless, hyaline wings forming a collar 0.2 to 0.3 mm. wide at the base of each achene; achene oblong-obovate, 0.4 mm. wide, subtruncate at apex; spikelets about 1.5 mm. wide (7).
- 7. Spikelets divaricate, not densely clustered *C. polystachyos* var. *texasis*
 Spikelets fasciculate, suberect, forming penicillate clusters at the ends of the rays *C. polystachyos*
- 8. Rhachilla readily disarticulating into one-fruited joints. Wings of the rhachilla and glumes persistent on the achenes; stamens 3; perennials with very short rhizomes, smooth and nonseptate culms and narrow spikelets (1 mm. wide) (Torulinium) (9).
 Rhachilla not articulated or articulated only at the base, not breaking into 1-fruited joints (Eucyperus and Mariscus) (13).
- 9. Achene linear, 1.5 to 2.0 mm. long, 0.3 mm. wide; glumes usually distant, the apex of one glume not reaching the base of the one next above on the same side of the rhachilla; wings of the rhachilla linear, 1.2 mm. long, 0.2 mm. wide, reaching the top of the achene (10).
 Achene oblong to obovoid; glumes imbricated on the same side of the rhachilla; wings of the rhachilla elliptic, frequently not extending beyond the middle of the achene, 1.0 mm. long, 0.4 to 0.5 mm. wide (11).
- 10. Leaves and bracts membranous, 1 to 4 (rarely 6) mm. wide; culms 1 to 2 mm. thick at the base *C. Engelmanni*
 Leaves and bracts coriaceous, 8 to 16 mm. wide; culms 5 to 10 mm. thick at the base *C. acicularis*
- 11. Inflorescence congested into a single, globose, compact head, 2 to 3 cm. in diameter; the spikes sessile; achene ellipsoid. Culms sharply triquetrous; leaves 4 to 6 mm. wide *C. macrocephalus*
 Inflorescence with some rays; some of the spikes pedicelled; achene obovoid-oblong to linear-oblong (12).
- 12. Spikelets suberect, penicillate, very densely fascicled at the ends of the rays *C. Eggersii*
 Spikelets divaricate, subdense, scattered along the rhachis *C. odoratus*
- 13. Culms nodose, papillose, or antrorsely scabrellate (14).
 Culms essentially not nodose, septate, or papillose, but smooth (16).
- 14. Culms antrorsely scabrellate, slender, 1 to 3 mm. wide at the base, rarely and obscurely septate, not papillose; stamen 1; glumes 1 to 1.5 mm. long; rhachilla wingless *C. surinamensis*
 Culms not scabrellate, stout, 4 to 15 mm. wide at the base; stamens 3; glumes 2 to 3 mm. long; rhachilla winged (15).
- 15. Culms conspicuously nodose when dried, terete except sometimes trigonous at the apex, not papillose; leaves reduced to sheaths; rhizome scaly, long-creeping *C. articulatus*
 Culms papillose and somewhat septate, trigonous throughout; leaves well-developed, very thick and coriaceous, rigidly serrulate on the margins; rhizome very short *C. ligularis*
- 16. Glumes retuse and tridentate at apex, pale, spreading, 7- to 9-nerved, 2.2 to 2.8 mm. long. Spikes 1 to 3, 8 to 12 mm. long, ovate, dense; spikelets 5 to 7 mm. long, 2 mm. wide, 4- to 9-flowered; rhachilla more or less winged; bracts 3 to 5; stamens 3; rays 0 to 2 *C. ischnos*
 Glumes not tridentate at apex (17).
- 17. Glumes conspicuously mucronate to aristate (18).
 Glumes mucronulate, acute to obtuse (*C. humilis* with 1 stamen and solitary head has somewhat mucronate glumes) (21).
- 18. Rhachilla winged; spikelets showing a median white stripe *C. compressus*
 Rhachilla wingless; spikelets not showing a median white stripe (19).
- 19. Stamen 1; culms 2 to 20 cm. tall; arista 0.7 to 1.2 mm. long *C. aristatus*
 Stamens 3; culms 20 to 60 cm. tall; mucro less than 0.6 mm. long (20).

20. Sheaths, leaves and glumes glutinous-viscid; the leaves involute and coriaceous *C. elegans*
 Sheaths, leaves and glumes not at all glutinous-viscid; the leaves flat and membranous *C. diffusus* var. *tolucensis*
21. Rhachilla essentially wingless; stamens 1, 2 or 3 (22).
 Rhachilla plainly winged; stamens strictly 3 (29).
22. Bracts 10 to 20, very equal in length; stamens 3. Leaves reduced to sheaths at the base of the culm at anthesis; rhizome 10 to 20 mm. thick; achene brown, smooth (23).
 Bracts very unequal; stamens 1 to 3 (24).
23. Plants dioecious; bracts 10 to 18; achenes 0.4 to 0.6 mm. long . . . *C. canus*
 Plants with hermaphrodite flowers; bracts usually 18 to 20; achenes 0.6 to 0.9 mm. long *C. alternifolius*
24. Achene 0.4 to 0.6 mm. long, white, slightly verrucose, stipitate; leaves commonly reduced to sheaths. Stamens 3, 2 or 1 *C. Haspan*
 Achene 0.8 to 1.5 mm. long, brown to black, smooth or somewhat verrucose, leaves developed (25).
25. Stamens 3; achene somewhat verrucose *C. Lundellii*
 Stamen 1; achene smooth (26).
26. Spikelets contracted into a solitary, terminal head; culms 11 to 25 cm. tall, densely caespitose; achenes 0.8 mm. long; an annual *C. humilis*
 Spikelets in several to numerous heads or clusters; culms 10 to 80 cm. tall, scarcely caespitose; achenes 1 to 1.8 mm. long; perennials (27).
27. Achene linear, 1.2 to 1.8 mm. long, 0.3 mm. wide; leaves 6 to 10 mm. wide, septate-nodulose *C. pseudovegetus*
 Achenes ellipsoid to oblong-linear; leaves 2 to 8 mm. wide, obscurely, if at all, septate-nodulose (28).
 var. *megalanthus*
28. Achene 1.3 to 1.5 mm. long, 0.6 mm. wide, ellipsoid, conspicuously tapering to both ends, iridescent; leaves 2 to 6 mm. wide *C. ochraceus*
 Achene 1.0 mm. long, 0.3 mm. wide, linear-oblong, acuminate, scarcely stipitate, not iridescent; leaves 3 to 8 mm. wide *C. Luzulae*
29. Leaves 15 to 20 mm. wide, very coriaceous; wings of the rhachilla conspicuous, readily deciduous, lustrous golden brown; culms 100 to 140 cm. tall, very stout (about 10 mm. thick at base), bright yellow *C. semiochraceus*
 Leaves 1 to 10 mm. wide; wings of the rhachilla persistent, colorless; culms 10 to 100 cm. tall, not bright yellow (30).
30. Achene linear, 1.8 mm. long, 0.4 mm. wide; leaves 2 to 3 mm. wide; spikelets 4- to 8-flowered, 1 mm. wide. Glumes 2.2 to 3.0 mm. long; culms 15 to 30 cm. tall *C. tenuis*
 Achenes oblong to obovoid, 0.6 to 1.0 mm. wide; leaves 3 to 10 mm. wide; spikelets 1- to 36-flowered, 1 to 2.5 mm. wide (31).
31. Glumes 4.0 to 4.5 mm. long. Spikelets 4- to 8-flowered, substichous, very distant on the rhachis; leaves 2 to 10 mm. wide *C. lentiginosus*
 Glumes 2 to 3.5 (rarely 4) mm. long (32).
32. Spikelets 1- to 3-flowered, falling away entire, the glumes persistent (33).
 Spikelets 5- to 24-flowered (36).
33. Spikelets 5 to 10 mm. long, 3- to 7-flowered, linear-lanceolate; spikes 10 to 15 mm. wide, broadly cylindric, subdense. Achene oblong-ellipsoid; bracteoles not caudate; rays always well developed . . . *C. hermaphroditus*
 Spikelets 3 to 5 mm. long, 1- to 3-flowered, ellipsoid or oblong-ellipsoid; spikes 5 to 10 mm. wide, dense (34).
34. Spikelets inflated, terete, ascending, at length divaricate, oblong-ellipsoid, 1- to 2-flowered; achene obovoid. Bracteoles conspicuously caudate throughout the spike; rays wanting or very short (rarely 5 cm.) *C. flavus*
 Spikelets scarcely inflated, tetragonal, divaricate even when very young, ellipsoid, 1- to 3-flowered; achene broadly ellipsoid (35).
35. Spikes sessile *C. Mutisii* var. *contractus*
 Spikes on rays 1 to 20 cm. long *C. Mutisii*
36. Leaves and bracts very coriaceous with antrorsely scabrellate margins; culm stout, 60 to 90 cm. tall, 5 to 8 mm. thick at the base. Plant of the brackish marshes; spikelets lustrous brown, 8- to 14-flowered
 Leaves and bracts membranous; culms about 15 to 60 cm. tall, 1 to 3 mm. thick at the base (37).
C. planifolius

37. Spikelets readily disarticulating from the rhachis, 1 mm. wide, 3- to 7-flowered; stolons and tubers wanting; glumes yellowish brown, faintly many-nerved *C. hermaphroditus*
 Spikelets persistent on the rhachis, 1 to 3 mm. wide, 7- to 36- (rarely 5-) flowered; stolons and tubers present; glumes 5- to 9-ribbed (38).
38. Glumes conspicuously 7- to 9-ribbed (the outer pair of ribs near the margin), straw-colored; stolons very slender (less than 0.5 mm. thick) and very numerous, herbaceous *C. esculentus*
 Glumes 5- to 7-nerved (the outer pair not marginal) reddish or purplish brown; rhizomes 0.5 to 2.0 mm. thick, usually few, ligneous . . . *C. rotundus*

1. *C. ACICULARIS* (Schrad.) Steud. Syn. 45. 1855.
Diclidium aciculare Schrad. ex Nees in Mart. Fl. Bras. 2¹: 55. 1842.
C. flexuosus Griseb. Fl. Brit. W. I. 566. 1864; non Vahl.
C. ferax var. *acicularis* Kükenth. in Pflanzenreich 4²⁰: 619. 1936.

Perennial. Rhizome short. Roots fibrous 1 to 2 mm. thick. Culms 30 to 90 cm. tall, about 5 to 10 mm. thick at the base, about 3 to 5 mm. thick at the apex, stout, rigid, neither scabrellate nor septate-nodulose, thickened at the base. Leaves 3 to 5 on a culm, 15 to 90 cm. long, 5 to 20 mm. wide, acuminate, very coriaceous, subrigid, flat, antrorsely scabrellate on the margins, dorsal midrib and on the more prominent veins of the ventral surface, the sheaths stramineous to reddish brown. Bracts 6 to 8, 10 to 60 cm. long, 5 to 20 mm. wide, otherwise like the leaves. Rays 4 to 12, branched, unequal, 0 to 30 cm. long, obliquely spreading. Peduncles 1 to 25 cm. long, 1.0 to 2.0 mm. wide, glabrous, multistriate, canaliculate. Peduncles of the secondary rays 1 to 9 cm. long. Spikes 20 to 50 mm. long, 20 to 35 mm. wide, loose. Spikelets distant and lax, divergent or reflexed, 5 to 25 mm. long, linear or acicular. Rhachilla readily disarticulating into 1-fruited joints, brown, the wings lustrous brown, nearly reaching the top of the achene, 1.2 to 1.4 mm. long. Glumes 2 mm. long, 1.6 mm. wide, ovate, chartaceous, imbricated or sometimes distant, the apex of one glume not reaching the base of the one next above on the same side of the rhachilla, mucronulate, the keel broad, green, not scabrellate, the sides lustrous to reddish brown, obsolete nerved. Stamens 3, originating at the angles of the achene. Anthers 1.5 to 1.8 mm. long, 0.1 mm. wide, linear; connective slightly produced. Style 1 mm. long; stigmas 2 mm. long. Achene 1.7 mm. long, 0.3 to 0.4 mm. wide, linear or linear-oblong, brown, trigonous, short-stipitate, minutely-puncticulate, scarcely apiculate, slightly falcate, not iridescent.—Marshes; British Honduras to Brazil.

BRITISH HONDURAS: Belize District—Maskall, *Gentle* 1127; Belize River, *Lundell* 3966; Bakers Pine Ridge, *Lundell* 7006. El Cayo District—*Bartlett* 12047, 12872.

2. *C. ALTERNIFOLIUS* L. Mant. 2: 28. 1771.
C. onustus Steud. Syn. 20. 1855.

Perennial. Roots cord-like. Rhizome short, very thick, 1 to 2 cm. long. Culms 30 to 150 cm. tall, 1 to 5 mm. thick at apex, 5 to 20 mm. at base, trigonous, sometimes blunt on the angles, deeply multistriate, sometimes minutely scabrellate at apex (transition form towards *C. flabelliformis* Rottb., which plant may be only a form of this species), not septate-nodulose. Leaves, reduced to numerous reddish brown, red-puncticulate, coarsely nerved, sheaths and mere scales at the base of culm, sometimes developed as ovate-lanceolate blades. Bracts commonly 18 to 20, equal in length, 10 to 30 cm. long, unequal in width, 1 to 15 mm. wide, green, sometimes glaucous, acute to acuminate, upwardly scabrellate on margins and midrib, very minutely puncticulate-scabrellate on the secondary ribs, deflexed at maturity. Rays as many as the bracts, most of them equal in length, 2 to 10 cm. long, with a few raylets 0 to 2 cm. long; the peduncles 0.5 mm. wide, deflexed at maturity, originating

in the inflated, pale, tubular, long (5 to 10 mm.) prophyllum. Spikelets 5 to 10 mm. long, 1.5 to 2 mm. wide, 12- to 30-flowered, ovate-lanceolate to linear-lanceolate, acute, compressed, 3 to 12 in the stellate or hemispheric heads; rhachilla straight, not zigzag, 0.4 mm. wide, 0.2 mm. thick, not winged, the stamens and achenes often persistent after the deciduous glumes. Glumes 1.6 to 2.0 mm. long, 1.4 to 1.6 mm. broad, ovate to lanceolate, imbricate, thin-chartaceous, very faintly cellulose-reticulate, 3- to 5-nerved, pale or with some reddish brown patches, subacute, sometimes short-mucronulate, sometimes very minutely scabrellate at apex. Stamens 3: anthers linear, 0.8 mm. long; connective prolonged as a white or red, ovate appendage; filaments about 1.0 mm. long. Style 0.5 mm. long; stigmas 1.0 mm. long. Achene 0.6 to 0.9 mm. long, 0.5 to 0.6 mm. broad, trigonous, dark brown, minutely cellular, short-apiculate, short-stipitate.—Waste places; introduced.

YUCATAN: *Greenman 447; Gaumer 23237.*

3. *C. ARISTATUS* Rottb. Descr. et Icon. **4**: 23. 1773.

C. uncinatus R. Br. Prodr. 215. 1810; non Poir.

C. Brownei Roem. & Schult. **2**: 228. 1817.

C. inflexus Muhl. Descr. Gram. 16. 1817.

C. Purshii Roem. & Schult. Syst. **2**: 177. 1817.

C. pygmaeus Nutt. Trans. Amer. Phil. Soc. new ser. **5**: 142. 1837, ex descript.; non Rottb., non Retz, non Lam.

C. aristatus var. *inflexus* (Muhl.) Boeck. Linnaea **35**: 500. 1868.

C. aristatus var. *Boeckeleri* Cavara, Atti R. Istit. Bot. Pavia 4. 1896.

C. aristatus var. *floribundus* E. G. Camus, Lecomte, Not. Syst. **1**: 243. 1910.

C. aristatus var. *perennis* M. E. Jones, Contr. West. Bot. **18**: 25. 1933.

Chlorocyperus inflexus Palla, Allg. Bot. Zeitschr. **17**: 6. 1911.

Dichostylis aristata Palla, Engler's Bot. Jahrb. **10**: 296. 1888.

Isolepis echinulata Kunth, Enum. Pl. **2**: 205. 1837.

Scirpus lappaceus Lam. Illustr. **1**: 139. 1791.

Glabrous annual, aromatic on drying. Roots fibrous, about 0.1 mm. in diameter. Culms densely caespitose or as much as 1 cm. apart, 1 to 15 cm. tall, about 1 mm. thick at the base, about 0.5 mm. at the trigonous apex, multistriate, not scabrellate, not septate-nodulose, flaccid, compressed, not tuberous-thickened at the base. Leaves 2 to 6 on a culm, about 10 to 15 cm. long, 0.5 to 2.0 mm. wide, acuminate, membranous, flat, mostly erect, not scabrellate on the margins, not septate-nodulose, sheaths purplish brown. Bracts 2 to 5, unequal in length and width, 1.5 to 8 cm. long, 0.5 to 2.0 mm. wide, in other respects like the leaves. Rays 0 to 5, unbranched, unequal in length, 0 to 7.5 cm. long, mostly ascending. Peduncles of rays 0.8 to 6.5 cm. long, 0.5 mm. thick, glabrous, multistriate. Prophyllum 2.5 to 10 mm. long, tubular, inflated, acute to 2-lobed at the summit. Head 5 to 20 mm. in diameter, circular to oblong-ovate, sometimes capitate-clustered, subdense to very dense; spikelets 5 to almost 50. Spikelets 4 to 8 mm. long, 2 to 3 mm. wide (including the arista), pleiostichous or subdistichous, compressed, the upper ascending, the lower divaricate or reflexed, 5- to 16-flowered. Rhachilla 0.2 mm. wide, zigzag, brown; the wing less than 0.1 mm. wide. Bracteole 1.0 to 1.2 mm. long, 0.3 to 0.5 mm. wide, ovate, obtuse or with an arista 0.3 to 0.5 mm. long. Secondary prophyllum 1 mm. long, 0.5 mm. wide, ovate, acute or 2-lobed at the apex, sheathing the rhachilla. Basal callosity 0.2 mm. wide and 0.1 mm. long. Body of glume 1.4 to 2.2 mm. long, the mucro an additional 0.5 to 1.7 mm., oblong-spathulate, membranous, 7- to 9-nerved, the nerves evenly distributed over the surface, reddish brown when mature, not scabrellate on the keel, not clasping-involute, the margins hyaline. Stamen 1, originating at one of the lateral faces of the achene; anther 0.3 to 0.4 mm. long, 0.1 to 0.15 mm. wide; connective red, slightly prolonged beyond the anther; filament 2 mm. long, 0.1

mm. wide, flat, hyaline. Style 0.8 mm. long; stigmas 3, 1 mm. long. Achene 0.8 to 1.2 mm. long, 0.3 to 0.5 mm. wide, trigonous, oblong, dark brownish purple, minutely raised-punctulate, the sides flat, stipitate, scarcely apiculate, neither curved nor falcate, not iridescent.—Waste places and sandy soil; New Brunswick to Vancouver Island, West Indies south to Chile; pantropical.

YUCATAN: Progreso, *Swallen 2939*, Izamal, *Gaumer 1023*.

4. *C. ARTICULATUS* L. Sp. Pl. 44. 1753.

C. niloticus Forsk. Fl. Aeg.-Arab. 13. 1775 (secundum Kükenthal).

C. gymnos Syst. Mant. 2: 97. 1824.

C. nudus Roxb. Fl. Ind. 1: 187. 1832; non Roxb. op. cit. 209, nec H. B. K.

C. borbonicus Steud. Syn. 31. 1855.

C. articulatus var. *conglomeratus* Britton, Bull. Torr. Bot. Club 13: 210. 1886.

C. articulatus multiflorus Kükenth. Pflanzenreich 4²⁰: 79. 1935.

Chlorocyperus articulatus Rikli, Pringsheim Jahrb. Wiss. Bot. 27: 563. 1895.

Perennial. Rhizome ligneous, 3 to 8 mm. thick, very long-creeping with culms spaced 0 to 20 cm. apart, provided with ovate to lanceolate overlapping scales, often 2 to 3 cm. long, the internodes commonly 1 to 1.5 cm. long. Culms 100 to 200 cm. tall, 4 to 15 mm. wide at the base tapering to 2 to 3 mm. at apex, striate, terete, not at all scabrellate, septate-nodose, the nodes becoming very conspicuous on drying. Leaves reduced to a few sheaths, rarely with a short lamina, membranous. Bracts 2 to 3, 5 to 15 mm. long, scale-like, cuspidate, ovate-lanceolate. Rays 4 to 12, 0 to 12 cm. in length, often branched, the peduncles filiform (0.03 in diameter) finally pendent. Prophyllum 3 to 10 mm. long, tubular, prolonged into two lanceolate, paleaceous teeth. Spikelets 1 to 20 on a ray, digitate to penicilliform, linear, acute, 6 to 60 mm. long, 1 mm. broad, compressed, dense, 12- to 40-flowered. Glumes 2.5 to 3 mm. long, 1.2 to 1.5 mm. wide, elliptic-ovate, obtuse, membranous, imbricated, green on the keel, brown on the sides, 3- to 7-nerved. Wings of rhachilla lanceolate, acute, 1.1 to 1.6 mm. long, 0.2 to 0.4 mm. wide, colorless, hyaline, caducous. Stamens 3; anthers linear, 2 mm. long, red; connective slightly prolonged. Style 0.5 mm. long, stigmas about 1 mm. Achenes 1.3 to 1.5 cm. long by 0.5 mm. broad, trigonous, oblong, dark purplish brown, lustrous, apiculate.—Marshes and shallow ponds; Alabama to Texas, Mexico, West Indies, Chile, Paraguay; pantropical.

BRITISH HONDURAS: Pantropic District—Belize, *Lundell 3965*; Churchyard, *Lundell 6949*. Stann Creek District—Newtown, *Schipp 921*. GUATEMALA: Dept. Peten, Lake Peten, *Lundell 3218*. La Libertad, *Lundell 3262*. Lake Zotz, *Lundell 3321*.

5. *C. BREVIFOLIUS* (Rottb.) Hassk. Catal. Hort. Bogor. 24. 1844.

C. cruciformis Endl. Cat. Hort. Acad. Vindob. 94. 1842; non Boeck.

C. monocephalus F. Muell. Fragm. 8: 271. 1874, pro parte; nec *Pycreus monocephalus* Clarke, nec Roxb.

Carex Esquirolii Léveillé et Vaniot, Bull. Soc. Bot. Fr. 53: 315. 1906; fide Kükenth.

Kyllinga brevifolia Rottb. Descr. et Icon. 13. 1773.

K. triceps Thunb. Fl. Japon. 35. 1784.

K. monocephala Thunb. Fl. Japon. 35. 1784.

K. odorata H. B. K. Nov. Gen. et Sp. 1: 170. 1815, pro parte; non Vahl.

K. cruciformis Schrad. in Roem. & Schult. Syst. Veg. Mant. 2: 137. 1824.

K. tenuis Baldwin, Trans. Am. Phil. Soc. new ser. 2: 168. 1825.

K. cruciata Nees, Linnæa 9: 286. 1834 (nomen).

K. sororia Kunth, Enum. Pl. 2: 131. 1837.

K. laxa Schrad. ex Nees in Mart. Fl. Bras. 2¹: 14. 1842.

K. gracilis Zoll. Verz. Ind. Archip. 63. 1854.

K. pumila A. Rich. in La Sagra, Fl. Cub. 3: 288. 1853.

K. tenuissima Steud. Syn. 67. 1855.

K. longiculmis Miq. Fl. Ind. Bat. 3: 292. 1859; fide Suringar.

K. bifolia Miq. Fl. Ind. Bat. 3: 293. 1859, pro parte.

K. Honolulu Steud. ex Jardin, Bull. Soc. Linn. Normand. 2. ser. 9: 278 et 281. 1875; fide Jackson (Index Kew.).

K. aurata Hohenackeri Boeck. Linnaea 35: 423. 1868 (excl. syn. *K. fuscata*).

K. brevifolia β *longifolia* Boeck. Linnaea 35: 426. 1868, pro parte.

K. kamtschatica Meinsh. Acta Horti Petrop. 18: 229. 1900.

K. colorata Druce, Bot. Exch. Club Brit. Isl. 630. 1917.

K. Riederiana Meinsh. ex Komarov, Fl. Kamtsch. 200. 1927.

Mariscus kyllingioides Steud. Syn. 60. 1855.

Schoenus coloratus L. Sp. Pl. ed. 2. 64. 1762, pro parte; fide Thunberg; fide Clarke.

Scirpus glomeratus L. Sp. Pl. 52. 1753, pro parte; fide Clarke.

Perennial. Rhizome 2 to 3 mm. thick, 1.0 to 25 cm. long, the internodes 1 to 2.5 cm. long, the scales 5 to 10 mm. long, 0.5 mm. wide, ovate or oblong-ovate, acute to acuminate, reddish brown. Culms 0 to 2.5 cm. apart, 6.5 to 60 cm. tall, 1.5 mm. thick at base, 0.5 mm. thick at apex, compressed-trigonal, multistriate, not scabrelate, not septate-nodulose, flaccid, not tuberous-thickened at base. Leaves 1 to 4 on a culm, 1.0 to 15 cm. long, 1 to 3 mm. wide, acute to acuminate, membranous, flat, erect, not septate-nodulose, upwardly-scabrelate on the dorsal midrib and margins, sheaths yellow or red, becoming fibrous. Bracts 3 or 4, unequal in length and width, 0.5 to 2.0 mm. wide, 0.5 to 7.0 cm. long, shorter than or surpassing the inflorescence, in other respects like the leaves. Spike 1 (rarely 2 or 3), sessile, 3 to 8 mm. long, 4 to 6 mm. wide, ovoid to subglobose, dense. Spikelets numerous, 2 to 3.5 mm. long, 0.8 to 1.0 mm. wide, elliptic to oblong-lanceolate, densely set on the rachis, pleiostichous, compressed, the upper appressed, the lower reflexed, 1-flowered. Glumes 1.8 to 2.2 mm. long, 1.0 to 1.5 mm. wide, ovate to ovate-elliptic, membranous, mucronate (the mucro about 0.1 to 0.2 mm. long), nerves 7 on the lower glume, 5 on the upper, the keel green, scabrelate, the sides white or pale yellow, the margins hyaline, not clasping the achene. Stamens 3 to 1; anthers 0.5 mm. long, 0.1 mm. wide, oblong-linear, yellow; connective white, not prolonged beyond the anther; filament about 2 mm. long, 0.1 mm. wide, flat, white-hyaline. Style 1 to 1.2 mm. long; stigmas 2, 0.5 mm. long. Achene 1 mm. long, 0.6 mm. wide, lenticular, ellipsoid to obovate-oblong, brown, minutely punctulate, the sides neither concave nor convex, scarcely stipitate at the base, not torulose, scarcely apiculate, neither curved nor falcate, not iridescent.—Waste places and shores; Georgia to Texas, West Indies, Mexico, south to Argentina; pantropical.

BRITISH HONDURAS: Belize District—Belize, *Lundell* 1906; Sibun River, Craig Point, *Gentle* 1398. Corozal District—Corozal—Consejo road, *Lundell* 4973.

6. *CYPERUS CANUS* Presl, Reliq. Haenk. 1: 179. 1830.

C. flabelliformis Boeck. Linnaea 35: 566. 1868; non Rottb.

Glabrous perennial. Rhizome thick, short, ligneous. Culms 80 to 150 cm. tall, about 4 mm. thick at apex, about 6 to 8 mm. at base, triquetrous, multistriate, glabrous or very minutely antrorsely scabrelate, not septate, rigid, erect. Leaves reduced to sheaths at base of culm at anthesis but during the first year well developed, 5 to 10 mm. wide, as long as culm, not septate, antrorsely scabrous on the margins, the midrib, and on the dorsal and ventral surface toward the apex. Sheaths purplish brown. Bracts 20 to 30 cm. long, 6 to 12 mm. wide, very equal, much surpassing the inflorescence, acuminate, in other respects like the leaves. Rays 10 to 18, 1 to 20 cm. long; raylets usually 3 or 4, about 1 cm. long. Peduncles very slender, 1 mm. wide, 0.2 mm. thick. Spikelets 3 to 8 in digitate clusters at the ends of raylets. Prophyllum about 5 to 10 mm. long, oblique at the mouth, inflated. Staminate spikelets 6 to 10 mm. long, 2.5 to 3 mm. wide, 10- to 40-flowered, much compressed.

Pistillate spikelets 5 to 14 mm. long, 2 to 3 mm. wide, 10- to 30-flowered. Rhachilla wingless. Glumes about 1.8 mm. long, 1.5 to 1.8 mm. wide, ovate, thin, acute at apex, appressed, pale, reddish brown, the often green keel antrorsely scabrellate toward the apex, the veins indistinct, the pistillate glumes slightly shorter. Stamens 3; anthers yellow, linear; the connective prolonged, red. Style 1.0 mm. long, trifold, its 3 branches 1.5 mm. long. Achene 0.45 to 0.6 mm. long, 0.25 mm. wide, dark brown, trigonous-ellipsoid.—Marshes, riverbanks; Mexico to Colombia.

YUCATAN: Aguada Xcholac, *Schott* 563. Izamal, *Gaumer* 483.

7. *C. COMPRESSUS* L. Sp. Pl. 46. 1753.

C. conglomeratus Willd. Enum. 5. 1813 (nomen); fide Kükenthal.

C. caffer G. Bertol. Rendic. Accad. Sc. Bologna 33. 1853-54.

Chlorocyperus compressus Palla, Denkschr. Akad. Wiss. Wien, Math.-Nat. Kl. 84: 451. 1909.

Annual. Roots fibrous to capillary, very numerous. Culms 5 to 40 cm. tall, 1 to 1.5 mm. thick, scarcely thicker at the base, trigonous or compressed-trigonous, not at all scabrellate, striate, more or less channeled. Leaves 1 to 4 at base of culm, about as long as culm, 1.5 to 3 mm. wide, flat or conduplicate, sometimes sparsely and very minutely scabrellate on the margin but not on the midrib, bright green, membranaceous, their sheaths purplish brown. Bracts 3 to 5, unequal, spreading, 1 to 3 mm. broad, longer than the umbel, smooth, except on scabrellate margins. Rays 1 to 12 cm. long, unbranched, slender. Prophyllum about 5 mm. long, tubular, truncate and 5-toothed at apex. Spikelets 3 to 10, subdigitate at the end of the ray, linear-oblong, 10 to 24 mm. long, 2 to 3 mm. broad, subcompressed, acute. Rhachilla straight, very flat, 0.5 to 0.8 mm. wide, its wings 1.2 mm. long, 0.2 to 0.3 mm. wide, persistent until the glume next below falls off. Glumes firm, closely imbricated, ovate, 3 to 3.5 mm. long, 2.5 to 3 mm. broad, acuminate, conspicuously mucronate and more or less excurved, 9- to 13-nerved, margins very broadly white-hyaline with a broad, green keel, pale yellow or greenish on the sides. Stamens 3; anthers about 0.6 mm. long, 0.1 mm. wide, linear, yellow; connective prolongation ovate, red; filaments about 3.0 mm. long. Style about 1 mm. long; stigmas 3, about 0.6 mm. long. Achene obovoid, trigonous, 1.0 to 1.3 mm. long, 0.8 to 1.0 mm. wide, dark brown, shining, minutely punctulate, somewhat ribbed on the angles, slightly emarginate at apex.—Waste places and clearings; Maryland to Texas and Missouri, West Indies, Mexico, south to Brazil; pantropical.

BRITISH HONDURAS: Belize District—Boomtown, *O'Neill* 8944; Sibun River, *O'Neill* 8945. GUATEMALA: Dept. Peten, La Libertad, *Aguilar* 183.

8. *C. DENSICAESPITOSUS* Mattf. & Kükenth. Pflanzenreich 4²⁰²: 597. 1936.

Kyllinga pumila Michx. Fl. Bor.-Amer. 1: 28. 1803; nec Steud., nec *Cyp. pumilus* L., nec Rottb.

K. odorata H. B. K. Nov. Gen. et Sp. 1: 170. 1815; non Vahl, nec *Cyp. odoratus* L.

K. elongata H. B. K. Nov. Gen. et Sp. 1: 170. 1815; nec *Cyp. elongatus* Sieb. neque aliorum.

K. gracilis Afzel. Remed. Guin. 71. 1817; nec Zoll., nec Kunth, nec *Cyp. gracilis* R. Br. neque aliorum.

K. monocephala Nees, Flora 11: 331. 1828.

K. viridiflora Link, Hort. Berol. 2: 322. 1833 (nomen); fide Kükenth.

K. caespitosa Nees, in Mart. Fl. Bras. 2: 12. 1842; non *Cyp. caespitosus* Poir., nec Llanos.

K. tenuifolia Steud. Syn. 69. 1855.

K. fraterna Steud. in Lechler, Berb. Amer. Austr. 56. 1857; non *C. fraternus* Kunth.

K. brevifolia f. *longifolia tricephala* Boeck. Flora 38: 516. 1879.

K. Naumanniana var. *tenuis* Boeck. Engler Bot. Jahrb. 5: 89. 1884.

K. flexuosa Boeck. Cyp. Nov. 2: 1. 1890; non *C. flexuosus* Vahl, nec Griseb.

Thryocephalum pumilum Nieuwland, Amer. Midl. Nat. 4: 94. 1915.

Annual. Culms contiguous, densely caespitose, 4 to 40 cm. tall, 0.8 mm. thick at base, 0.4 mm. thick at apex, trigonous, multistriate, not scabrellate, not septate-nodulose, flaccid, some-

what compressed, not tuberous-thickened at base. Leaves 2 to 3 on a culm, shorter than the culm, about 2 mm. wide, acuminate, membranous, flat, flaccid, upwardly scabrellate on margins and dorsal midrib; sheaths reddish brown, becoming fibrous. Bracts 3 to 4, unequal in length, 1 to 10 cm. long, 0.5 to 2.0 mm. wide, in other respects like the leaves. Spikes 4 to 8 mm. long, 3 to 4 mm. wide, sessile, solitary (or one or two additional), globose, sessile, lateral, divaricate, ovate to oblong-cylindric, dense. Spikelets 1.5 to 2.0 mm. long, 0.5 mm. wide, 0.2 mm. thick, pleiostichous, extremely flat, 1-, rarely 2-flowered, numerous in a head-like spike, appressed, ascending. Glumes unequal, the longer 2 mm. long, 0.7 mm. wide, 7-nerved, the shorter 1.5 mm. long, 0.5 mm. wide, 5-nerved, both mucronate, scabrellate-spinulose on the green keel, pale green or brown on the thin, hyaline sides, lanceolate, acuminate, not clasping. Stamens 2 or 1; anthers 0.5 mm. long, 0.1 mm. wide, oblong; filament 1.1 mm. long, 0.2 mm. wide, white-hyaline. Style about 0.4 mm. long; stigmas 2, about 0.2 mm. long, not fimbriate. Achene 1.1 mm. long, 0.4 mm. wide, lenticular, oblong, yellowish brown, punctulate, sides slightly convex, short-stipitate; beak about 0.2 mm. long; body 0.9 to 1.0 mm. long.—Waste places and clearings; Delaware, Missouri, West Indies, Mexico, south to Argentina; pantropical.

BRITISH HONDURAS: Belize District—Boomtown, *O'Neill* 8973, 8974; Maskall, *O'Neill* 8975, 8976, 8977. El Cayo District—near Camp 6, *Gentle* 2370. Stann Creek District—Stann Creek, *O'Neill* 8972. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2498.

9. *C. DIFFUSUS* Vahl var. *TOLUCENSIS* (H. B. K.) Kükenth. Pflanzenreich 4²⁰²: 211. 1936; non *Mariscus toluensis* Steud.

C. elegans Swartz, Obs. Bot. 30. 1791; non L.

C. toluensis H. B. K. Nov. Gen. et Sp. 1: 206. 1815.

C. parviflorus Willd. in Link, Jahrb. 1³: 85. 1820.

C. chalaranthus Presl, Reliq. Haenk. 1: 177. 1830.

C. umbrosus Lindl. & Nees in Mart. Fl. Bras. 2¹: 31. 1842.

C. octophyllus Hochst. ex Steud. Syn. 20. 1855.

C. homoiiria Steud. Syn. 23. 1855.

C. laxus Griseb. Fl. Brit. W. I. 563. 1864.

C. chorisanthos C. B. Clarke, Contr. U. S. Nat. Herb. 10: 449. 1908.

C. diffusus subsp. *chalaranthus* (Presl) Kükenth. Pflanzenreich 4²⁰²: 210. 1936.

C. diffusus var. *chorisanthos* (C. B. Clarke) Kükenth. Pflanzenreich 4²⁰²: 210. 1936.

C. diffusus var. *umbrosus* (Lindl. & Nees) Kükenth. Pflanzenreich 4²⁰²: 210. 1936.

Perennial. Roots fibrous, 0.1 to 1.5 mm. thick, 1 to 14 cm. long. Rhizome short, about 0.5 to 1.0 cm. long, about 0.5 mm. thick, ligneous. Culms 20 to 60 cm. tall, contiguous or as much as 1 cm. apart, 1.5 mm. thick at the base, 1 to 1.5 mm. thick at the apex, trigonous, multistriate, not scabrellate, not septate-nodulose, firm, not tuberous-thickened at the base. Leaves 2 to 7 on a culm, shorter than or almost equaling the culm, 8 to 25 cm. long, 3 to 9 mm. wide, acute to acuminate, membranous, flat, erect or somewhat flaccid, not septate-nodulose, prominently veined, minutely upwardly scabrellate on the margins, on the dorsal midrib and on two or more of the prominent veins on the ventral surface, especially toward the apex. Sheaths reddish brown, becoming fibrous. Bracts 5 to 8, of unequal length, mostly of uniform width, 2.5 to 20 cm. long, 1 to 9 mm. wide, the average width being about 7 mm., in other respects like the leaves. Bractlets setaceous. Rays 8 to 12, branched, unequal, 0 to 20 cm. long, obliquely spreading or ascending. Raylets 3 to 5, unequal, unbranched. Peduncles of rays 1.5 to 12 cm. long, 0.1 to 0.2 mm. thick, glabrous, multistriate, sulcate. Prophyllum 7 to 9 cm. long, tubular, acute at the summit, paleaceous. Heads of 1, 2 or 3

spikelets. Spikelets 1.5 to 2 mm. wide, 4 to 10 mm. long, ovate to oblong-acute, digitately arranged, subcompressed, 5- to 10-flowered. Rhachilla 0.4 to 0.5 mm. wide, straight, greenish brown, wingless. Bracteole 2.0 mm. long, ovate-acute to acuminate, 1 mm. wide, scabrellate on the midrib. Glumes 2 to 3.0 mm. long (of which 0.4 to 0.5 is the mucro), 2.0 mm. wide, ovate, membranous, cuspidate at the apex, the keel green, broad, not scabrellate, the nerves 7 to 9, aggregated close to the keel, the sides greenish white to yellowish brown, the margins hyaline, more or less spreading, the base persisting. Stamens 3, originating at the angles of the achene; anthers 0.6 to 0.8 mm. long, 0.1 to 0.2 mm. wide, linear-oblong, reddish yellow; connective red, prolonged about 0.1 mm. beyond the anther as a white tuft; filament 2.0 mm. long, 0.1 mm. wide. Styles 0.1 mm. long; stigmas 3, 1 to 2 mm. long, slightly fimbriate. Achene 1.4 mm. long, 0.9 mm. thick, trigonous, broadly obovoid, dark brown, smooth, the sides concave, slightly stipitate, not torulose, neither curved nor falcate, nor iridescent.—Banks of streams, moist thickets and forests; West Indies, Mexico, south to Paraguay.

BRITISH HONDURAS: Belize District—Belize, *O'Neill* 8963, 8968; Maskall, *O'Neill* 8966, 8967. El Cayo District—Vaca, *Gentle* 2310. Stann Creek District—Stann Creek, *O'Neill* 8964; *Gentle* 1892.

10. C. EGGERSII Boeck. Cyp. Nov. 1: 53. 1888.

Torulium Eggersii C. B. Clarke in Urban, Symb. Antill. 21: 56. 1900.

Perennial. Roots fibrous, about 1 to 2 mm. thick. Rhizome very short, ligneous. Culms contiguous, 20 to 90 cm. tall, 2 to 3 mm. thick at the apex, 3 to 5 mm. thick at the base, bluntly trigonous, stout and rigid, multistriate, occasionally antrorsely scabrellate on the angles, not septate-nodulose, sometimes tuberous-thickened at the base. Leaves 4 to 6 on a culm, 5 to 15 mm. wide, 12 to 60 cm. long, subcoriaceous, acuminate, flat, erect, not septate-nodulose, antrorsely scabrellate on the margins, dorsal midrib and on the two or more prominent veins of the ventral surface; the sheaths reddish brown. Bracts 5 to 8, 3 to 30 cm. long, 4 to 10 mm. wide, otherwise like the leaves. Rays 5 to 10, unequal, 0 to 15 cm. long, ascending or obliquely spreading, with 3 to 5 ovate or ovate-cylindric spikes congested into a dense terminal head, 12 to 30 mm. in diameter. Peduncles of rays 0 to 8 cm. long, glabrous, multistriate. Prophyllum 1 to 2.5 cm. long, tubular, the apex long-acuminate or bicuspidate, upwardly scabrellate on the margins. Spikelets 6 to 10 mm. long, 0.8 to 1.0 mm. wide, oblong or linear-lanceolate, suberect, penicillate, somewhat terete, 3- to 9-flowered. Rhachilla readily disarticulating into 1-fruited joints. Wings of the rhachilla elliptic, 0.6 mm. long, very short, reaching only halfway up the achene, lustrous brown, persistent, clasping the achene. Bracteole 1 mm. long, 0.7 mm. wide, ovate-acute. Secondary prophyllum about 1.5 mm. long, 1 mm. wide, elliptic-obtuse, sheathing the rhachilla. Glumes 2 mm. long, 1.6 mm. wide, ovate-obtuse, sometimes mucronulate, clasping the achene, chartaceous, imbricated, the sides stramineous to lustrous brown, the margins hyaline, the nonscabrellate keel green. Stamens 3; anthers 0.4 mm. long; connective slightly produced; filaments about 2.5 mm. long. Style about 0.5 mm. long; its branches about 1 mm. long. Achene oblong, 1.2 mm. long, 0.5 to 0.6 mm. wide, bluntly trigonous, minutely punctulate, very short-stipitate, apiculate, yellowish brown, not iridescent.—Marshes and riverbanks; Texas to West Indies, south to Ecuador.

BRITISH HONDURAS: Corozal District—Corozal—Orange Walk road, *Lundell* 5008. Belize District—Maskall, *O'Neill* 8959; Northern River, *Gentle* 940; Belize, *Lundell* 1908. El Cayo District—Vaca, *Gentle* 2558. GUATEMALA: Dept. Peten, El Paso, *Lundell* 1548. Lake Peten, *Lundell* 3155.

11. *C. ELEGANS* L. Sp. Pl. ed. 2. 68. 1762; nec Walt., nec hort., nec Kunth.

C. viscosus Sw. Prodr. 20. 1788.

C. laxus Lam. Ill. 1: 146. 1791; nec R. Br., nec Griseb.

C. viviparus Steud. Syn. 316. 1855.

C. trachynotus Torr. U. S. Boundary Survey. 227. 1858.

Papyrus elegans G. Don in Loudon's Hort. Brit. 22. 1830.

Scirpus viscosus Lam. Ill. 1: 142. 1791.

Perennial. Roots coarsely fibrous. Rhizome very short, the culms contiguous, caespitose, 30 to 60 cm. tall, 1.5 to 2 mm. thick at apex, 2 to 4 mm. at base, sometimes scabrellate and septate-nodulose, more or less distinctly trigonous, multistriate. Leaves 3 to 6 on a culm, about as long as the culm, 1 to 4 mm. wide, involute, becoming triquetrous toward apex, septate-nodulose, viscous, grayish green, coriaceous, distantly but prominently upwardly scabrous, their sheaths brownish and somewhat inflated at the base. Bracts 3 to 5, very unequal, 5 to 40 cm. long, about 1 to 4 mm. wide, like the leaves, septate-nodulose, often viscous, grayish green, coriaceous, scabrous. Rays 3 to 8, very unequal, 0 to 12 cm. long, the peduncles 0.5 to 1.0 mm. thick, sometimes with short raylets 0 to 2 cm. long, the bractlets short about 1 to 10 mm. long or wanting. Spikelets capitate to flabelliform-capitate, 3 to 20 in a cluster, oblong to linear, 3 to 15 mm. long, 2.5 to 3.5 mm. wide, 6- to 20-flowered, turgid, wings of rhachilla wanting. Glumes 2 to 3 mm. long, 2 mm. wide, viscous, subcoriaceous, broadly ovate to rotundate, imbricated, conspicuously cuspidate-mucronate, 7- to 9-nerved, usually reddish purple when young, fading to straw color at maturity, the margins involute and clasping the achene, the keel conspicuously scabrellate especially at the apex. Stamens 3; anthers yellow, linear, 1 mm. long, 0.2 mm. wide; connective scarcely prolonged, red; filaments 1.5 mm. long. Styles about 1 mm. long, stigmas 2 mm. long. Achene trigonous-obovoid, 1.4 to 1.8 mm. long, 1 mm. wide, prominently stipitate, somewhat apiculate, black, lustrous, the faces concave, the surface somewhat bullate.—Lagoons and banks of streams; Florida to New Mexico, West Indies, Mexico, south to Costa Rica.

YUCATAN: Progreso, *Swallen* 2374. San Felipe, *Gaumer* 1403. Izamal, *Gaumer* 2485, 2492. *Gaumer* 1028, 2329 sine loc. QUINTANA ROO: Cozumel Island, *Swallen* 2882; *Millspaugh* 1596, 1686. BRITISH HONDURAS: Corozal District—Corozal—Santa Rita road, *Gentle* 801. Belize District—Churchyard, *Lundell* 6960.

12. *C. ENGELMANNI* Steud. Syn. 47. 1855.

C. tenuior Engelm. in Gray's Man. ed. 2. 492. 1856.

C. ferax L. C. Rich. subsp. *Engelmanni* Kükenth. in Pflanzenreich 4²⁰: 620. 1936.

Perennial. Roots fibrous, about 0.5 to 1.0 mm. thick. Rhizome very short. Culms contiguous, 2 to 40 cm. tall, 1 to 2 mm. thick at the apex, 1 to 2 mm. thick at the base, glabrous, multistriate, not septate-nodulose, not scabrellate, compressed-trigonous, sometimes sulcate. Leaves 2 to 4 on a culm, 2 to 40 cm. long, 2 to 5 mm. wide, antrorsely scabrellate on the margins, dorsal midrib and on the ventral surface toward the apex and on the more prominent veins, not septate-nodulose, membranous, flat, the sheaths reddish brown. Bracts 3 to 5, 1.5 to 40 cm. long, 1 to 6 mm. wide, in other respects like the leaves. Rays 3 to 10, 0 to 8 cm. long, unequal, branched, the peduncles 0 to 5 cm. long, about 1 mm. wide, multistriate, usually bearing 3 or 4 loose spikes congested at the summit into a large, open head, having a diameter of 15 to 50 mm. Spikelets distant, divergent or reflexed, linear, acute to acuminate, 5 to 22 mm. long, 1 mm. wide, terete, 6- to 16-flowered. Rhachilla readily disarticulating into 1-fruited joints, brown, the wings lustrous brown, hyaline toward the margins, about 1.6 mm. long, reaching the apex of the achene, clasping. Glumes 2.2 to 2.8 mm. long, 1 to 1.2 mm. wide, ovate, sometimes mucronulate, not imbricated but distant, the

apex of one glume not reaching the base of the one next above on the same side of the rachilla, the keel green or brown, not scabrellate, the sides usually reddish brown, 7-nerved. Stamens 3, originating at the angles of the achene; anthers 0.4 mm. long, 0.1 mm. wide; connective slightly prolonged; filaments 2 to 2.5 mm. long, 0.1 mm. wide, white-hyaline. Style 0.5 mm. long; stigmas 3, 1.0 mm. long. Achene 1.7 to 2.0 mm. long, 0.2 to 0.3 mm. wide, trigonous, linear, dark brown to black, short-stipitate, minutely apiculate, slightly iridescent.—Marshes; Massachusetts, southern Ontario, Minnesota, south to West Indies, Argentina.

YUCATAN: Izamal, *Gaumer 1035*. Progreso, *Millspaugh 1671*.

The local plant is somewhat of a transition between *C. Engelmannii* of the northern United States and of the tropical *C. acicularis*.

13. *C. ESCULENTUS* L. Sp. Pl. 45. 1753.

C. aureus Ten. Fl. Napol. Prodr. 1: 8. 1811.

C. melanorrhizus Del. Ill. Fl. Aeg. 50. 1813.

C. tuberosus Pursh, Fl. Amer. Sept. 1: 52. 1814; non Rottb., nec Willd.

C. phymatodes Muhl. Desc. 23. 1817.

C. nervosus Bertol. Piant. Bras. Opusc. Scient. Bologna 3: 407. 1819.

C. gracilis Link, Jahrb. 13: 84. 1820; non R. Br., nec Muhl.

C. repens Ell. Sketch Bot. South Carol. 1: 69. 1821.

C. gracilescens Roem. & Schult. Syst. Mant. 2: 100. 1824.

C. Tenorii Presl, Fl. Sic. 1: 43. 1826.

C. Tenorianus Roem. & Schult. Syst. Mant. 3: 544. 1827.

C. Sieberianus Link, Hort. Berol. 1: 313. 1827.

C. pallidus Savi, Cat. Piant. Egiz. in Mem. Raddi 23. 1830.

C. damiettensis A. Dietr. Sp. Pl. 2: 269. 1833.

C. retusus Nees, Linnaea 9: 285. 1835 (nomen).

C. lutescens Torr. & Hook. Ann. Lyc. N. Y. 3: 433. 1836; non Torr. (Mex. Bound. Survey) [based on *Drummond 452* not *453*].

C. scirpoides R. Br. ex Hochst. Flora 24: Intell. 1: 21. 1841.

C. helodes Schrad. ex Nees in Mart. Fl. Bras. 21: 37. 1842.

C. fulvescens Liebm. Vidensk. Selsk. Skr. ser. 5. 2: 210. 1851.

C. cubensis Steud. Syn. 42. 1855.

C. chrysostachys Boeck. Flora 42: 438. 1859.

C. Heermannii Buckl. Proc. Acad. Sc. Phila. [14]: 10. 1862.

C. ruficomus Buckl. Proc. Acad. Sc. Phila. [14]: 9. 1862.

C. esculentus β *leptostachyus* Boeck. Linnaea 36: 290. 1870.

C. esculentus γ *macrostachyus* Boeck. Linnaea 36: 291. 1870.

C. esculentus Sprucei Clarke. Journ. Linn. Soc. 21: 181. 1884.

C. esculentus var. *angustispicatus* Britton, Bull. Torr. Bot. Club 13: 211. 1886.

C. esculentus var. *Heermannii* Britton, Bull. Torr. Bot. Club 13: 211. 1886.

C. Buchananii Boeck. Cyp. Nov. 1: 4. 1888.

C. esculentus aureus Richter, Pl. Europ. 1: 135. 1890.

C. esculentus var. *phymatodes* Kükenth. in Fedde, Repert. 23: 185. 1926.

C. esculentus lutescens Kükenth. in C. Osten, Anal. Mus. Montevideo. ser. 2^a. 3²: 146. 1931.

Chlorocyperus aureus Palla, Allg. Bot. Zeitschr. 9: 69. 1903.

Chlorocyperus phymatodes Palla, Allg. Bot. Zeitschr. 9: 69. 1903.

Perennial. Stolons very numerous, 5 to 50 cm. long, 0.5 to 1.0 mm. thick with ovate-lanceolate scales 0.5 to 1.0 mm. long, remote or imbricated, terminating in tubers. Tubers globose to ovoid, very scaly when young, much-shriveled and deeply rugose when old. Culms 15 to 50 cm. tall, trigonous, not all scabrellate. Leaves about 10 to 20, crowded, about as long as the culm, 3 to 10 mm. wide, flat, firm, not at all scabrellate on the margins nor on the midrib, long-attenuate, sheaths pale or reddish brown at the base. Bracts 2 to 6, longer or shorter than the inflorescence. Rays 5 to 10, simple or branched, 0 to 12 cm.

long; peduncles 1 mm. thick. Prophyllum tubular, 10 to 15 mm. long. Spikelets distant, 5 to 24 on a spike, distichous, divaricate, linear, 6 to 30 mm. long, 1 to 3 mm. wide when mature, turgid and not compressed, 8- to 40-flowered. Wings of rhachilla 1.5 mm. long, 0.5 mm. wide, hyaline, colorless, persistent, sometimes red-lineolate. Glumes 2.6 to 4.0 mm. long, 1.4 to 2.0 mm. wide, light brown, thin, hyaline, conspicuously 7- to 9-nerved, imbricated, spreading at the apex, ovate to ovate-elliptic, short-mucronulate, keel distinct to obsolete. Stamens 3; anthers yellow or red, 1.5 mm. long, 0.2 mm. wide, linear; connective produced into a short, ovate, red appendage 0.1 mm. long; filaments 1.5 to 2 mm. long. Style 2 mm. long; stigmas 3, 2 to 3 mm. long. Achene 1.3 to 2.0 mm. long, 0.6 to 0.8 mm. wide, broadly oblong, trigonous, obtuse, not apiculate, grayish or light brown, shining, densely punctulate.—Waste places, beach sands and sandy soils; Canada to Argentina, West Indies; cosmopolitan weed.

YUCATAN: *Gaumer 1511* sine loc. QUINTANA ROO: Chichankanab, *Gaumer 2451*. COBA, *Lundell & Lundell 7836*.

14. *C. FLAVUS* (Vahl) Nees, *Linnaea* **19**: 698. 1847.

C. bracteiferus Steud. *Syn.* 28. 1855.

C. flavomarisus Griseb. *Fl. Brit. W. I.* 567. 1864; pro parte.

C. productus Wright in *Sauv. Fl. Cub.* 77. 1871.

C. flavomarisus Griseb. var. *peduncularis* Britton, *Bull. Torr. Bot. Club* **13**: 215. 1886.

C. cayennensis Britton, *Bull. Dept. Agric. Jamaica* **5**. Suppl. 1: 8. 1907.

C. flavus var. *peduncularis* (Britton) Kükenth. *Pflanzenreich* 4²⁰: 532. 1936.

Didymia cyperomorpha Phil. *Engler Bot. Jahrb.* **8**: 57. 1887.

Duval-Jouvea Buchtienii Palla in *Buchtien, Contrib. Fl. Boliv.* 87. 1910 (nomen).

Kyllingia cayennensis Lam. *Ill.* **1**: 149. 1791; apud Britton; non apud Kükenth.

Mariscus flavus Vahl, *Enum.* **2**: 374. 1806.

Mariscus confertus H. B. K. *Nov. Gen. et Sp.* **1**: 213. 1815.

Mariscus huarmensis H. B. K. *Nov. Gen. et Sp.* **1**: 214. 1815.

Mariscus mexicanus Willd. ex Link *Jahrb.* **13**: 90. 1820.

Mariscus rigidus Spreng. *Syst.* **4**²: Cur. poster. 29. 1827.

Mariscus elatus Kunth, *Enum. Pl.* **2**: 116. 1837 (excl. synonym. pluribus).

Mariscus cayennensis Urb. *Symb. Antill.* **2**¹: 165. 1900.

Perennial. Roots fibrous, 0.5 to 1.2 mm. thick, 0 to 15 cm. long. Rhizome 0 to 3 cm. long, 1 cm. wide, ligneous. Culms contiguous to 1 cm. apart, 30 to 100 cm. tall, 5 mm. thick at the base, 2 or 3 mm. thick at the apex, trigonous, multistriate, sometimes upwardly scabrellate on the angles, not septate-nodulose, firm, tuberous-thickened at the base. Leaves about 8 on a culm, shorter or longer than the culm, 2 to 6 mm. wide, acuminate, membranous, flat, becoming involute, mostly erect, not septate-nodulose, finely and evenly scabrellate on the margins, dorsal midribs and sometimes on the ventral surface especially toward the apex, the sheaths reddish purple, becoming fibrous. Bracts 4 to 6, unequal in length and width, 1.5 to 10 cm. long, 0.5 to 2 mm. wide, longer or shorter than the inflorescence, in other respects like the leaves. Rays 0 to 8, 0 to 5 cm. long, unbranched. Spikes 10 to 20 mm. long, 4 to 10 mm. wide, oblong or ovate, dense with approximately 36 to 50 spikelets each. Spikelets 1- to 2-flowered, 3.0 to 5.0 mm. long, 1 mm. wide, mostly set at right angles to the rhachis, elliptic, somewhat quadrangular. Rhachilla 0.2 mm. wide, curved over the achenes, straw-colored, the wings 1.5 mm. long, 0.5 mm. wide, yellow, hyaline, persistent, clasping the achene. Bracteole 1 to 4 mm. long, about 0.5 mm. wide, ovate-obtuse or commonly setaceous-caudate. Secondary prophyllum 1.2 mm. long, 0.8 mm. wide, ovate-obtuse, clasping at the base. Basal callosity 0.2 mm. long, 0.2 mm. thick. Glumes 2.5 to 3 mm. long, 2 mm. wide, ovate-elliptic, 9-nerved, the keel green, not scabrellate, the sides stramineous to brown, the margins yellow-hyaline, not clasping-

involute, the two glumes of about equal size, tardily deciduous, clasping the achene. Stamens 3, originating at the angles of the achene; anthers linear; connective slightly prolonged; filaments 3 mm. long. Style about 1 mm. long; stigmas 3. Achene 1.8 to 2.0 mm. long, 0.8 to 1 mm. wide, trigonous, elliptic, dark brown, minutely punctulate, the sides slightly concave, the angles blunt, not iridescent, not beaked.—Borders of streams and forests; Louisiana, Texas, West Indies, Mexico, south to Paraguay.

YUCATAN: Uximal, *Swallen* 2599, 2601. BRITISH HONDURAS: Orange Walk District—Orange Walk, *O'Neill* 8960; Honey Camp, *Lundell* 525. Belize District—Boomtown, *O'Neill* 8961; Mussell Creek, *O'Neill* 9007. El Cayo District—Mountain Pine Ridge, *Lundell* 6819. GUATEMALA: Dept. Peten, La Libertad, *Aguiar* 197.

Lundell 525 from Honey Camp has been cited by Kükenthal as *C. regiomontanus Pittieri* Kükenthal. This specimen has broadly obovoid, not oblong, achenes and is clearly *C. flavus*.

15. *C. HASPAN* L. Sp. Pl. 45. 1753.

- C. juncooides* Lam. Ill. 1: 147. 1791.
C. aphyllus Vahl, Eclog. Amer. 2: 6. 1798.
C. autumnalis Vahl, Enum. 2: 318. 1806.
C. graminifolius Poir. in Lam. Encycl. 7: 267. 1806.
C. platyculmis R. Br. Prodr. 214. 1810.
C. nudus H. B. K. Nov. Gen. et Sp. 1: 203. 1815.
C. gracilis Muhl. Descr. Gram. 6. 1817; teste Kükenthal.
C. gramineus Roem. et Schult. Syst. 2: 205. 1817.
C. stellatus Willd. ex Link, Jahrb. 1³: 84. 1820.
C. cayennensis Willd. ex Link, Jahrb. 1³: 84. 1820; non Britton.
C. junceus Willd. ex Link, Jahrb. 1³: 85. 1820.
C. vaginatus Willd. ex Link, Jahrb. 1³: 85. 1820; non R. Br.
C. leptos R. & S. Syst. Mant. 2: 105. 1824.
C. tunicatus R. & S. Syst. Mant. 2: 115. 1824.
C. laticulmis Spreng. Syst. 1: 228. 1825.
C. Muehlenbergii Spreng. Syst. 5: 221. 1828.
C. pedatus Meyer, Reise 1: 431. 1834 (nomen nudum).
C. Haspan coarctatus Nees in Mart. Fl. Bras. 2¹: 25. 1842.
C. riparius Nees in Mart. Fl. Bras. 2¹: 28. 1842.
C. planiculmis Steud. Syn. 22. 1855.
C. Haspan americanus Boeck. Linnaea 35: 575. 1868.
C. Haspan indicus Boeck. Linnaea 35: 574. 1868.
C. triqueter Boeck. Flora 62: 548. 1879.
C. microcarpus Boeck. Abh. Naturw. Ver. Bremen 7: 37. 1882.
C. americanus Palla, Denkschr. Akad. Wiss. Wien, Math.-Nat. Kl. 79: 173. 1908.
C. Haspan juncooides Kükenth. in Fedde, Repert. 23: 184. 1926.
C. Haspan f. *coarctatus* Osten. Anal. Mus. Hist. Nat. Montevideo. ser. 2. 3: 135. 1931.
C. Haspan var. *riparius* Kükenth. Pflanzenreich 4²⁰: 250. 1936.
Mariscus Pes-avium Bertol. Misc. Bot. 8: 30. 1849.
Scirpus autumnalis Rottb. Descr. et Icon. 58 t. 17. fig. 3. 1773.

Annual or perennial. Roots fibrous. Rhizome short, about 5 mm. thick, ligneous. Culms contiguous or 1 to 10 mm. apart, subcaespitose, 10 to 70 cm. tall, 2 to 3 mm. wide at apex, 3 to 7 mm. wide at base, compressed-trigonous to three-winged or very flat, neither septate-nodulose nor scabrellate, somewhat flaccid. Leaves commonly reduced to 2 or 4 purplish brown or green sheaths at the base of culm, occasionally developed as long (5 to 30 cm. long, 2 to 6 mm. wide) or short (1 to 6 cm. long, 6 to 10 mm. wide) laminae, flat, soft, membranous, not septate-nodulose, essentially smooth, sometimes very minutely upwardly scabrous at the apex. Bracts 2, 1 to 5 cm. long, very unequal especially in length, 1 to 3

mm. wide. Rays very unequal, 0 to 15 cm. long, usually with 0 to 6 raylets, 0 to 30 mm. long, peduncles about 0.5 to 0.8 mm. wide, compressed-trigonus; prophyllum 5 to 15 mm. long, inflated, tubular, paleaceous. Spikelets 4 to 10 mm. long, 1 mm. wide, linear, acute, compressed, 6- to 30-flowered, 3 to 12 in a hemispheric head. Rhachilla 0.3 mm. wide, 0.2 mm. thick, brown, straight, not zigzag, not winged, achenes and stamens persisting after the glumes. Glumes 1 to 1.5 mm. long, 0.8 to 1.0 mm. wide, oblong-ovate, obtuse, sometimes minutely mucronulate, not scabrelate at the apex, more or less imbricated, thin-membranous, reddish, greenish or straw-colored, 3-nerved, soon deciduous. Stamens commonly 3, sometimes 2 or 1; anthers 0.5 mm. long, 0.1 mm. wide, linear-oblong, yellow or red, with a very minute tuft of short, white hairs at apex; filament 0.5 mm. long. Style about 0.6 mm. long; stigma the same length. Achene rounded-trigonus, 0.4 to 0.6 mm. long, 0.3 to 0.4 mm. wide, subglobose, verrucose, stipitate, scarcely apiculate, white.—Marshes and shallow ponds; Virginia, Texas, Mexico, West Indies, south to Argentina.

BRITISH HONDURAS: Orange Walk District—Orange Walk, *O'Neill* 8951. Belize District—Belize, *O'Neill* 8949; Boomtown, *O'Neill* 8950; Maskall, *O'Neill* 8952, 8958; Northern River, *Gentle* 892; Sibun River, *Gentle* 1453. El Cayo District—near Vaca, *Gentle* 2322, 2576. Stann Creek District—Newtown, *Schipp* 906; Melinda Pine Ridge, *Gentle* 1912; Stann Creek—Mullins River road, *Gentle* 1926.

16. *C. HERMAPHRODITUS* (Jacq.) Standley, Contr. U. S. Nat. Herb. 18: 88. 1916.

C. alpinus Liebm. Vidensk. Selsk. Skr. Kjøbenh. ser. 5. 2: 215. 1851.

C. Ruizianus Boeck. Linnaea 36: 360. 1870.

C. incompletus Boeck. Linnaea 36: 361. 1870.

C. tetragonus Hemsl. Biolog. Centr. Amer. Bot. 3: 452. 1882-86; non Ell.

Carex hermaphrodita Jacq. Collect. 4: 174. 1790.

Eleocharis cyperina Roem. & Schult. Syst. 2: 155. 1817.

Kobresia cyperina Willd. Spec. Pl. 4: 206. 1805.

Mariscus Tovari H. B. K. Nov. Gen. et Sp. 1: 215. 1815.

Mariscus Jacquinii H. B. K. Nov. Gen. et Sp. 1: 216. 1815.

Mariscus patulus Schrad. ex Nees in Mart. Fl. Bras. 2¹: 47. 1842.

Mariscus hermaphroditus Urban, Symb. Antill. 2¹: 165. 1900.

Perennial. Roots fibrous, 0 to 15 cm. long, 0.5 to 2.0 mm. wide. Rhizome 0 to 3 cm. long, 1 to 5 mm. thick, ligneous. Culms contiguous or as much as 1 cm. apart, 8 to 80 cm. tall, 1.5 to 3.0 mm. thick at the base, 1 to 2 mm. thick at the apex, trigonus, multistriate, not scabrelate, not septate-nodulose, rigid, often tuberous-thickened at the base. Leaves 3 to 9 on a culm, 6 to 70 cm. long, 3 to 7 mm. wide, acute to acuminate, membranous, flat, erect, not septate-nodulose, upwardly scabrelate on the margins, dorsal midrib and occasionally on the ventral surface toward the apex, the sheaths purplish brown. Bracts 5 to 8, 2 to 48 cm. long, 2 to 7 mm. wide, in other respects like the leaves. Rays 0 to 12, sometimes branched, 0 to 12 cm. long, ascending or obliquely spreading. Peduncles of rays 0 to 9 cm. long, 0.2 to 1.0 mm. wide, glabrous, multistriate. Prophyllum about 10 mm. long, tubular-inflated, acute or with two caudate lobes at the apex. Spike 10 to 30 mm. long, 10 to 15 mm. wide, ovate to oblong-cylindric, subdense, subdistichous. Spikelets numerous, 5 to 10 mm. long, 1.0 mm. wide, 0.5 to 0.8 mm. thick, oblong-lanceolate, tetragonus, mostly divaricate, the upper ascending, the lower sometimes reflexed, 3- to 7-flowered. Rhachilla about 0.2 mm. wide, straight, straw-colored, the wings about 1.3 mm. long, 0.4 mm. wide, colorless, hyaline, persistent, more or less clasping the achene. Bracteole about 1.5 to 5.0 mm. long, 0.5 mm. wide, ovate, acute to long-caudate. Secondary prophyllum about 2.0 mm. long, 0.6 mm. wide, oblong, obtuse. Glumes 2.5 to 3.5 mm. long, 1.0 to 1.2 mm. wide, equal in

length, ovate-elliptic, appressed, membranous, obtuse or slightly mucronate, many-nerved, the nerves evenly distributed over the surface, the keel green, the sides yellowish to golden brown, the margins hyaline, clasping-involute. Stamens 3, originating at the angles of the achene; anthers 0.6 mm. long; connective not prolonged beyond the anther; filament 0.1 mm. wide, about 3.0 mm. long, flat. Styles 1.4 mm. long; stigmas 3, 1 to 1.5 mm. long, slightly fimbriate. Achene 1.2 to 1.8 mm. long, 0.8 mm. wide, trigonous, oblong-ellipsoid, slightly falcate, sides slightly concave, neither stipitate nor torulose at the base, minutely apiculate, not beaked, not iridescent.—Margins of damp forests; Mexico to Argentina. (Alabama according to Small.)

BRITISH HONDURAS: El Cayo District—near Camp 6, *Gentle* 2313.

17. *C. HUMILIS* Kunth, Enum. Pl. **2**: 23. 1837.

C. pygmaeus Liebm. Vidensk. Selsk. Skr. ser. 5. **2**: 203. 1851; non Nutt.

C. pygmaeus Aztecorum Clarke, Journ. Linn. Soc. **21**: 83. 1884.

C. humilis Kunth. var. *elatior* Britton, Bull. Torr. Bot. Club **15**: 99. 1888.

Glabrous annual. Roots fibrous, about 0.1 mm. wide, about 1.0 to 10 cm. long. Culms contiguous, densely caespitose, 1 to 25 cm. tall, 1 mm. wide throughout, flaccid, compressed except at the triquetrous apex, multistriate, not scabrellate, not tuberous-thickened at the base. Leaves 1 or 2 on a culm, 1.5 to 20 cm. long, 1 to 2 mm. wide, acuminate, membranous, flat, erect, not septate-nodulose, sparingly upwardly-scabrellate on margins and dorsal midrib, the sheaths reddish brown. Bracts 2 to 4, 1 to 15 cm. long, 1 to 2 mm. wide, in other respects like the leaves. Inflorescence contracted into a solitary terminal head. Head 3 to 18 mm. in diameter, broadly globose, very dense. Spikelets numerous, 3 to 6 mm. long, 1.5 to 2.0 mm. wide, oblong-lanceolate, compressed, 8- to 18-flowered. Rhachilla 0.3 to 0.4 mm. wide, 0.1 mm. thick, straight, straw-colored, wingless. Glumes 1 to 1.2 mm. long, 0.8 to 1.0 mm. wide, ovate, 3-ribbed, ending in a very short, stout mucro, the keel green, the sides white hyaline. Stamen 1, originating at one of the lateral angles of the achene. Anther 0.3 mm. long, 0.1 mm. wide, oblong. Filament 1.0 mm. long, 0.1 mm. wide. Connective not prolonged beyond the anther. Styles 0.3 to 0.5 mm. long. Stigmas 3, 0.6 mm. long. Achene 0.8 mm. long, 0.4 to 0.5 mm. wide, trigonous, ovoid, acuminate, olive to chestnut brown, transversely rugose, slightly stipitate at the base.—Clearings in jungles, moist open forests and stream banks; Mexico, West Indies, south to Peru.

CAMPECHE: Tuxpeña, *Lundell* 1191. BRITISH HONDURAS: Corozal District—Corozal-Consejo road, *Lundell* 4975. Belize District—Maskall, *O'Neill* 8962. El Cayo District—Little Cocquericot, *Lundell* 3964, 3967; near Camp 6, *Gentle* 2369. Toledo District (?)—*Peck* 733. GUATEMALA: Dept. Peten, El Paso, *Lundell* 1604. Lake Peten, *Lundell* 2086.

18. *C. ISCHNOS* Schlechtend. Bot. Zeit. **7**: 99. 1849.

C. Botterii Boeck. Allg. Bot. Zeitschr. **2**: 2. 1896.

Mariscus ischnos Clarke in Hook. Fl. Brit. Ind. **6**: 623. 1893.

Perennial. Roots fibrous, about 0.1 to 1.0 mm. wide, 0 to 10 cm. long. Rhizome 0 to 10 mm. long, about 0.5 mm. thick, ligenous. Culms 0.5 to 1.0 cm. apart, 20 to 75 cm. tall, 2 mm. thick at the base, 1 mm. thick at the apex, trigonous or triquetrous, multistriate, not scabrellate, not septate-nodulose, firm, often slightly tuberous-thickened at the base. Leaves 2 to 4 on a culm, filiform to 1.5 mm. wide, wiry, 10 to 40 cm. long, triquetrous to conduplicate, antrorsely scabrellate on the margins and dorsal midrib and occasionally on the ventral surface near the apex, the sheaths reddish brown. Bracts 3 to 5, 1 to 18 cm. long, filiform, wiry, triquetrous, antrorsely scabrellate on the angles. Inflorescence usually contracted into 1 to 4 dense heads at the summit of the culm, occasionally some of the heads

peduncled. Heads 5 to 15 mm. in diameter, ovate or subglobose. Peduncles sometimes 0.5 to 3 cm. long, glabrous, multistriate, setaceous. Spikelets 5 to numerous, 5 to 9 mm. long, 2 mm. wide, compressed, oblong-lanceolate, acute, 4- to 12-flowered. Rhachilla 0.2 mm. wide, straight, the wing not more than 0.1 mm. wide, white-hyaline, persistent. Bracteole 2 to 3 mm. long, 0.3 mm. wide, ovate-acuminate or caudate, scabrellate on the margins. Secondary prophyllum 1.5 to 2.0 mm. long, oblong-obtuse or acute, sheathing the rhachilla. Glumes equal, 2.2 to 2.8 mm. long, 1.2 to 1.6 mm. wide, ovate to oblong-lanceolate, tridentate at the apex, obscurely to distinctly 7- to 9-nerved, spreading when mature, the keel green, sometimes scabrellate, the sides white-hyaline to yellow, the margins hyaline. Stamens 3, originating at the angles of the achene; anthers 0.3 mm. long, 0.1 mm. wide, oblong; connective not produced. Style 2 mm. long; stigmas 3. Achene 1.2 to 1.5 mm. long, 0.5 to 0.8 mm. wide, obovoid to oblong-ellipsoid, brown, punctulate, the sides concave, scarcely apiculate, neither stipitate nor torulose, not beaked, not iridescent.—Tropical pinelands and prairies; Mexico, south to Colombia.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Lundell 6818*. GUATEMALA: Dept. Peten, La Libertad, *Aguilar 6*.

19. *C. LANCEOLATUS* Poir. var. *COMPOSITUS* Presl, *Reliq. Haenk.* **1**: 167. 1830.

C. melanostachyus Kunth, *Enum. Pl.* **2**: 10. 1837, pro parte (fide Kükenth.); non H. B. K.

C. helvus Liebm. *Vidensk. Selsk. Skr. ser. 5.* **2**: 197. 1851.

C. ambiguus Liebm. *Vidensk. Selsk. Skr. ser. 5.* **2**: 199. 1851; non Steud.

C. correctus Steud. *Syn.* **7**. 1855.

C. Jacquemontii Boeck. *Linnaea* **35**: 442. 1868.

C. Olfersianus var. *elatiior* Boeck. *Linnaea* **35**: 440. 1868.

C. Olfersianus Boeck. *Engler Bot. Jahrb.* **1**: 362. 1881.

C. lepidus Phil. *Anal. Univ. Chile* **93**: 347. 1896; teste Kükenth.

C. lanceolatus var. *helvus* Kükenth. in *Fedde, Repert.* **32**: 74. 1933.

Pycreus densus Urb. *Symb. Antill.* **2**¹: 164. 1900.

Pycreus helvus Clarke in Urb. *Symb. Antill.* **2**¹: 19. 1900.

Perennial. Roots fibrous, 0.1 to 1.0 mm. wide, 1 to 7 cm. long. Rhizome 0.3 mm. thick, 0 to 5 cm. long, scarcely ligneous, internodes about 5 mm. long. Culms caespitose, contiguous, 15 to 40 cm. tall, 1.5 mm. thick at the base, 0.5 to 1.0 mm. thick at the apex, trigonous, multistriate, not scabrellate, flaccid, compressed, not septate-nodulose. Leaves 2 to 4 on a culm, shorter than the culm, 1 to 2 mm. wide, acuminate, membranous, flat, erect, upwardly scabrellate on the margins and dorsal midrib particularly toward the apex, the sheaths reddish brown. Bracts 2 to 4, unequal in length and width, 2 to 8 cm. long, 2 mm. wide, surpassing the inflorescence, in other respects like the leaves. Rays 1 to 5, rarely wanting, unbranched, unequal, 0.5 to 4.0 cm. long, ascending, each with 4 to 17 spikelets, capitate at the apex. Peduncles of rays 0.3 to 2 cm. long, 0.5 mm. thick or less, glabrous, multistriate. Prophyllum 2 to 3 mm. long, tubular. Heads about 15 mm. in diameter. Spikelets 3 to 7 mm. long, 1.5 to 2.0 mm. wide, lanceolate, flat, 5- to 16-flowered. Rhachilla about 0.5 mm. wide, straight or slightly zigzag, straw-colored, the wings obsolete. Glumes 1.5 mm. long, 1.0 to 1.4 mm. wide, subequal, broadly ovate, obtuse at the apex, 3-nerved, the keel green to brown, the sides hyaline. Stamens 2; anthers 0.4 mm. long, linear, reddish; connective red; filament about 0.6 mm. long, linear, white hyaline. Style about 0.6 mm. long; stigmas 2, about 1 mm. long. Achene 0.9 to 1.0 mm. long, 0.5 to 0.6 mm. wide, lenticular, obovate-ellipsoid, the sides convex, stipitate, not beaked, surfaced with hexagonal cells, reddish brown.—Banks of streams and borders of forests; Florida, Texas, Mexico, West Indies, south to Paraguay.

BRITISH HONDURAS: El Cayo District—Vaca, *Gentle 2318, 2557*. Stann Creek District—Melinda Pine Ridge road, *Gentle 1935*.

20. *C. LENTIGINOSUS* Millsp. & Chase, Field Mus. Bot. 3¹: 74. 1903.

C. tenuis Swartz var. *lentiginosus* (Millsp. & Chase) Kükenth. in Pflanzenreich 4²⁰: 418. 1936.

Perennial. Roots fibrous, about 0.5 mm. thick. Culms contiguous, 25 to 80 cm. long, uniformly thick from base to apex (0.5 to 1.5 mm.), trigonous, multistriate, not scabrellate, not septate-nodulose, firm, slightly tuberous-thickened at the base. Leaves 2 to 4 on a culm, 2 to 6 mm. (rarely 10) wide, acuminate, membranous, flat, erect, minutely antrorsely scabrellate on the margins, on the dorsal midrib, and on the ventral surface, not septate-nodulose, the sheaths reddish purple. Bracts 6 to 10, 5 to 45 cm. long, 1 to 5 mm. wide, in other respects like the leaves; bractlets setaceous. Rays 6 to 16, sometimes branched, 0 to 17 cm. long, obliquely spreading or ascending. Raylets 1 or 2, originating at the base of the spike, subequal. Peduncles of rays 0 to 14.5 cm. long, setaceous, glabrous, multistriate. Prophyllum 7 to 18 mm. long, tubular-inflated, the acuminate apex prolonged 2 to 3 mm., red punctate. Spike 20 to 35 mm. long, 20 to 25 mm. wide, short-oblong. Spikelets distichous, 10 to 13 mm. long, 1 to 1.5 mm. wide, linear-lanceolate, terete, divaricate or slightly reflexed, 4- to 6-flowered. Rhachilla about 0.1 mm. wide, straight, straw-colored, wings about 0.3 mm. wide, colorless, sometimes spotted with purple, hyaline, persistent, clasping the achene. Bracteole 1 to 6 mm. long, 0.2 to 1.0 mm. wide, ovate, acute to long caudate. Secondary prophyllum, 1 to 2.5 mm. long, 0.8 to 1.0 mm. wide, ovate or oblong-ovate, sheathing the rhachilla. Glumes equal, 4 to 5 mm. long, 1 mm. wide, oblong-lanceolate, short mucronate, 7- to 11-nerved, appressed or somewhat spreading at the tips, clasping the achene, the keel green, the sides light brown, spotted with dark purple. Stamens 3, originating at the angles of the achene; anthers linear-oblong, 0.3 to 0.4 mm. long, 0.1 mm. wide; filaments 3.5 to 5.0 mm. long, 0.1 to 0.2 mm. wide. Style about 0.5 to 1.0 mm. long; stigmas 3, 1.5 to 2 mm. long. Achene 1.8 to 2.0 mm. long, 0.6 to 0.7 mm. wide, trigonous, obovoid-oblong, brown, conspicuously punctate, the sides concave, sometimes slightly falcate; neither stipitate nor torulose at the base, not iridescent, not beaked.—“Moist places”; Yucatan, British Honduras.

YUCATAN: San Felipe, *Gaumer 1402*. Izamal, *Gaumer 2487*. Muna, *Swallen 2653*. Peto, *Swallen 2675*. Merida, *Schott 565*. QUINTANA ROO: Chichankanab, *Gaumer 1282, 1283, 1284, 1286, 1287, 1290, 1296, 2145, 2331, 23416*. Tancah, *Swallen 2806*. San Miguel, Cozumel Island, *Swallen 2814*. BRITISH HONDURAS: Corozal District—San Antonio, *Lundell 4994*.

21. *C. LIGULARIS* L. Pl. Jamaic. Pugill. 3. 1759.

C. callophorus G. F. W. Meyer, Fl. Esseq. 32. 1818.

C. ventricosus Nees, Flora 11: 332. 1828; non R. Br.

C. coriaceus Schrad. ex Nees in Mart. Fl. Bras. 2¹: 42. 1842.

C. rubescens Schrad. ex Steud. Syn. 27. 1855; non Kunth.

C. punctatifolius Steud. Syn. 27. 1855.

C. glandulosus Rolfe, Journ. of Bot. 20: 362. 1882.

C. trigonus Boeck. Cyp. Nov. 1: 11. 1888; teste Kükenth.

C. Sintenisii Boeck. Cyp. Nov. 1: 12. 1888; teste Kükenth.

C. rionensis Boeck. Cyp. Nov. 1: 12. 1888; teste Kükenth.

C. glauco-viridis Boeck. Allg. Bot. Zeitschr. 2: 19. 1896.

Mariscus rufus H. B. K. Nov. Gen. et Sp. 1: 216. 1815.

Mariscus coriaceus G. F. W. Meyer, Fl. Esseq. 38. 1818.

Mariscus glandulosus Bojer, Hort. Maurit. 382. 1837; teste Kükenth.

Mariscus ligularis Urban, Symb. Ant. 2¹: 165. 1900.

Perennial. Roots fibrous, rigid, sometimes densely puberulent, 0.5 to 3 mm. thick, 10 to 150 mm. long. Rhizome very short, 1.5 cm. long, 1 cm. wide, ligneous. Culms contiguous, 30 to 90 cm. tall, 2 to 5 mm. thick at apex, 5 to 7 mm. thick at base, trigonous, papillose, firm, yellowish or cinereous green. Leaves longer or shorter than the culm, 5 to 20 mm.

wide, acuminate, membranous, flat, septate-nodulose, papillose, spinulose-scabrellate on margins and dorsal midrib, and sometimes on the ventral surface, yellowish or cinereous green. Leaf-sheaths reddish brown. Bracts 5 to 12, unequal in length and width, 20 to 85 cm. long, 5 to 15 mm. wide, shorter than or surpassing the inflorescence, in other respects like the leaves. Rays 5 to 12, branched, unequal, 3 to 16 cm. long, 1 to 3 mm. thick; peduncles papillose. Prophyllum about 0.5 to 3 cm. long, tubular-inflated, varying from acute to 2-toothed at the apex, often red-punctulate. Spikes 3 to 7 in a cluster at the ends of the rays, dense, sessile or on short pedicels, 15 to 25 mm. long, 10 to 12 mm. wide. Terminal spike mostly oblong-cylindric, longer and usually wider than the lateral, subglobose, divaricate or reflexed ones. Spikelets 3 to 7 mm. long, 2 to 2.7 mm. wide, pleiostichous, very numerous, 2- to 6-flowered, turgid, terete, divaricate at 90 degrees to the rhachis, the lower reflexed. Rhachilla 0.1 to 0.2 mm. wide, zigzag, reddish brown. Wings of rhachilla 1 to 1.4 mm. long, 0.2 to 0.6 mm. wide, ovate-obtuse, hyaline, clasping achene. Bracteole 1.1 mm. long, 0.5 mm. wide, ovate, mucronate, membranous, light brown, red-lineolate. Secondary prophyllum 1.5 mm. long, 0.75 mm. wide, obtuse, obovate. Basal callosity 0.15 mm. long, 0.1 mm. wide. Glumes 2.0 to 2.5 mm. long, 1.2 to 2 mm. wide, ovate, apiculate, chartaceous with membranous margins, lustrous, 9- to 11-nerved, brown or straw-colored with reddish brown striations, the keel green, clasping, involute, imbricated, the uppermost sterile, the lowermost a little larger than those above, tardily deciduous, bases persisting. Stamens 3, originating at the angles of the achene; anthers 0.6 mm. long, 0.1 or 0.2 mm. wide, linear, acute, apiculate, red; connective red, slightly prolonged; filament 2.4 to 4 mm. long, 0.05 to 0.2 mm. wide, flat, straw-colored. Styles 0.5 mm. long; stigmas 3, about 1 mm. long. Achene 1.2 to 1.4 mm. long, 0.5 mm. thick, trigonous, obovoid-ellipsoid, apiculate, brown, raised-punctulate, the sides slightly concave, substipitate, not beaked, neither curved nor falcate, not iridescent.—Beaches and brackish marshes; Florida, West Indies, Mexico, south to Brazil; pantropical.

YUCATAN: San Felipe, *Gaumer 1401*. BRITISH HONDURAS: Corozal District—San Antonio, *Lundell 4763*; Santa Rita, *Lundell 5015*. Belize District—Belize, *Lundell 1883, 1909, 1949, 4708*; *O'Neil 8947*. Stann Creek District—Newtown, *Schipp 902*.

22. *Cyperus Lundellii* O'Neill, sp. nov.

FIG. 2.

Rhizoma brevis. Radices 1–2 mm. crassi. Culmus 60–100 cm. altus, apice 2–3.5 mm. crassus, basi 2–5 mm. crassus, triquetter, rectus, angulis apice antrorse scabrellatis, vix septato-nodulosus, multistriatus. Foliae 3–6, 20–90 cm. longae, 3–6 mm. latae, subcoriaceae, planae, apice triquetres, interdum obscure septato-nodulosae, marginibusque costis antrorse scabrellatis, supra glabrae. Bracteae 3–4, 4–45 cm. longae, 2–5 mm. latae, valde inaequales antheram compositam longe superantes. Radii 5–8, 0–17 cm. longi, 0.3–1.0 mm. lati, glabri. Radioli 3–6, 0–4 cm. longi. Spiculae 6–13 mm. longae, 2 mm. latae, lineares, acutae, tumidulae, 3–6-nim digitatae, 12–32-florae. Rhachilla 0.2 mm. lata, recta, exalata, straminea. Glumae 1.7–2.0 mm. longae, 1.5–1.8 mm. latae, suborbiculatae, acutae, mucronulatae, laxae dispositae, membranaceae, obsolete 3-nervosae, basi articulatae persistentes, lateribus stramineae. Stamina 3 in annulo calloso inserta; antherae lineares apice albo-setosae; filamenta 1–1.3 mm. longa, 0.1 mm. lata, brunnea. Stylus 0.5–1.0 mm. longus; stigmata 3, 0.5–1.0 mm. longa. Achaenium 1 mm. longum, 0.5 mm. latum, trigonum, ovatum, nigrescens, acutum, substipitatum, conspicue verrucosum, haud falcatum.

Perennial. Roots 1 to 2 mm. thick. Rhizome short. Culm contiguous, 60 to 100 cm. tall, 2 to 5 mm. thick at the base, 2 to 2.5 mm. thick at the apex, triquetrous, erect, antrorsely scabrellate on the angles, obscurely septate-nodulose, multistriate. Leaves 3 to 6 on a culm,

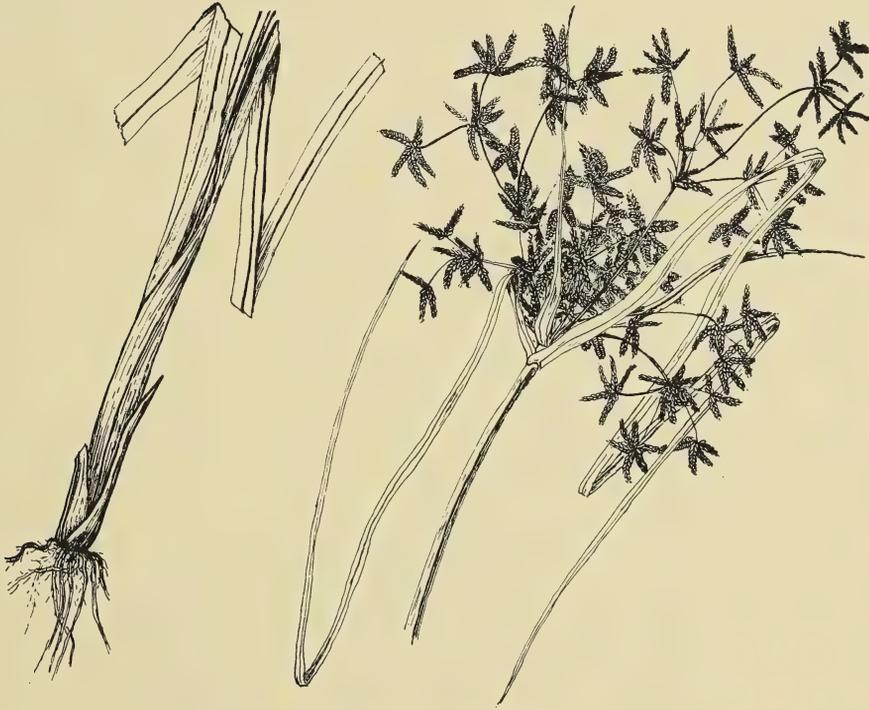
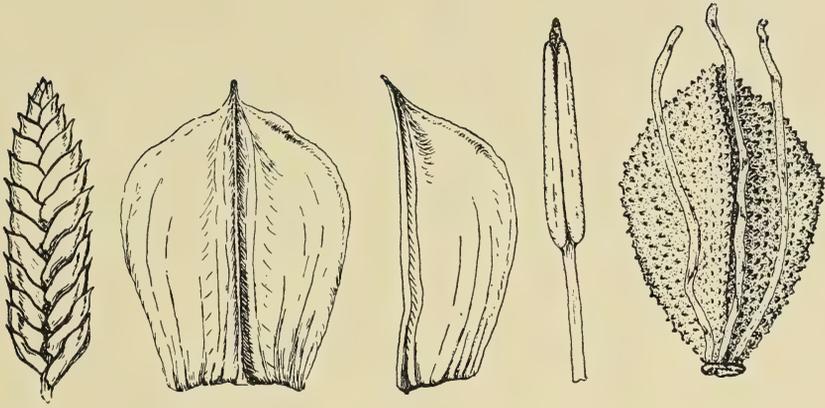


FIG. 2—*Cyperus Lundellii*
Spikelet $\times 4$; glumes $\times 20$; anther and achene $\times 40$; habit sketch $\times 1$.
(Drawn by Sister Teresita Kittel, O.S.F.)

20 to 90 cm. long, 3 to 6 mm. wide, subcoriaceous, flat, triquetrous at the apex, sometimes obscurely septate-nodulose, antrorsely scabrellate on the margins and dorsal midrib, smooth on the ventral surface. Bracts 3 or 4, 4 to 45 cm. long, 2 to 5 mm. wide, much exceeding the inflorescence. Rays 5 to 8, 0 to 17 cm. long, 0.3 to 1 mm. wide, glabrous. Raylets 3 to 6, 0 to 4 cm. long with 3 to 6 spikelets, digitately arranged at the summit. Spikelets 6 to 13 mm. long, 2 mm. wide, linear, acute, turgid, flat, 12- to 32-flowered. Rhachilla 0.2 mm. wide, straight, wingless, straw-colored. Glumes equal, 1.7 to 2.0 mm. long, 1 to 1.2 mm. wide, suborbicular, acute, mucronulate, spreading, membranous, very obsolete 3-nerved, not scabrellate on the greenish keel, the sides straw-colored, articulated to the persistent bases. Stamens 3, two originating at the base of one lateral face, the third at the other; anthers 0.6 mm. long, 0.1 mm. wide; connective slightly prolonged, white setose; filaments 1 to 1.3 mm. long, 0.1 mm. wide, brown, confluent as a basal ring. Style 0.5 to 1.0 mm. long, its branches 3, 0.5 to 1.0 mm. long. Achene 1 mm. long, 0.5 mm. wide, trigonous, ovoid, black at maturity, acute, short-stipitate, conspicuously verrucose, not falcate, slightly iridescent.—Type specimen in the University of Michigan Herbarium; duplicate in the Langlois Herbarium, Catholic University of America: *Lundell 2657*, on riverbank, Subin River, Monte Santa Teresa, Dept. Peten, Guatemala.

GUATEMALA: Dept. Peten, El Paso, *Lundell 1475*.

This species finds its place in Kükenthal's treatment of *Cyperus* (Pflanzenreich 4²⁰². 1936) in the subgenus *Eucyperus*, section *Incurvi*. Its nearest relative appears to be *C. miliifolius* Poepp. & Kunth. The following key differentiates these two species:

Leaves 10 to 20 mm. wide; glumes 7- to 9-nerved, brown; achene punctulate *C. miliifolius*
 Leaves 3 to 6 mm. wide; glumes obscurely 3-nerved, straw-colored; achene verrucose . . . *C. Lundellii*

The verrucose achene distinguishes the species sharply from any other near relatives.

23. *C. LUZULAE* (L.) Retz. Obs. 4: 11. 1786.

C. polycephalus Lam. Ill. 1: 147. 1791.

C. sphaerostachys Link, Jahrb. 1³: 89. 1820.

C. globuliferus Link, Jahrb. 1³: 89. 1820; non Presl.

C. Trinitatis Steud. Synops. 26. 1855.

C. pseudosurinamensis Boeck. Allg. Bot. Zeitschr. 1: 201. 1895.

C. Bangianus Gandoger, Bull. Soc. Bot. Fr. 66: 297. 1919.

C. guatemalensis Gandoger, Bull. Soc. Bot. Fr. 66: 297. 1919.

Kyllinga polycephala Link, Enum. 1: 47. 1821; "planta non evoluta."

Mariscus polycephalus Link, Hort. Berol. 1: 324. 1827.

Mariscus parviflorus Nees, Flora 11: 329. 1828.

Scirpus Luzulae L. Sp. Pl. ed. 2. 75. 1762; teste Uittien.

Glabrous perennial. Roots fibrous, about 0.5 to 1.0 mm. thick, 0 to 12 cm. long. Rhizome 0.5 to 3.5 cm. long, about 0.5 mm. thick, ligneous. Culms contiguous, 18 to 50 cm. tall, bluntly trigonous, multistriate, not septate-nodulose, stout and rigid, sometimes tuberous-thickened at the base. Leaves 5 to 12, 7 to 40 cm. long, 3 to 8 mm. wide, acute or acuminate, coriaceous, flat, erect, rarely and obscurely septate-nodulose, minutely and evenly antrorsely scabrellate on the margins and dorsal midrib, smooth on the ventral surface, the sheaths reddish brown. Bracts 7 to 11, 1 to 40 cm. long, in other respects like the leaves. Rays 6 to 12, the few spikes at the summit of each contracted into a dense ovoid to oblong-ovoid head, 6 to 15 mm. in diameter. Peduncles of rays 1.0 to 5.5 cm. long, multistriate. Spikelets 2.5 to 4.0 mm. long, 2 mm. wide, ovate to oblong-ovate, very much compressed, 6- to 16-flowered. Rhachilla less than 0.1 mm. wide, greenish or straw-colored, wingless. Glumes 1.2 to 1.5 mm. long, 0.8 to 1.0 mm. wide, ovate to oblong-ovate, membranous, incurved, slightly mucronate, not clasping the achene, the base persisting, obsolete 3-nerved, the keel obscure,

the sides white or yellowish and coarsely cellular. Stamen 1, originating at one of the lateral angles; anthers linear; filaments 1.5 mm. long, 0.1 mm. wide, flat, hyaline. Style 0.5 mm. long; stigmas 3, 1 mm. long. Achene 1 mm. long, 0.25 to 0.3 mm. wide, trigonous, linear-oblong, acuminate, the sides flat, falcate, scarcely stipitate at the base, minutely punctulate, not iridescent, slightly apiculate.—Clearings, shores, riverbanks and marshes; West Indies, Mexico, south to Paraguay.

BRITISH HONDURAS: Belize District—Belize, *O'Neill* 8986; Boomtown, *O'Neill* 8988; Maskall, *O'Neill* 8987; Sibun River, *O'Neill* 8989; Prospecto, Northern River, *Gentle* 889. El Cayo District—Little Cocquericot, Belize River, *Lundell* 3970; San Antonio, *Bartlett* 13073. Stann Creek District—Stann Creek, *O'Neill* 8983. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2523; *Aguilar* 9.

24. *C. MACROCEPHALUS* Liebm. Vidensk. Selsk. Skr. ser. 5. 2: 221. 1851.

C. oxycarioides Britton, Bull. Torr. Bot. Club 11: 86. 1884.

Perennial. Roots fibrous, about 0.5 to 1 mm. thick. Rhizome very short. Culms contiguous, 15 to 65 cm. tall, about 2 to 3 mm. thick at the base, 1 to 2 mm. thick at the apex, trigonous, glabrous, multistriate, not septate-nodulose, not scabrellate, firm, slightly tuberous-thickened at the base. Leaves 2 to 3 on a culm, 15 to 40 cm. long, 2 to 7 mm. wide, subcoriaceous, acuminate, flat, revolute, not septate-nodulose, antrorsely scabrellate on the margins, the dorsal midrib, and on the ventral surface toward the apex and on the more prominent veins, the sheaths reddish brown. Bracts 4 to 7, unequal, 4 to 10 cm. long, 1.5 to 8 mm. wide, in other respects like the leaves. Inflorescence very densely contracted at the summit of the culm into a solitary, terminal, globose, compact head, 10 to 40 mm. in diameter. Spikelets 5 to 12 mm. long, 1 mm. wide, 4- to 12-flowered, subcompressed, oblong to linear-lanceolate. Rhachilla readily disarticulating into 1-fruited joints, the wings rhomboidal, 0.7 to 0.8 mm. long, lustrous brown, clasping the achene, persistent. Glumes 2 mm. long, 1.6 mm. wide, ovate, sometimes mucronulate, chartaceous, obscurely 7- to 9-nerved, imbricate, clasping the achene, the keel green, not scabrellate, the sides stramineous to reddish brown, the margins white-hyaline. Stamens 3; anthers 0.5 mm. long, 0.1 mm. wide; connective slightly prolonged; filaments 2 to 3 mm. long, 0.1 mm. wide, white-hyaline. Style 0.6 mm. long, its branches about 1 mm. long. Achene ellipsoid, 1.2 mm. long, 0.5 mm. wide, bluntly trigonous, minutely punctulate, short-stipitate, apiculate, not iridescent.—Riverbanks and marshes; Texas to Guatemala.

CAMPECHE: Tuxpeña, *Lundell* 1042. BRITISH HONDURAS: Corozal District—Corozal-Consejo road, *Lundell* 4974. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett* 12769. Remate, *Lundell* 2091.

25. *C. MUTISII* (H. B. K.) Grisebach, Fl. Brit. W. I. 567. 1864.

C. ochreateus Boeck. Linnaea 36: 386. 1870.

C. compresso-triqueter Boeck. Cyp. Nov. 1: 10. 1888; fide Kükenth.

Mariscus Mutisii H. B. K. Nov. Gen. et Sp. 1: 216. 1815.

Mariscus Poeppigianus Kunth, Enum. Pl. 2: 123. 1837.

Mariscus Karwinskianus Kunth, Enum. Pl. 2: 123. 1837.

Mariscus micans Nees in Mart. Fl. Bras. 2¹: 50. 1842.

Mariscus mexicanus Steud. Syn. 64. 1855.

Mariscus oaxacensis Steud. Syn. 65. 1855.

Perennial. Roots fibrous. Rhizome short, ligneous. Culms contiguous, 30 to 100 cm. tall, 2 to 5 mm. thick at the base, 2 to 3 mm. thick at the apex, trigonous, multistriate, rarely scabrellate on angles, not septate-nodulose, rigid, sometimes tuberous-thickened at the base. Leaves 2 to 3 on a culm, 12 to 60 cm. long, 2 to 12 mm. wide, long-attenuate, subcoriaceous,

flat, becoming involute, erect, not septate-nodulose, antrorsely scabrellate on the margins, on the dorsal midribs, and on the ventral surface. Sheaths reddish brown, becoming fibrous. Bracts 5 to 8, 1 to 10 mm. wide, 5 to 37 mm. long, in other respects like the leaves. Rays 7 to 10, 1 to 20 cm. long, with 1 to 6 spikes digitate at the apex. Bractlets 1 to 4 cm. long, setaceous, triquetrous, scabrellate on the angles. Peduncles of rays, 0 to 15 cm. long, glabrous, multistriate. Prophyllum 5 to 40 mm. long, tubular, 2-lobed or 2-awned, the awns sometimes as much as 20 mm. long. Terminal spikes 20 to 45 mm. long, 5 to 10 mm. wide, oblong-cylindric, the lateral 10 to 30 mm. long, 5 to 10 mm. wide, short to long-cylindric. Spikelets 3 to 4 (7) mm. long, 0.8 to 2.0 mm. wide, ellipsoid, divergent or reflexed, tetragonal, 1- to 5-flowered. Rhachilla 0.1 mm. wide, straw-colored, zigzag, the wings about 0.5 mm. wide, clasping the achene, white-hyaline. Bracteole about 1.5 to 2.0 mm. long, 0.5 mm. thick at base, ovate-acute to long-acuminate at the apex. Secondary prophyllum about 1.3 mm. long, 0.8 mm. wide, broadly ovate, obtuse, sheathing the rhachilla. Glumes unequal, the lowermost larger than those above, 2.2 to 3.2 mm. long, 1.5 to 2 mm. wide, clasping-involute, ovate-obtuse to elliptic, occasionally mucronulate, 9- to 13-nerved, membranous, the keel green, not scabrellate, the sides yellow, red-lineolate to brown, the margins hyaline. Stamens 3, rarely 2; anthers 0.6 mm. long, 0.1 mm. wide, linear; connective not produced; filaments 2 mm. long, 0.1 mm. wide. Style about 0.6 mm. long; stigmas 3, 1.5 to 2.0 mm. long. Achene 1.5 to 1.8 mm. long, 0.7 to 0.8 mm. wide, broadly ellipsoid, brown, the sides concave, raised-punctulate, neither stipitate nor torulose at the base, minutely apiculate, not falcate, not iridescent, not beaked.—Clearings, edges of moist forests; Mexico, West Indies, south to Bolivia.

QUINTANA ROO: Coba, *Lundell & Lundell* 7837. BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Lundell* 6710, 6817.

26. *C. MUTISII* (H. B. K.) Griseb. var. *CONTRACTUS* Kükenth. in Engler Pflanzenreich 4²⁰: 486. 1936.

The variety differs from the species in the absence of rays.

BRITISH HONDURAS: El Cayo District—near Camp 6, *Genle* 2314.

27. *C. OCHRACEUS* Vahl, Enum. 2: 325. 1806.

C. Bakeri Clarke, Journ. Linn. Soc. 20: 290. 1883.

Perennial. Roots fibrous. Rhizome short, 3 to 5 mm. thick, ligneous. Culms contiguous, 15 to 80 cm. tall, 1 to 2 mm. thick at apex, 2 to 5 mm. at the base, trigonous, multistriate, not scabrellate, not septate-nodulose. Leaves 6 to 12 on a culm, about as long as the culm, 2 to 6 mm. wide, flat or conduplicate, rarely and obscurely septate-nodulose, minutely scabrellate on the margins and midrib, grayish green; the sheaths purplish brown. Bracts very unequal, 5 to 8, 1 to 30 cm. long, 1 to 6 mm. wide, like the leaves. Rays 6 to 12, 1 to 16 cm. long, often with 1 to 5 raylets, 0 to 2.5 cm. long. Spikelets 5 to 20 mm. long, 2 to 3 mm. wide, oblong-lanceolate to linear, turgid, 16- to 30-flowered, about 12 to 24 spikelets in a flattened, subglobose head. Rhachilla straight, not zigzag, brown, 0.3 mm. wide, 0.1 mm. thick, not winged. Glumes 1.5 to 2.0 mm. long, 1.0 to 1.2 mm. wide, broadly ovate, not imbricated at maturity, chartaceous, cellulose-reticulate, 3-nerved, falcate, straw-colored to bright yellow or pale brown, subapiculate, sometimes minutely upwardly scabrellate on the keel at the apex. Stamen 1; anther linear, 1.2 to 1.4 mm. long, yellow; connective scarcely prolonged, filament 1.0 mm. long. Style 0.5 mm. long, stigma 0.5 mm. long. Achene ellipsoid to oval, 1.3 to 1.5 mm. long, 0.5 to 0.6 mm. wide, conspicuously stipitate and acuminate-apiculate, purplish brown, white-reticulate by a surface layer of single, large cells which are

very thin, gradually caducous and often iridescent.—Marshes and banks of streams; Florida, Texas, West Indies, Mexico, south to Argentina.

CAMPECHE: Champoton, *Steere* 1790, 1973. Tuxpeña, *Lundell* 830. BRITISH HONDURAS: Corozal District—Corozal, *O'Neill* 8978; San Andres, *Lundell* 4810. Orange Walk District—New River, Orange Walk, *O'Neill* 8980. Belize District—Maskall, *O'Neill* 8979; *Gentle* 1018. El Cayo District—Little Cocquericot, Belize River, *Lundell* 3971. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett* 12788.

28. *C. ODORATUS* L. Sp. Pl. 46. 1753; non auct. plur.

- C. ferax* L. C. Rich. Act. Soc. Hist. Nat. Paris 1: 106. 1792; teste Dandy.
C. stellatus Rudge, Pl. Guiana 17. 1805.
C. jubaeiflorus Rudge, Pl. Guiana 17. 1805.
C. ferox Vahl, Enum. 2: 357. 1806.
C. speciosus Vahl, Enum. 2: 364. 1806.
C. raphiostachys Link, Jahrb. 1³: 87. 1820.
C. Michauxianus Schult. in Roem. & Schult. Mant. 2: 123. 1824.
C. fastuosus Hamilton, Prodr. Pl. Ind. Occ. 12. 1825.
C. poaeoides Hamilton, Prodr. Pl. Ind. Occ. 12. 1825.
C. Haenkei Presl, Reliq. Haenk. 1: 172. 1830; non *Mariscus Haenkei* Presl.
C. lomentaceus Nees & Meyen, Linnaea 9: 285. 1834 (nomen).
C. lucidus Kunth, Enum. Pl. 2: 89. 1837.
C. Hamiltonii Kunth, Enum. Pl. 2: 90. 1837.
C. rufinus Liebm. Vidensk. Selsk. Skr. ser. 5. 2: 222. 1851.
C. Sanctae-Crucis Liebm. Vidensk. Selsk. Skr. ser. 5. 2: 223. 1851.
C. granadinus Liebm. Vidensk. Selsk. Skr. ser. 5. 2: 224. 1851.
C. Oerstedii Liebm. Vidensk. Selsk. Skr. ser. 5. 2: 224. 1851.
C. fossarum Liebm. Vidensk. Selsk. Skr. ser. 5. 2: 225. 1851.
C. fragilis Liebm. Vidensk. Selsk. Skr. ser. 5. 2: 226. 1851.
C. longeradiatus Steud. Syn. 37. 1855.
C. pseudostrigosus Steud. Syn. 46. 1855.
C. virginicus Jacq. ex Steud. Syn. 47. 1855.
C. lenticularis Steud. Syn. 48. 1855.
C. bracteolatus Steud. Syn. 49. 1855.
C. consocius Steud. ex Jardin in Mem. Soc. Sc. Nat. Cherb. 4: 11. 1856.
C. calopterus Miq. Fl. Ind. Bat. 2: 282. 1859.
C. holophyllus Miq. Fl. Ind. Bat. 2: 283. 1859.
C. ferruginescens Boeck. Linnaea 36: 396. 1870.
C. pennatus Boeck. Linnaea 36: 404. 1870; non Lam., non Steud.
C. nitidulus Boeck. Linnaea 36: 363. 1870.
C. parvus Boeck. Linnaea 36: 397. 1870.
C. multibracteatus Boeck. Flora 58: 107. 1875.
C. californicus S. Wats. Bot. Calif. 2: 216. 1880.
C. Michauxii Boeck. in Engler Bot. Jahrb. 1: 363. 1881.
C. speciosus var. *parvus* Britton, Bull. Torr. Bot. Club 13: 214. 1886.
C. speciosus var. *squarrosus* Britton, Bull. Torr. Bot. Club 13: 214. 1886.
C. parvispiculatus Boeck. Cyp. Nov. 1: 6. 1888.
C. purpureo-vaginatulus Boeck. Cyp. Nov. 2: 8. 1890.
C. Pohlmanus Kuntze, Rev. Gen. Pl. 3²: 333. 1898.
C. longispicatus Norton, Trans. Acad. St. Louis 12: 37. 1902.
C. Nortoni A. A. Heller, Muhlenbergia 6: 12. 1910.
C. ferax subsp. *speciosus* (Vahl) Kükenth. Pflanzenreich 4²⁰²: 619. 1936.
C. ferax var. *squarrosus* (Britton) Kükenth. Pflanzenreich 4²⁰²: 620. 1936.
C. ferax var. *squarrosus* f. *parvus* (Boeck.) Kükenth. Pflanzenreich 4²⁰²: 620. 1936.
Diclidium Maximiliani Schrad. var. excl. β Nees in Mart. Fl. Bras. 2¹: 52. 1842.
Diclidium lenticulare Nees in Mart. Fl. Bras. 2¹: 53. 1842.
Diclidium odoratum Nees in Mart. Fl. Bras. 2¹: 54. 1842.
Diclidium ferox Nees in Mart. Fl. Bras. 2¹: 54. 1842.

Dididium lomentaceum Nees in Mart. Fl. Bras. 2¹: 55. 1842.

Dididium uliginosum Nees in Mart. Fl. Bras. 2¹: 56. 1842.

Mariscus Pohlianus Nees in Mart. Fl. Bras. 2¹: 50. 1842.

Mariscus ferax Clarke in Hook. Fl. Brit. Ind. 6: 624. 1893.

Torulinium confertum Hamilton, Prodr. Pl. Ind. Occ. 15. 1825.

Torulinium ferax Urb. Symb. Antill. 2¹: 165. 1900.

Torulinium Michauxianum Clarke in Urban, Symb. Antill. 2¹: 56. 1900.

Glabrous perennial. Rhizome short. Roots fibrous, about 1.0 to 2.0 mm. thick. Culms contiguous, 30 to 120 cm. tall, 5 to 10 mm. thick at the base, 3 to 5 mm. thick at the apex, robust, rigid, canaliculate, neither scabrellate nor septate-nodulose, thickened at the base. Leaves 3 to 5 on a culm, 10 to 60 cm. long, 4 to 12 mm. wide, acuminate, subcoriaceous, subrigid, flat, becoming involute, antrorsely scabrellate on the margins, dorsal midrib, and on the more prominent veins of the ventral surface, the sheaths stramineous to brown. Bracts 6 to 8, 6 to 60 cm. long, 1.0 to 12 mm. wide, otherwise like the leaves. Bractlets 5 to 8, 10 to 60 mm. long, 1 to 4 mm. wide. Rays 6 to 12, 0 to 20 cm. long, branched, obliquely spreading or ascending. Peduncles 0 to 4 cm. long, 1 to 2 mm. wide, multistriate. Prophyllum 15 to 60 mm. long, tubular, bicuspidate, the scabrellate-margined teeth as much as 30 mm. long. Raylets 3 to 5, 0 to 6 cm. long, sometimes branched. Spikes 20 to 30 mm. long, 10 to 25 mm. wide, ovate to oblong-cylindric. Spikelets distant and subax, divergent or reflexed, linear-acute to acuminate, 5 to 16 mm. long, 1 mm. wide, more or less terete, (3-) 6- to 16-flowered. Rhachilla readily disarticulating into 1-fruited joints, brown, the wings lustrous brown, about 0.4 to 0.5 mm. wide, 1 mm. long, thick and somewhat spongy, hyaline near the margins, tightly clasping or completely enclosing the achene, persistent. Glumes 2 to 3.5 mm. long, 1.5 to 2.0 mm. wide, broadly ovate to ovate-elliptic, slightly rigid and subcoriaceous, appressed, closely imbricated with the one next above on the same side of the rhachilla, sometimes mucronulate, the broad, nonscabrellate keel green, the sides lustrous brown or red-stramineous, obsoletely 7- to 9-nerved. Stamens 3, originating at the angles of the achene; anthers 0.4 to 0.8 mm. long, 0.1 to 0.2 mm. wide, linear or linear-oblong; connective scarcely produced; filaments about 2.5 mm. long, 0.1 mm. wide. Style 1.0 mm. long; stigmas 3, 1.0 mm. long. Achene 1.0 to 1.5 mm. long, 0.5 mm. wide, oblong to obovoid-oblong, trigonous, brown to black, somewhat falcate, slightly stipitate, apiculate, the style base sometimes persistent as a beak 1.2 mm. long, minutely punctulate, not iridescent.—Marshes, ponds, riverbanks; Massachusetts to Minnesota to California, West Indies, and south to Argentina; pantropical.

QUINTANA ROO: Chichankanab, *Gaumer 1288, 1289, 2495*. BRITISH HONDURAS: Belize District—Boomtown, *O'Neill 8946*. Stann Creek District—Stann Creek, *O'Neill 8954*; Middlesex, *Schipp 361*.

29. C. PERUVIANUS (Lam.) F. N. Williams, Bull. Herb. Boiss. ser. 2. 7: 90. 1907.

C. aphyllus (Kunth) F. Muell. Fragm. 8: 272. 1874; nec Vahl, nec Boeck., nec Hassk.

Kyllinga peruviana Lam. Encycl. 3: 366. 1789.

Kyllinga vaginata Lam. Illustr. 1: 148. 1791.

Kyllinga globosa Beauv. Fl. d'Oware 1: 50. 1804.

Kyllinga capitata Beauv. Fl. d'Oware 1: 50. 1804.

Kyllinga tibialis Ledeb. in Schrad. Neues Journ. 2²: 291. 1805.

Kyllinga aphylla Kunth, Enum. Pl. 2: 127. 1837.

Lyprolepis denudata Steud. Syn. 130. 1855.

Mariscus aphyllus Vahl, Enum. 2: 373. 1806.

Glabrous perennial. Roots fibrous, about 0.5 mm. thick, about 10 cm. long. Rhizome 10 to 30 cm. long, about 5 mm. thick, ligneous, the internodes about 1 cm. long, scales about 6 mm. in diameter, broadly ovate, brown. Culms about 1 cm. apart, 30 to 65 cm. tall, about

3 mm. thick at the base and 1 mm. thick at the apex, somewhat quadrangular, multistriate, not scabrellate, not septate-nodulose, firm, often compressed at the apex. Leaves wanting or reduced to laminae 1 cm. or less in length, not scabrellate, not septate-nodulose, the sheaths yellowish brown, coriaceous, not becoming fibrous, progressively longer from the outer to the inner, about 6 to 12 on a culm. Bracts 2 to 4, unequal in length, about 0.3 to 3.0 cm. long, the shorter 4 mm. wide, the longer 1.5 to 2.0 mm. wide, lanceolate-acuminate, antrorsely scabrellate, not septate-nodulose. Heads globose, 6 to 10 mm. in diameter, very dense with numerous, 1-flowered spikelets. Glumes unequal, the longer about 3.0 to 3.5 mm. long, 1.2 mm. wide, 7-nerved, the shorter 2.5 mm. long, 1.2 mm. wide, 11-nerved, oval, membranous, acuminate at the apex, the keel and sides straw-colored, not scabrellate. Stamens 3; anthers 1 mm. long, about 0.1 mm. wide; filaments about 1 mm. long, white-hyaline. Style about 0.5 mm. long; stigmas 2, about 1.4 mm. long, fimbriate. Achene about 1.1 mm. long, 0.6 mm. wide, compressed-lenticular, obovate, yellow to light brown, the sides slightly convex, neither stipitate nor beaked.—Sea beaches and riverbanks; West Indies, British Honduras, south to Colombia.

BRITISH HONDURAS: Stann Creek District—Stann Creek, *O'Neill* 8969; Middlesex, *Schipp* 382.

30. *C. PLANIFOLIUS* L. C. Rich. Act. Soc. Hist. Nat. Paris 1: 106. 1792.

C. brunneus Swartz, Fl. Ind. Occid. 1: 116. 1797.

C. brizaeus Vahl, Enum. Pl. 2: 316. 1806.

C. purpurascens Vahl, Enum. Pl. 2: 359. 1806.

C. glaucus Steud. Syn. 42. 1855.

C. glaucus β *gracilis* Boeck. Linnaea 36: 339. 1870.

C. Ottonis Boeck. Linnaea 36: 350. 1870.

C. evaginatus Boeck. Linnaea 36: 351. 1870.

C. Ottonis var. *humilior* Boeck. Linnaea 36: 351. 1870.

C. discolor Boeck. Cyp. Nov. 1: 7. 1888.

C. Krugii Boeck. Cyp. Nov. 1: 8. 1888.

C. Solmsii Boeck. Allg. Bot. Zeitschr. 2: 3. 1896; teste Kükenth.

C. planifolius var. *brunneus* (Sw.) Kükenth. in Fedde, Repert. 23: 189. 1926.

C. planifolius var. *Ottonis* (Boeck.) Kükenth. in Fedde, Repert. 23: 188. 1926.

C. planifolius var. *brunneus* f. *decolorans* Kükenth. Pflanzenreich 4²⁰: 449. 1936.

C. planifolius var. *brunneus* f. *gracilis* (Boeck.) Kükenth. Pflanzenreich 4²⁰: 449. 1936.

C. planifolius var. *Ottonis* f. *humilior* (Boeck.) Kükenth. Pflanzenreich 4²⁰: 449. 1936.

Mariscus purpurascens Clarke, Kew Bull. 283. 1893.

Mariscus brizaeus Clarke in Urban, Symb. Antill. 2¹: 52. 1900.

Mariscus brunneus Clarke in Urban, Symb. Antill. 2¹: 51. 1900.

Mariscus planifolius Urban, Symb. Antill. 2¹: 165. 1900.

Perennial. Roots fibrous. Culms robust, 60 to 90 cm. tall, 3 mm. thick at the apex, about 5 to 8 mm. thick at the base, trigonous, somewhat sulcate, rarely scabrellate, not septate-nodulose, firm, slightly tuberous-thickened at the base. Leaves 5 or 6 on a culm, longer or shorter than the culm, 13 to 90 cm. long, 3 to 10 mm. wide, acuminate, coriaceous, flat, erect, not septate-nodulose, antrorsely scabrellate on the margins and dorsal midrib, the sheaths brown, becoming fibrous. Bracts 4 to 8, unequal, 10 to 60 cm. long, 3 to 8 mm. wide, otherwise like the leaves. Rays 0 to 7, unequal, 0 to 8 cm. long, ascending, with 1 to 3 broadly ovate spikes, 1.0 to 3.0 cm. in diameter, aggregated into a loose or dense head, 1.5 to 3.5 cm. in diameter. Peduncles 0.5 to 5 cm. long, glabrous, multistriate. Prophyllum 6 to 10 mm. long, tubular-inflated, paleaceous, truncate or 2-lobed. Spikelets 6 to 16 mm. long, 1.5 to 3 mm. wide, 1 mm. thick, linear-acute, divaricate or appressed, 8- to 14-flowered. Rhachilla 0.3 mm. wide, straight, stramineous, the wings 0.6 mm. wide, about 1.5 mm. long, stramineous, red-punctate, clasping the achene. Bracteole 1 to 2 mm. long, about 1

mm. wide, ovate-acute. Secondary prophyllum 2 mm. long, 1 mm. wide, broadly ovate, obtuse or truncate, sheathing the rhachilla. Glumes 3 to 3.5 mm. long, 1.2 mm. wide, ovate-lanceolate, subacute, mucronulate, 7- to 11-nerved, imbricate, lax, the keel green or brown, not scabrellate, the sides lustrous brown, the margins yellow-hyaline, inrolled. Stamens 3, originating at the angles of the achene; anthers 0.8 mm. long, 0.1 to 0.2 mm. wide, linear; connective not prolonged; filament 3.5 mm. long, 0.1 mm. wide, flat. Style 1.5 mm. long, its 3 branches 2 mm. long. Achene 1.6 mm. long, 0.8 mm. thick, trigonous, obovoid-oblong, dark brown to black, sides neither concave nor convex, not stipitate-torulose at the base, neither beaked nor falcate, not iridescent.—Sand dunes, beaches, lagoons; Florida, West Indies, Yucatan.

YUCATAN: Progreso, *Swallen* 2973, 2980. QUINTANA ROO: San Miguel, Cozumel Island, *Swallen* 2890. Tanchah, *Swallen* 2786, 2788, 2789, 2820, 2830, 2831. Mugeris Island; Holbox Island, *Gaumer*.

31. *C. POLYSTACHYOS* Rottb. Descr. et Icon. 39. 1773.

- C. odoratus* auctorum plur.; non L.; teste Dandy.
C. paniculatus Rottb. Descr. et Icon. 40. 1773.
C. fascicularis Lam. Ill. 1: 144. 1791.
C. scopellatus L. C. Rich. Act. Soc. Hist. Nat. Paris 1: 106. 1792.
C. olidus Vahl, Enum. Pl. 2: 333. 1806.
C. brizaeus Presl, Rel. Haenk. 1: 168. 1830; excl. syn.
C. flavidus Bojer, Hort. Maurit. 380. 1837; fide Kükenth.
C. Sonderi J. A. Schmidt, Beitr. Fl. Cap Verd. Ins. 162. 1852.
C. teretifractus Steud. in Zoll. Verz. Ind. Archip. 622. 1854; fide Kükenth.
C. teretifractus Steud. Syn. 3. 1855; fide Kükenth.
C. elongatus Steud. Syn. 11. 1855.
C. vulgaris teretifractus Miq. Fl. Ind. Bat. 3: 256. 1859; fide Kükenth.
Chlorocyperus polystachyus Rikli, Pringsheims Jahrb. Wiss. Bot. 27: 563. 1895.
Pycurus polystachyos Beauv. Fl. d'Oware 2: 48. 1807.
Pycurus paniculatus Nees, Linnaea 9: 283. 1835.
Pycurus odoratus Urb. Symb. Antill. 2¹: 164. 1900; non *C. odoratus* L.

Perennial. Roots fibrous, of one kind, 1 mm. or less thick. Rhizome very short. Culms 20 to 55 cm. tall, about 1 mm. thick at the apex and 2 mm. thick at the base, trigonous, smooth, firm. Leaves 2 to 5 on a culm, shorter than the culms, 20 to 30 cm. long, 2 to 4 mm. wide, acuminate, coriaceous, flat, antrorsely scabrellate on the margins and dorsal midribs, the sheaths reddish brown, not becoming fibrous. Bracts 3 to 6, unequal in length, 3 to 14 cm. long, 1 to 2.5 mm. wide, surpassing the inflorescence, in other respects like the leaves. Rays 4 to 6, branched, unequal, 0.6 to 4.0 cm. long, spreading, about 6 raylets to a ray. Peduncles of rays 0.3 to 1.8 cm. long, about 0.4 mm. thick. Prophyllum 4.5 to 5 mm. long, tubular, 2-lobed at the summit. Spikelets 7 to 10 mm. long, about 1.5 mm. wide, compressed, ascending, 13- to 40-flowered. Rhachilla 0.2 mm. wide, zigzag, straw-colored, the wings about 0.3 mm. long, 0.1 mm. wide, oval, colorless, hyaline, persistent. Bracteole about 0.6 mm. long, 0.4 mm. wide, ovate. Secondary prophyllum about 0.9 mm. long, 0.5 mm. wide, ovate-elliptic, sheathing the rhachilla. Glumes about 1.6 mm. long, 1.1 mm. wide, oval, membranous, subequal, obtuse, obscurely 3-nerved, the nerves close to the keel, straw-colored, the margins hyaline. Stamens 2, rarely 1; anthers about 0.4 mm. long, about 0.1 mm. wide, red. Style about 0.5 mm. long; stigmas 2, 1 mm. long. Achene about 1 mm. long, 0.3 to 0.4 mm. wide, obovate-oblong, lenticular, surfaced with hexagonal cells, the sides convex, very short stipitate, short apiculate, brown, becoming black, densely punctulate.—Tropical pinelands and on sandy acid soil; Mexico to West Indies, south to Uruguay; pantropical.

BRITISH HONDURAS: Belize District—Belize, *O'Neill* 8996; Boomtown, *O'Neill* 8997, 8998; Belize, *Lundell* 1877, 1907, 4709; Bakers Pine Ridge, *Lundell* 6988. Stann Creek District—*Schipp* 908.

32. *C. POLYSTACHYOS* Rottb. var. *TEXENSIS* (Torr.) Fernald, *Rhodora* **41**: 530. 1939.

C. holosericeus (auctorum e.g. Kükenthal); non Link.

C. Gatesii Torr. Ann. Lyc. N. Y. **3**: 255. 1836.

C. microdontus Torr. Ann. Lyc. N. Y. **3**: 255. 1836.

C. microdontus var. *texensis* Torr. Ann. Lyc. N. Y. **3**: 430. 1836.

C. fugax Liebm. Vidensk. Selsk. Skr. ser. 5. **2**: 196. 1851.

C. inconspicuus Liebm. Vidensk. Selsk. Skr. ser. 5. **2**: 197. 1851.

C. Liebmanni Steud. Syn. 7. 1855.

C. texensis Steud. Syn. 9. 1855.

C. polystachyos Rottb. var. *leptostachyus* Boeck. *Linnaea* **35**: 478. 1868.

C. polystachyus var. *holosericeus* Clarke, Journ. Linn. Soc. **21**: 55. 1884.

C. filicinus var. *microdontus* Fernald, *Rhodora* **19**: 153. 1917.

C. polystachyos var. *leptostachyus* f. *fugax* (Liebm.) Kükenth. in Fedde, Repert. **23**: 184. 1926.

C. polystachyos var. *leptostachyus* f. *inconspicuus* (Liebm.) Kükenth. Pflanzenreich **4**²⁰: 372. 1936.

Pycneus Olfersianus Nees in Mart. Fl. Bras. **2**¹: 8. 1842; fide Kükenth.

Pycneus polystachyus var. *laxiflora* Clarke in Urb. Symb. Antill. **2**¹: 17. 1900.

Separable from the species by means of the following:

var. *typicus*—Spikelets fasciculate, suberect, forming penicillate clusters at the ends of the rays.

var. *texensis*—Spikelets divaricate, not densely clustered, not penicillate.

Sandy acid soil and pinelands; Virginia to Texas, Mexico, West Indies, south to Ecuador.

BRITISH HONDURAS: Corozal District—Corozal, *Lundell* 4740; San Andres, *Lundell* 5004. Belize District—Belize, *O'Neill* 8992; Boomtown, *O'Neill* 8994, 8995; Bakers Pine Ridge, *Lundell* 7004. Stann Creek District—Stann Creek—Capon road, *Gentle* 1934.

33. *C. PSEUDOVEGETUS* Steud. var. *MEGALANTHUS* Kükenth. Pflanzenreich **4**²⁰: 176. 1936.

Perennial, glabrous throughout. Roots fibrous. Rhizomes short, ligneous, about 3 mm. thick. Culms contiguous 25 to 60 mm. tall, about 2 to 5 mm. thick at the base, 2 to 3 mm. thick at the apex, stout, rigid, trigonous, multistriate, not at all scabrellate, not septate-nodulose. Leaves 5 to 12, 6 to 10 mm. wide, 25 to 60 cm. long, acuminate, membranous, flat to conduplicate, septate-nodulose, minutely antrorsely scabrellate on the margins and dorsal midrib, the sheaths reddish brown, becoming fibrous. Bracts 4 to 8, 0 to 30 cm. long, 1.0 to 8.0 mm. wide, in other respects like the leaves. Rays about 8, unequal, 0 to 5 cm. long, usually with 3 to 6 subglobose heads contracted into a compound head, 12 to 25 mm. in diameter. Peduncles about 0.5 mm. thick, glabrous, multistriate. Prophyllum tubular, 5 to 10 mm. long, paleaceous. Spikelets 4 to 7 mm. long, 3 to 4 mm. wide, ovate, subcompressed, 10- to 20-flowered. Rhachilla about 0.2 mm. wide, straight or curved, brown, wingless. Glumes 2 to 2.5 mm. long, 0.8 to 1 mm. wide, oblong-lanceolate, conspicuously falcate, 3-ribbed, straw-colored, imbricate, reticulate-cellulose, occasionally minutely scabrellate and somewhat cuspidate on the keel at the apex, readily deciduous. Stamen 1; anther linear, about 0.8 to 1.0 mm. long, 0.3 mm. wide; connective prolonged 0.1 mm. beyond the anther; filament 2 to 2.5 mm. long. Style about 0.5 mm. long; stigmas 3, 0.5 to 1.0 mm. long. Achene 1.2 to 1.8 mm. long, 0.2 to 0.3 mm. wide, obscurely trigonous, linear, purplish brown, minutely punctulate, slightly falcate, conspicuously stipitate but not torulose at the base, apiculate, the style base often long persistent as a slender beak.—Riverbanks; Mexico to Guatemala.

GUATEMALA: Dept. Peten, Monte Santa Teresa, *Lundell* 2658.

34. *C. ROTUNDUS* L. Sp. Pl. 45. 1753.

- C. hexastachyos* Rottb. Descr. et Icon. 28. 1773.
C. tetrastachyos Desf. Fl. Atlant. 1: 45. 1798.
C. hydra Michx. Fl. Bor. Amer. 1: 27. 1803.
C. radicosus Sibth. & Smith, Fl. Graec. Prodr. 1: 30. 1806.
C. olivaris Targ.-Tozz. Mem. Soc. Ital. Sc. 13²: 338. 1807.
C. patulus M. Bieb. Fl. Taur. Cauc. 3: 47. 1819.
C. agrestis Willd. ex Link, Jahrb. 1³: 86. 1820.
C. rubicundus Willd. ex Link, Jahrb. 1³: 87. 1820.
C. curvatus Llanos, Fragm. Pl. Philipp. 15. 1851; fide Kükenth.
C. micreilema Steud. Syn. 32. 1855.
C. pallescens Loscos & Pardo, Ser. Imperf. Pl. Aragon. 419. 1866-67; fide Kükenth.
C. stoloniferus β *pallidus* Boeck. Linnaea 35: 490. 1868.
C. herbicavus Melliss, St. Helena 343. 1875; fide Kükenth.
C. purpureo-variegatus Boeck. Cyp. Nov. 2: 37. 1890.
C. rotundatus Koorders, Exkursjonsfl. Java 1: 190. 1911.
Chlorocyperus rotundus Palla, Allg. Bot. Zeitschr. 6: 201. 1900.

Perennial, with fibrous roots. Stolons 5 to 20 cm. long, about 0.5 mm. thick, ending in fibrous coated tubers, 0.5 to 1.0 mm. in diameter. Culms slender, 1 to 1.5 mm. wide at apex, about 2 mm. at base, 15 to 50 cm. tall, triquetrous, sometimes compressed, not at all scabrelate. Leaves 5 to 12, usually clustered at the base of culm, flat, 3 to 6 mm. wide, membranous, smooth, not scabrelate even on margins, about as long as the culm, sheaths reddish brown, sometimes septate-nodulose. Bracts 2 to 4, longer or shorter than the inflorescence, 2 to 5 mm. wide, sometimes slightly scabrelate, unequal. Rays 3 to 8, simple or sometimes branched, 0 to 9 cm. long; peduncles about 0.5 mm. thick, unequal; raylets few. Prophyllum long, tubular, pale, prolonged as two slender, lanceolate teeth. Spikelets 2 to 12 on a spike, linear, compressed, 4 to 40 mm. long, 0.7 to 2.5 mm. wide, 12- to 36-flowered. Wings of rhachilla ovate to lanceolate, 2 to 3.5 mm. long, 0.5 to 1.2 mm. wide, hyaline, colorless or sparsely red-lineolate. Glumes imbricate, membranous, ovate, obtuse, 3 to 3.5 mm. long, 2 to 2.5 mm. wide, reddish brown, the keel green, narrowly hyaline on the margins, 7-nerved, scarcely mucronate. Stamens 3; anthers linear, 2 mm. long \times 0.4 mm. wide; connective produced into a red, ovate appendage, 0.1 to 0.2 mm. long; filaments 4 mm. long, 0.2 mm. wide. Style 2 mm. long; stigmas 3 mm. long. Achenes obovoid to ellipsoid, 1.5 to 1.9 mm. long, 0.9 to 1 mm. wide, black, shining, minutely punctulate, scarcely apiculate.—Waste places and sandy soil; Virginia to Texas, Mexico, West Indies, Argentina; cosmopolitan weed.

YUCATAN: Progreso, *Swallen* 2950, 2962. *Gaumer* 1087, 1088 sine loc. CAMPECHE: Champoton, *Steere* 1753. QUINTANA ROO: Chichankanab, *Gaumer* 2173. BRITISH HONDURAS: Corozal District—Corozal, *Lundell* 4702. Belize District—Gracie Rock, Sibun River, *Gentle* 1616.

35. *C. SEMIOCHRACEUS* Boeck. Flora 61: 29. 1878.

- C. Bourgaei* Clarke ined. ex Lundell, Carnegie Inst. Wash. Publ. 436: 287. 1934 (based on *Pringle* 215 and 13232).

Perennial. Roots fibrous, about 1 to 3 mm. thick. Rhizome short, thick, ligneous. Culms contiguous, 100 to 140 cm. tall, very stout and rigid, about 20 mm. thick at the base, about 8 mm. thick at the apex, ochraceous, bluntly trigonous except at the distinctly triangular apex, glabrous, multistriate, not at all scabrelate. Leaves very coriaceous, shorter than the culm, 15 to 20 mm. wide, brown-indurate-serrulate on the margins, on the dorsal midribs, and sometimes sparingly on the ventral surface. Sheaths 30 cm. long, reddish purple. Bracts

5 to 12, much exceeding the inflorescence, the longest sometimes 90 cm., as much as 20 mm. wide, otherwise like the leaves. Rays 7 to 12, unequal, branched, 0 to 48 cm. long. Prophyllum 2 to 8 cm. long, somewhat flat, brown-serrulate on the margins, produced posteriorly as 1 or 2 long-lanceolate teeth. Raylets 3 to 12, 3 to 10 cm. long, sometimes branched. Bractlets 3 to 7, shorter than or about equaling the raylets, 1 to 8 cm. long, 1 to 2 mm. wide. Spikes, always some sessile and always some peduncled, fasciculate, long-cylindric, 20 to 60 mm. long, 10 to 20 mm. wide, dense. Spikelets divaricate or ascending, pleiostichous, linear-oblong or linear, 3 to 15 mm. long, 1 mm. wide, subcompressed, 8- to 10-flowered. Rhachilla 0.2 mm. wide, brownish, the wings 0.8 mm. long, 0.1 mm. wide, linear-lanceolate, dehiscing spirally from the rhachis, very caducous, lustrous brown. Glumes densely imbricated, lustrous, 1.3 to 1.8 mm. long, 0.6 to 0.7 mm. wide, ovate to obovate, sometimes mucronulate, the nerves obscure, the keel green or brown, the sides lustrous brown, the margins yellow-hyaline. Stamens 3, originating at the angles of the achene; anthers linear, about 0.6 mm. long, 0.1 mm. wide; connective slightly prolonged; filaments 2 to 2.5 mm. long, 0.1 mm. wide, flat, white-hyaline. Style 0.5 to 0.8 mm. long; stigmas 3, about 1 mm. long. Achene 0.8 mm. long, 0.3 mm. wide, compressed-trigonous, oval to ovoid, scarcely apiculate, short-stipitate, not iridescent, pale brown.—Swamps and edges of wet jungles; Mexico to British Honduras.

BRITISH HONDURAS: Belize District—Maskall, *O'Neill* 8943. GUATEMALA: Dept. Peten, Uaxactun, *Bartlett* 12779.

36. *C. SURINAMENSIS* Rottb. Descr. et Icon. 35. 1773.

C. denticulatus Schrad. ex Roem. & Schult. Mant. 2: 104. 1824.

C. surinamensis β *lutescens* Boeck. Linnaea 35: 555. 1868.

C. surinamensis var. *formosus* (Vahl) Kükenth. in Fedde, Repert. 32: 74. 1933.

C. Barrancae M. E. Jones, Contr. West. Bot. 18: 25. 1933.

Perennial. Roots coarsely fibrous. Rhizome very short, about 3 mm. thick. Culms contiguous, 10 to 60 cm. tall, 0.5 to 1 mm. thick at apex, 1 to 3 mm. thick at base, trigonous, downwardly (very rarely partially upwardly) scabrous especially on the angles, multistriate, sometimes compressed, not septate-nodulose. Leaves 2 to 6 on a culm, about as long as the culm, 1 to 3 mm. wide, membranous, flat or conduplicate, bright green, rarely and obscurely septate-nodulose, minutely upwardly scabrellate on the margins, the sheaths purplish or brownish. Bracts 5 to 7, very unequal, 1 to 30 cm. long, 1 to 4 mm. wide, membranous, etc., like the leaves. Rays about 5 to 7, 0 to 7 cm. long, sometimes with raylets 0 to 2 cm. long, the peduncle 0.5 to 1.0 mm. thick; prophylla about 4 to 6 mm. long, hyaline at summit. Spikelets oblong to linear, 3 to 14 mm. long, 2 mm. wide, much compressed, 8 to 40 in usually hemispheric flattened heads, the rhachilla wingless, brown, straight or curved, not zigzag, 1 to 2 mm. wide, 0.05 mm. thick. Glumes 1.0 to 1.5 mm. long, 0.8 to 1.0 mm. wide, ovate, acute or minutely apiculate, sometimes minutely upwardly scabrellate on the keel at the apex, cellulose-reticulate, straw-colored, 3-nerved, thin-membranous. Stamen 1; anther linear, 0.5 mm. long, yellow; filament 1.5 mm. long. Style 0.5 mm. long; stigma 0.4 mm. Achene 0.6 to 0.7 mm. long, 0.2 to 0.3 mm. wide, narrowly ovoid-oblong, bluntly trigonous, faintly transversely rugose, minutely punctulate, short-apiculate, reddish brown.—Marshes and riverbanks; Florida to Texas, Mexico, West Indies, south to Paraguay.

YUCATAN: Progreso, *Swallen* 2962. BRITISH HONDURAS: Belize District—Belize, *O'Neill* 8981, 8982; *Lundell* 1928, 3980. Stann Creek District—Newtown, *Schipp* 922. *Campbell* sine loc.

37. *C. TENUIS* Swartz, Prodr. Veg. Ind. Occ. 20. 1788.

C. caracasanus Kunth, Enum. 2: 86. 1837.

C. platystachyus Griseb. Fl. Brit. W. I. 567. 1864.

C. Hartii Boeck. Cyp. Nov. 1: 9. 1888.

C. flexibilis Maury in Morot, Journ. de Bot. 2: 392. 1888.

C. tenuis var. *grandiceps* Kükenth. Pflanzenreich 4²⁰²: 417. 1936.

Mariscus flabelliformis H. B. K. Nov. Gen. et Spec. 1: 215. 1815.

Perennial. Roots fibrous, 0.1 to 0.5 mm. wide, about 0 to 8 cm. long. Rhizome short. Culms contiguous, caespitose, 10 to 50 cm. tall, 1 to 2 mm. thick at the base, 1 to 1.5 mm. thick at the apex, trigonous, multistriate, smooth, not septate-nodulose, firm, sometimes tuberous-thickened at the base. Leaves 3 to 5 on a culm, 5 to 30 cm. long, 2 to 3 mm. wide, acuminate, membranous, flat, not septate-nodulose, antrorsely scabrellate on the margins, on the dorsal midrib, and sometimes on the ventral surface especially toward the apex, the sheaths reddish purple. Bracts 5 to 9, 4 to 18 cm. long, 2 to 3 mm. wide, in other respects like the leaves. Rays 5 to 12, unbranched, unequal, 0 to 9 cm. long, ascending or obliquely spreading. Peduncles of rays filiform to 0.5 mm. wide, glabrous, multistriate. Prophyllum 5 to 8 mm. long, tubular, acute or acuminate at the summit. Spike 15 to 20 mm. long, 10 to 25 mm. wide, ovate to short-oblong. Spikelets subdistichous, subdense or distant, 5 to 15 mm. long, 1 mm. wide, 3- to 8-flowered, somewhat tetragonal, linear, acuminate. Rhachilla 0.1 mm. wide, straw-colored, the wings 0.2 to 0.3 mm. wide, white-hyaline. Bracteole 0.5 to 5.0 mm. long, 0.3 mm. thick at the base, ovate-acute or acuminate. Secondary prophyllum about 1.5 to 2.0 mm. long, about 0.8 mm. wide, ovate-acute or obtuse, sheathing the rhachilla. Glumes 3 to 3.5 mm. long, 1 mm. wide, oblong-elliptic, obtuse, mucronulate, appressed, 7- to 11-nerved, slightly clasping the achene, base persistent, the keel green, the sides greenish white to brown, the margins hyaline. Stamens 3, originating at the angles of the achene; anthers 0.5 mm. long, about 0.1 to 0.2 mm. wide, linear; connective slightly prolonged; filament 2 to 3 mm. long, 0.1 mm. wide, flat. Style 0.5 to 0.8 mm. long; stigmas 3, 2 to 2.5 mm. long. Achene 1.5 to 2.0 mm. long, 0.4 to 0.5 mm. wide, trigonous, brown, oblong-ellipsoid, falcate, slightly stipitate at the base, scarcely apiculate, the sides slightly concave, conspicuously punctate, not iridescent, dull, not beaked.—Clearings, margins of forests, riverbanks; Mexico to West Indies, south to Brazil; Africa.

BRITISH HONDURAS: Orange Walk District—Orange Walk, *O'Neill* 9004. Belize District—Maskall, *O'Neill* 8999, 9003, 9005, 9006; Belize River, *Lundell* 3963. Stann Creek District—Stann Creek—Mullins River road, *Gentle* 1956. GUATEMALA: Dept. Peten, La Libertad, *Aguilar* 77.

38. *C. UNILOIDES* R. Br. Prodr. Fl. Nov. Holl. 216. 1810.

C. bromoides Willd. ex Link, Jahrb. 3: 85. 1820.

C. angulatus Nees in Wight, Contr. 73. 1834.

C. pseudo-bromoides Boeck. Linnaea 35: 464. 1868.

C. spinuliferus Boeck. Linnaea 35: 465. 1868.

C. angulatus β *capensis* Boeck. Linnaea 35: 465. 1868.

C. Selloanus Boeck. Linnaea 35: 466. 1868.

C. luteolus Boeck. Flora 58: 82. 1875.

C. unioides var. *bromoides* Maury, Mém. Soc. Phys. Genève 31: 125. 1890.

C. tosaensis Makino, Bot. Mag. Tokyo 6: 47. 1892 (nomen); fide Kükenth.

C. Tauberti Boeck. Allg. Bot. Zeitschr. 1: 185. 1895.

Pycreus angulatus Nees, Linnaea 9: 283. 1835.

Pycreus albo-marginatus var. *bromoides* Chodat, Bull. Herb. Boiss. 6: App. 1: 19. 1898.

Pycreus angulatus f. *bromoides* Lindm. Bih. Svenska Vet.-Akad. Handl. 26. Afd. 3⁹: 6. 1900.

Pycreus unioides Urb. Symb. Antill. 21: 164. 1900.

Pycreus umbrosiformis Chermeson, Bull. Soc. Bot. Fr. ser. 4. 67: 326. 1920.

Perennial. Roots fibrous, the longest about 12 cm. long, 1 to 1.5 mm. thick. Rhizome very short. Culms 17 to 90 cm. tall, about 2.5 mm. wide at the base and 1.5 mm. at the apex, trigonous, multistriate, smooth, firm, not septate-nodulose. Leaves 2 to 4 on a culm, 20 to 60 cm. long, shorter than the culms, 1 to 4 mm. wide, attenuate, membranous, flat or conduplicate, antrorsely-scabrellate on the margins, the sheaths dark reddish brown, becoming fibrous. Bracts 2 to 4, unequal in length and width, 2 to 14 cm. long, 1 to 2 mm. wide, surpassing the inflorescence, in other respects like the leaves. Rays 2 to 5, unbranched, unequal, 0 to 15 cm. long, ascending. Peduncles of rays 1 to 12 cm. long, about 0.1 to 0.5 mm. thick. Prophyllum 0.5 to 1.0 cm. long, tubular, acute at the summit. Spikes loose, with 4 to 16 spikelets irregularly arranged. Spikelets 1 to 1.5 cm. long, 3 to 4 mm. wide, very flat, 12- to 24-flowered. Rhachilla quadrangular in cross section, 0.1 mm. thick, about 0.6 mm. wide, zigzag, straw-colored. Glumes about 3.8 mm. long, 1 mm. wide, ovate, subequal, from the base to apex of the spikelet, acute, 3-ribbed, the ribs close to the green, non-scabrellate keel, the sides yellow and red-lineolate, the margins white-hyaline. Stamens 3; anthers about 2.0 mm. long, 0.2 mm. wide, red; filaments 0.1 mm. wide. Style 0.8 to 1.0 mm. long, its branches 0.8 mm. long. Achene about 1.1 mm. long, 1 mm. wide, lenticular, obovate, grayish to black, sunken-punctulate, not stipitate, convex on the sides, short-apiculate, conspicuously cellular.—Banks and marshes; California, West Indies, south to Argentina.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Lundell 6719*.

C. globulosus Aubl. was collected in a mangrove swamp at Sisal in Yucatan by Schott November 9, 1865. Apparently it has not been collected since in our region and seems best omitted.

6. **DICHROMENA** Michx.

Leafy-stemmed perennials. Spikelets aggregated into a solitary, terminal head, compressed, bearing about 3 to 10 achenes, several of the lower glumes usually empty. Glumes spirally imbricate. Perianth wanting. Stamens 3. Style 2-cleft. Achene lenticular, transversely rugulose, the broad, flat style-base persisting as tubercle.

- 1. Leaves 5 to 12 mm. wide. Culms caespitose, 40 to 60 cm. tall, bracts green throughout . . . *D. Watsoni*
Leaves 1 to 3 mm. wide (2).
- 2. Bracts perfectly glabrous, white at the base dorsally and ventrally. Rhizome long (10 to 30 cm.) and conspicuous *D. colorata*
Bracts ciliate at base and sometimes pilose or hirsute as well, green or white. Rhizome wanting or short (rarely as long as 1 to 2 cm. in *D. ciliata*) (3).
- 3. Spikelets often subspicate, 3 to 15, white; tubercle on the achene 0.3 to 0.7 mm. high; bracts usually white at the base *D. ciliata*
Spikelets digitate, 1 to 3, drying cinnamon brown; tubercle on the achene 0.2 to 0.3 mm. high; bracts inconspicuously white, usually green at the base *D. radicans*

I. **DICHROMENA CILIATA** Vahl, Enum. Pl. 2: 240. 1806.
D. nervosa Vahl, Enum. Pl. 2: 241. 1806.

Rhizome very short or rarely 1 to 2 cm. long, the internodes and scales as in *D. colorata*. Culms caespitose, 10 to 60 cm. tall, about 1 mm. thick throughout, conspicuously fibrous at the base, trigonous, multistriate, not scabrellate, not septate-nodulose, erect, wiry, sometimes hirsute at apex. Leaves 4 to 6 on a culm, 10 to 30 cm. long, 1 to 3 mm. wide, sometimes pilose on margins or on the entire dorsal surface or glabrous, not septate-nodulose, not scabrellate except at the apex, 1-ribbed, the sheaths brownish. Bracts 4 to 6, usually white at the base, pilose on the margins at the base and often on the dorsal veins as well. Spikelets 5 to 10 mm. long, ovate-lanceolate, compressed, 3 to 18 in a head, bearing about 3 to 10 achenes, several of the lowest glumes usually empty. Glumes 3 to 5 mm. long, 2 to 3 mm.

wide, ovate to lanceolate, chartaceous, white, 1-ribbed, sometimes antrorsely scabrellate at the apex on the midrib. Stamens 3; anthers 3 mm. long, yellow, conspicuously twisted in drying; filaments about 4 mm. long. Style 2-cleft, 2 mm. long, its branches 2 mm. long. Body of achene about 1.2 mm. in diameter, circular to ovoid, dark brown, transversely rugulose, lenticular, biconvex, crowned on the rounded apex by the wide tubercle (0.3 to 0.7 mm. high, 1.0 mm. wide).—On moist rich soil; British Honduras to South America.

YUCATAN: Uxmal, *Swallen* 2598, 2638. QUINTANA ROO: Coba, *Lundell & Lundell* 7839. Cozumel Island, San Miguel, *Swallen* 2872. BRITISH HONDURAS: Belize District—Belize River, *Lundell* 3976; Cohune Ridge, *O'Neill* 8878; Boomtown, *O'Neill* 8879. Stann Creek District—Mullins River road, *Schipp* 217. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2296; *Aguilar* 41.

2. *DICHROMENA COLORATA* (L.) A. S. Hitchc. Ann. Rep. Mo. Bot. Garden 4: 141. 1893.

Schoenus coloratus L. Sp. Pl. 43. 1753.

Scirpus cephalotes Walt. Fl. Car. 71. 1788; teste Ell. et Britton.

Dichromena leucocephala Michx. Fl. Bor. Am. 1: 37. 1803.

D. cephalotes Britton, Bull. Torr. Bot. Club. 15: 100. 1888.

Rhizome often 10 to 30 cm. long, 1 mm. thick, scarcely ligneous, the internodes about 5 to 15 mm. long, the scales 15 mm. long, linear-lanceolate, hyaline, conspicuously many-ribbed, the ribs long persistent as a fibrous coat. Culm 30 to 60 cm. tall, 1 mm. thick at apex, 2 mm. at the base, spaced about 5 to 10 cm. apart on the rhizome, trigonous, multistriate, smooth, not septate-nodulose, erect. Leaves 4 to 6 on a culm, 10 to 30 cm. long, 1 to 3 mm. wide, flat or conduplicate, thick-membranous, not septate-nodulose, very minutely antrorsely scabrellate toward the apex, 1-ribbed, much shorter than the culm, the sheaths pale green or brownish. Bracts 4 to 6, 1 to 12 cm. long, 1 to 3 mm. wide, soon reflexed, yellowish white at the base dorsally and ventrally. Spikelets 6 to 8 mm. long, 3 to 4 mm. wide, oblong-ovoid, compressed, bearing 6 to 10 achenes, the lower glumes empty, about 30 to 50 spikelets aggregated in the solitary, terminal head, the latter 10 to 20 mm. in diameter. Glumes 3 to 4 mm. long, broadly ovate-lanceolate, thin, white-hyaline, 1-nerved, subacute. Stamens 3; anthers pale yellow, 2 mm. long. Style 2-cleft, 2 mm. long, the branches 2 mm. long. Body of achene 0.8 mm. high, 1.0 mm. wide, truncate at apex (the flat tubercle an additional 0.2 mm. long, 1 mm. wide, entirely covering top of achene), lenticular, biconvex, circular to obovate, transversely rugulose.—Pinelands and low sandy areas; New Jersey to Bahamas, Bermuda, south to British Honduras.

YUCATAN: Progreso, *Swallen* 2909; *Lundell & Lundell* 8208. QUINTANA ROO: Lake Chichankanab, *Swallen* 2730. CAMPECHE: Champoton, *Steere* 1842. BRITISH HONDURAS: Belize District—Maskall, *O'Neill* 8876, 8877; Belize, *O'Neill* 8880; Salt Creek, *O'Neill* 8882. GUATEMALA: Dept. Peten, Lake Peten, Nictun, *Lundell* 3147.

3. *DICHROMENA RADICANS* Schlecht. & Cham. Linnaea 6: 38. 1831.

D. pubera Vahl, Enum. Pl. 2: 241. 1806, pro parte.

Densely caespitose. Rhizome very short. Culm 20 to 45 cm. tall, about 0.5 mm. thick throughout, wiry, compressed, glabrous, not scabrellate, not septate-nodulose. Leaves 2 to 3 on a culm, 10 to 30 cm. long, 1 to 3 mm. wide, flat, membranous, not septate-nodulose, conspicuously 5- to 9-nerved dorsally, obsolete nerved ventrally, antrorsely ciliolate on the margins and on the ribs, the sheaths green dorsally, but paleaceous, pubescent, and white, ventrally. Bracts 2 to 5, 0 to 7 cm. long, 1 to 3 mm. wide, their broad, usually ciliate and pilose bases closely investing the head, inconspicuously white basally, otherwise like the leaves. Spikelets 1 to 5, 8 to 10 mm. long, lanceolate, acuminate, terete, sessile and digitate

in terminal solitary head, often proliferous. Glumes 4 to 6 mm. long, ovate to lanceolate, 1-ribbed, cinnamon-brown, chartaceous, not hyaline-margined, increasing in size from the base to the apex of the spikelet. Stamens 3; anthers long-linear, 3 to 3.5 mm. long, 0.2 mm. wide; filaments about 5 mm. long. Style 2 mm. long, its 2 branches 2 mm. long. Achene lenticular, biconvex, circular, 0.8 mm. in diameter (the tubercle an additional 0.2 mm.), smooth, lustrous, coarsely cellular, scarcely transversely rugulose, broadly stipitate, cream colored, its tubercle 0.8 mm. wide.—Thickets, clearings and edges of jungles; British Honduras and tropical America.

BRITISH HONDURAS: Belize District—Salt Creek, *O'Neill* 8881. El Cayo District—El Cayo, *Lundell* 4451; San Antonio, *Bartlett* 13069. Stann Creek District—Big Creek, *Schipp* 108.

4. *DICHROMENA WATSONI* Britton, Bull. Torr. Bot. Club. **15**: 101. 1888.

“Culm stout, sulcate, nearly smooth, 40 to 50 cm. high; leaves of the stem about 5, 15 to 20 cm. long, 5 to 7 mm. wide at the base, tapering to an acute apex, about seven-nerved, the nerves impressed on the upper surface and prominent on the lower; leaves of the involucre about nine, resembling those of the stem; spikes about nine, acute, 12 to 15 mm. long, sessile, forming a capitate cluster at the summit of the culm; scales ovate-lanceolate, acute and mucronate with the excurrent tip of the mid-nerve; achenium obovate, much shorter than the scale, transversely rugose, tipped with a broad, depressed tubercle; style, two-cleft.”—In forests; British Honduras to Panama.

BRITISH HONDURAS: Toledo District—Temash River, *Schipp* S-960.

“A remarkably large species, the cauline leaves arising from loose sheaths, and those of the involucre differing from other species of the genus in being green to their bases.”

7. *FIMBRISTYLIS* Vahl

Annuals or perennials. Stolons wanting. Culms leafy at the base. Bracts solitary to several. Spikelets several to many-flowered, in umbel-like clusters (or solitary in *F. monostachya*). Glumes spirally imbricate (distichous in *F. monostachya*), the lower 1 or 2 empty, the rest fertile, readily deciduous, the veins uniting with the midrib at the apex or wanting. Flowers hermaphrodite, lacking perianth. Stamens 1 to 3. Style 2- or 3-cleft, fimbriate or glabrous, swollen at the base, falling away entire, the base not persistent. Achene lenticular or trigonous, reticulate, cancellate or trabeculate.

- 1. Style branches 3; achene trigonous (2).
Style branches 2; achene lenticular (5).
- 2. Spikelet solitary and terminal or rarely a few more; glumes thick-chartaceous, sub-distichous at the base of the spikelet; achene 1.5 to 1.7 mm. long, umbonate . . . *F. monostachya*
Spikelets numerous on a culm; glumes thin-chartaceous, spirally imbricate; achene 0.4 to 0.6 mm. long (3).
- 3. Spikelets 2 to 3 mm. long, 1.5 mm. wide, rounded at apex; glumes rounded at apex, oval; style fimbriate *F. miliacea*
Spikelets 4 to 10 mm. long, 2 to 3 mm. wide, acute to acuminate; glumes mucronate; style glabrous (4).
- 4. Culms 0.5 to 1.0 mm. wide at apex, compressed-triangular, 10 to 30 cm. tall; leaves 0.5 to 2.0 mm. wide *F. autumnalis*
Culms 1.5 to 2.0 mm. wide at the apex, much compressed, 20 to 60 cm. tall; leaves 2 to 6 mm. wide *F. complanata*
- 5. Spikelets 2 to 3 mm. long, 1.5 to 2 mm. wide; glumes 1.5 mm. long; style glabrous or slightly fimbriate; achene 0.5 to 0.6 mm. long *F. spathacea*
Spikelets 4 to 16 mm. long, 2 to 3 mm. wide; glumes 2 to 4 mm. long; style conspicuously fimbriate; achene 0.6 to 1.2 mm. long (6).
- 6. Glumes puberulent above the middle, 3 to 4 mm. in diameter; leaves very short, often less than 5 cm. long. Achene 1.2 to 1.5 mm. long *F. ferruginea*
Glumes glabrous; leaves well-developed (7).

7. Glumes ovate, 3 to 4 mm. long; achene 1 to 1.2 mm. long; bases of leaf sheaths conspicuously black and indurated *F. spadicea*
 Glumes broadly ovate, 2 mm. in diameter; achene 0.7 to 1.0 mm. long; leaf sheaths neither darkened nor indurated *F. annua*

1. *FIMBRISTYLIS ANNUA* (All.) R. et S. Syst. **2**: 95. 1817.

- Scirpus annuus* All. Fl. Pedem. **2**: 277. 1785.
S. diphyllus Retz, Obs. Bot. **4**: 15. 1791.
Fimbristylis diphyllum Vahl, Enum. Pl. **2**: 289. 1806.
F. laxum Vahl, Enum. Pl. **2**: 292. 1806.
F. Scherardi Bub. Dodec. 29. 1850.
F. polymorpha Boeck. Kjøbenh. Vidensk. Meddel. 141. 1869.
F. Holwayana Fernald, Proc. Amer. Acad. **36**: 492. 1901.

Annual or persisting. Culms caespitose, 4 to 60 cm. tall, 0.5 to 1 mm. thick at apex, 1.5 at the base, compressed, multistriate, glabrous or sparingly pubescent, not scabrellate, not septate-nodulose, wiry. Leaves about 10 to 15 in a basal tuft, much shorter than the culm, 5 to 20 cm. tall, 1 to 2 mm. wide, thick-membranous, short, acute at apex, the margins conspicuously involute and thickened, antrorsely scabrellate, not septate-nodulose, glabrous, ciliate or pilose, about 7- to 13-nerved dorsally, obsoletely nerved ventrally, gradually broadened into the greenish or brownish sheaths. Bracts about 3 to 5, unequal, 1 to 7 mm. long, like the leaves. Rays about 3 to 5, 0 to 2 cm. long, unequal, ascending or divaricate, raylets 1 to 5. Inflorescence resembling a simple or compound umbel, umbelets few-flowered. Spikelets 4 to 10 mm. long, 2 to 3 mm. in diameter, ovoid to oblong-ovoid, pedicelled, distant. Rhachilla reddish brown, showing persistent bases of the glumes. Glumes 2 mm. in diameter, broadly ovate, 1-ribbed, nerveless, chartaceous, apiculate and rounded at the apex, spirally imbricate, reddish brown, readily deciduous. Stamen 1; anther 0.5 mm. long; filament 2.5 mm. long. Style 1 to 1.5 mm. wide, very flat, fimbriate on both margins, bifid, swollen at the base, the branches 0.5 to 1.0 mm. long, likewise fimbriate. Achene 0.7 to 1.0 mm. long, 0.6 to 0.9 mm. wide near the apex, obovate, lenticular, cream-colored to light brown, conspicuously trabecular, about 7 to 9 rows on each face, stipitate, lustrous.—Marshes and moist sandy soil; Georgia, West Indies, Texas, south to South America; pantropical.

BRITISH HONDURAS: Belize District—Boomtown, *O'Neill* 8933; Maskall, *O'Neill* 8934; Belize, *O'Neill* 8936.

The conspicuously pilose plants may be designated as forma *pubescens* Link.

Scirpus pubescens Link. Jahrb. **3**: 80. 1818-20.

BRITISH HONDURAS: Belize District—Bakers Pine Ridge, *Lundell* 6993; Maskall, *O'Neill* 8935.

2. *FIMBRISTYLIS AUTUMNALIS* (L.) R. et S. Syst. **2**: 97. 1817.

- Scirpus autumnalis* L. Mant. **2**: 180. 1771.
S. mucronulatus Michx. Fl. Bor. Am. **1**: 31. 1803.
Trichelostylis geminata L. et N. in Mart. Fl. Bras. **21**: 79. 1842.
Fimbristylis Frankii Steud. Syn. III. 1855.
F. Frankii var. *brachyactis* Fernald, Rhodora **11**: 180. 1909.
F. mucronulata Blake, Rhodora **20**: 24. 1918.
F. autumnalis var. *mucronulata* Fernald, Rhodora **37**: 398. 1935.

Annual. Culms 10 to 30 cm. tall, 0.5 to 1 mm. thick at the apex, 1 to 1.5 mm. at the base, compressed-trigonous, multistriate, glabrous or antrorsely scabrellate on the margins, not septate, flaccid. Leaves about 5 to 10 on a culm, tufted at the base, much shorter than the culm, 5 to 20 cm. tall, 0.5 to 2.0 mm. wide, membranous, flat, the margins cartilaginous, involute, smooth or minutely antrorsely scabrellate, multinerved and with inconspicuous

stomata dorsally, veinless, coarsely cellular and without stomata ventrally, gradually broadened into the greenish or brownish sheaths. Bracts about 3 to 5, shorter than the inflorescence, 1 to 3 cm. long, unequal, like the leaves. Rays about 4 to 8, 0 to 4 cm. long, branched, unequal, the raylets 1 to 6, about 1 to 1.5 cm. long. Inflorescence resembling a compound umbel. Spikelets 4 to 10 mm. long, about 1 to 2 mm. wide, ovoid to linear, terete, many-flowered. Rhachilla brown, showing persistent glume-bases. Glumes about 1.5 mm. long, 0.6 to 0.8 mm. wide, ovate to ovate-lanceolate, thin-membranous, with a thick keel or midrib, otherwise veinless, mucronate and brown at apex. Stamens 1 to 3; anthers 0.3 mm. long; filaments 1 mm. long. Styles glabrous, not fimbriate, about 1 mm. long, swollen at the base, trifid, the branches about 0.5 mm. long. Achene 0.4 to 0.5 mm. long, 0.4 to 0.5 mm. wide, trigonous, obovoid, light yellow with a rib on each angle, faintly reticulate, tuberculate near the base.—In marshes and damp sandy soil; Maine to Ontario to South America.

BRITISH HONDURAS: Belize District—Maskall, *O'Neill* 8927, 8928; Boomtown, *O'Neill* 8929, 8930; Sibun River, *O'Neill* 8931; Bakers Pine Ridge, *Lundell* 7001. Stann Creek District—Newtown, *Schipp* 903, 904; Stann Creek—Melinda Pine Ridge road, *Gentle* 1960, 1961.

3. *FIMBRISTYLIS COMPLANATA* (Retz) Link, Hort. Berol. **1**: 292. 1827.

Scirpus complanatus Retz, Obs. Bot. **5**: 14. 1789.

Cyperus amentaceus Rudge, Pl. Guian. 16. 1805.

Perennial. Culms 20 to 60 cm. tall, 1.5 to 2.0 mm. thick at the apex, 2.0 to 2.5 mm. at the base, much compressed, multistriate, glabrous or antrorsely scabrellate on the margins, not septate, flaccid. Leaves about 5 to 10 on a culm, tufted at the base, much shorter than the culm, 10 to 30 cm. tall, 2 to 6 mm. wide, thick-membranous, flat, the margins cartilaginous, involute, smooth or minutely antrorsely scabrellate, multinerved, and with conspicuous stomata dorsally, veinless, coarsely cellular and without stomata ventrally, gradually broadened into the greenish or brownish sheaths. Bracts about 3 to 5, shorter than the inflorescence, 1 to 3 mm. long, unequal, like the leaves. Rays about 4 to 8, 0 to 4 cm. long, branched, unequal, the raylets 1 to 6, about 1 to 1.5 mm. long. Inflorescence resembling a compound umbel. Spikelets 4 to 10 mm. long, about 2 mm. wide, ovoid to linear, terete, many-flowered. Rhachilla brown, showing persistent glume-bases. Glumes about 1.5 mm. long, 0.6 to 0.8 mm. wide, ovate to ovate-lanceolate, thin-membranous, with a thick keel or midrib, otherwise veinless, mucronate and brown at apex. Stamens 1 to 3; anthers 0.3 mm. long; filaments 1 mm. long. Styles glabrous, not fimbriate, about 1 mm. long, swollen at the base, trifid, the branches about 0.5 mm. long. Achene 0.4 to 0.5 mm. long, 0.4 to 0.5 mm. wide, trigonous, obovoid, light yellow with a rib at each angle, faintly reticulate.—In marshes and damp sandy soil; Mexico to South America; pantropical.

BRITISH HONDURAS: El Cayo District—Vaca, *Gentle* 2526.

4. *FIMBRISTYLIS FERRUGINEA* (L.) Vahl, Enum. **2**: 291. 1806 (*ferrugineum* apud Vahl).

Scirpus ferrugineus L. Sp. Pl. 50. 1753.

Perennial. Rhizome very short. Culms contiguous, 20 to 80 cm. tall, 1 to 2 mm. thick at the apex, 3 to 4 mm. thick at base, compressed-trigonous, multistriate, glabrous, not at all scabrellate, not septate, erect, rigid. Leaves about 3 to 10 cm. long, 1 to 2 mm. wide, about 6 on a culm, only the uppermost 2 or 3 developed into short laminae, subcoriaceous, canal-iculate, nerveless, not septate, gradually broadened into the sheaths, the margins involute, antrorsely scabrellate, the ventral surface coarsely cellular and without stomata, the dorsal surface finely cellular, bearing stomata. Sheaths brown, about 5 cm. long. Bracts 2 to 4,

10 to 20 mm. long, about 1.5 mm. wide at base, usually shorter than inflorescence and with a pair of brown and ciliolate wings at base, the wings 0.5 to 1.0 mm. wide at base. Rays short, the peduncles less than 1 cm. long, rarely branched. Spikelets 1 or 2 at the end of each peduncle, 8 to 20 mm. long, 3 to 4 mm. in diameter, oblong-ovoid, terete, about 30- to 40-flowered. Rhachilla dark brown, appearing deeply pitted by the persistent bases of the glumes. Glumes 3 to 4 mm. in diameter, broadly ovate, chartaceous, obsolete many-nerved, without a keel, brown, puberulent above the middle, the midrib vestigial as a short, dorsal mucro about 0.2 mm. long. Stamens commonly 2; anthers 1 mm. long; filaments 3 mm. long. Styles 2 to 2.5 mm. long, very flat, thickened at base, fimbriate on the margins, bifid, the branches 0.5 mm. long. Achene 1.2 to 1.5 mm. long, 1.0 mm. wide, obovate, biconvex, conspicuously cellular, light yellow.—In brackish marshes and coastal sands; West Indies, Central and South America; pantropical.

QUINTANA ROO: Cozumel Island, *Millspaugh 1594*.

5. *FIMBRISTYLIS MILIACEA* (L.) Vahl, Enum. Pl. 2: 287. 1806 (*miliaceum* apud Vahl).

Scirpus miliaceus L. Syst. Nat. ed. 10. 868. 1759.

Trichostylis miliacea var. *microstachya* Nees in Seem. Bot. Voy. Herald 222. 1854.

Glabrous annual. Culms densely caespitose, 15 to 50 cm. tall, 1 mm. thick at apex, 1 to 1.5 mm. at base, compressed but sharply triquetrous at the apex, multistriate, not septate-nodulose, sometimes antrorsely scabrellate at the apex, flaccid. Leaves about 3 to 6 at the base of the culm, 10 to 30 cm. long, 1 to 2 mm. wide, flat or slightly involute, membranous, flaccid, not septate-nodulose, minutely antrorsely scabrellate on the margins, ribless, gradually broadened into the green or pale brown sheaths. Bracts obsolete or 1 to 4, awn-like, 0.5 to 3 mm. long, antrorsely scabrellate. Rays about 3 to 6, commonly 3- to 6-branched, 1 to 3 cm. long, divaricate, the raylets about 1 cm. long. Spikelets 2 to 3 mm. long, 1.5 mm. in diameter, terete, ovoid, long-pedicelled, distant, about 20- to 40-flowered. Rhachilla purplish, the persistent glume bases very short. Glumes 1 to 1.2 mm. long, about 0.8 mm. wide, oval, thin-chartaceous, rounded, not cuspidate at apex, keeled, ribless, the margins hyaline, closely spirally imbricate. Stamens 1 or 2; anthers 0.3 mm. long; filaments 1 mm. long. Style trifid, 0.5 mm. long, the branches about 0.8 mm. long, fimbriate, flat, style-base dilated. Achene 0.5 to 0.6 mm. long, 0.4 to 0.5 mm. wide, obovoid, pale brown, minutely fenestrate by oblong cells, conspicuously tuberculate, especially on the angles and on the trabeculae.—Marshes and shores and sandy soils; Louisiana, and the Bahamas, south to South America; pantropical.

GUATEMALA: Dept. Peten, El Paso, *Lundell 1605*. La Libertad, *Aguilar 182*.

6. *FIMBRISTYLIS MONOSTACHYA* (L.) Hassk. Pl. Jav. Rar. 61. 1848.

Cyperus monostachyus L. Mant. Pl. 2: 180. 1771.

Abildgaardia monostachya Vahl, Enum. Pl. 2: 296. 1806.

Perennial. Culms densely caespitose, 5 to 40 cm. tall, 0.5 to 0.8 mm. thick throughout, often twisted, much compressed, multistriate, glabrous, not septate-nodulose, wiry, the sheaths brown, short. Leaves 10 to 30 cm. long, 1 to 1.5 mm. wide, subcoriaceous, flat to involute, antrorsely scabrellate on the margins, not septate-nodulose, ribless, essentially glabrous. Bracts 1 or 2, 1 to 8 mm. long, shorter than the head, linear-subulate, antrorsely scabrellate. Spikelet 12 to 20 mm. long, 5 mm. wide, ovate-lanceolate, 20- to 40-flowered, solitary, terminal or rarely the culm branched and one to several additional spikelets. Rhachilla brown, showing the persistent bases of the glumes, straight, 1 mm. wide. Glumes 5 to 7 mm. long, 3 to 4 mm. wide, ovate, acute, somewhat cuspidate, 1-ribbed, nerveless, chartaceous, distichous in the lower part of the spikelet, closely imbricate. Stamens 3, origi-

nating at the angles of the achene; anther 2.5 mm. long, yellow, 0.2 mm. wide; connective not prolonged; filaments 5 mm. long, 0.2 mm. wide. Style 3 mm. long, 0.5 mm. wide at the base, much compressed, swollen at the base, conspicuously fimbriate on both margins, trifid, the branches 2 mm. long, fimbriate. Body of the achene 1.5 to 1.7 mm. high, 2.0 mm. broad, depressed-globose, umbonate, conspicuously broad-stipitate (the stipe obcuneate, 0.5 mm. high), white or brown, lustrous, conspicuously verrucose or muricate, glabrous.—On sand dunes and beaches and in marshes; Yucatan to South America.

YUCATAN: Progreso, *Lundell & Lundell* 8098. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2475, 3483, 3643.

7. *FIMBRISTYLIS SPADICEA* (L.) Vahl, Enum. Pl. 2: 294. 1806 (*spadiceum* apud Vahl).

Scirpus spadiceus L. Sp. Pl. 51. 1753.

Perennial, glabrous throughout. Rhizome short, thick. Culms 30 to 120 cm. tall, 1 to 2 mm. thick at the apex, 3 to 5 mm. thick at the base, compressed, multistriate, antrorsely scabrellate at apex, not septate-nodulose, erect, covered at the base by the black or dark brown, persistent sheaths. Leaves about 6 to 12 at the base of the culm, 20 to 60 cm. long, 1 to 2 mm. wide, flat to involute, coriaceous, erect or declining, not septate-nodulose, antrorsely scabrellate on the margins, ribless. Sheaths dark brown becoming black with age, scarious, brown at the summit ventrally, ciliolate at the apex, abruptly contracted into the lamina. Bracts shorter or longer than the inflorescence, 1 to 3, 1 to 10 cm. long, about 1 mm. wide, narrowly linear, obtuse, antrorsely scabrellate, ribless, unequal. Rays 3 to 6, often branched, 0 to 10 cm. long, unequal, ascending, raylets 1 to 2 cm. long. Spikelets few to numerous, 8 to 16 mm. long, about 3 mm. in diameter, terete, oblong-ovate, pedicelled, distant, about 30- to 50-flowered in a terminal, subumbellate cluster. Rhachilla black, showing the short, persistent bases of the glumes, straight, 0.5 mm. wide. Glumes 3 to 4 mm. long, 2 to 2.5 mm. wide, ovate, thick-chartaceous, minutely cuspidate, ribless, brown, closely and spirally imbricate. Stamens 3; anthers yellow, 1.5 mm. long, 0.2 mm. broad, the connective slightly prolonged at the apex, red; filaments 3 to 4 mm. long, posticous, 0.3 mm. broad. Style 2 mm. long, 0.2 mm. wide, dilated at the base, very flat, fimbriate, bifid, the branches 1.5 mm. long, fimbriate. Achene 1 to 1.2 mm. long, 1 mm. wide, lenticular, biconvex, obovate, cuneate, brown, coarsely cellular in vertical rows, truncate at apex, substipitate.—Sea beaches, sand dunes, lake shores, and especially brackish marshes; Virginia to South America, and the West Indies.

YUCATAN: Progreso, *Swallen* 2912; *Lundell & Lundell* 8209, 8210; *Gaumer* 1449. QUINTANA ROO: San Miguel, Cozumel Island, *Swallen* 2835. BRITISH HONDURAS: Belize District—Belize, *Lundell* 1875, 4710; Boomtown, *O'Neill* 8937; Haulover, *O'Neill* 8938; St. Georges Cay, *O'Neill* 8939. Stann Creek District—All Pines, *Schipp* 615.

8. *FIMBRISTYLIS SPATHACEA* Roth, Nov. Pl. 24. 1821.

Scirpus glomeratus Retz. Obs. Bot. 4: 11. 1786.

Fimbristylis glomerata Urban, Symb. Antill. 2¹: 166. 1900; non Nees.

F. melanospora Fernald, Proc. Amer. Acad. 36: 491. 1901.

Perennial, glabrous throughout. Rhizome very short and thick. Culms 10 to 50 cm. tall, 1 mm. thick at apex, 2 mm. at the base, much compressed, multistriate, not septate-nodulose, not scabrellate, erect, rigid. Leaves very numerous, clustered at the base of the culm, 5 to 30 cm. long, 1 to 3 mm. wide, flat but involute on the margins, coriaceous, not septate-nodulose, antrorsely scabrellate on the margins, ribless, glabrous, abruptly dilated into the broad, brown, closely imbricated sheaths, truncate or short-acute. Bracts about 3 or 4, scarcely exceeding the inflorescence, 10 to 20 cm. long, about 4 to 6 mm. wide at the base, linear-

subulate, antrorsely scabrellate on the margins and midrib. Rays numerous, branched, unequal, divaricate, 0 to 1 cm. long, raylets about 3 mm. long. Spikelets numerous, 2 to 3 mm. long, 1.5 to 2 mm. wide, subcompressed, about 12- to 20-flowered, pedicelled. Rhachilla dark, 0.5 mm. wide, with persistent bases of the glumes conspicuous. Glumes 1.5 mm. long, 1 mm. wide, ovate, thin-chartaceous, obsolete nerved, rounded along the midrib, broadly hyaline on the margins, glabrous, not cuspidate, rounded at the apex, spirally and closely imbricate. Stamens 2; anthers yellow, 0.5 mm. long; connective prolonged as a conspicuous apical tuft; filaments 1.5 mm. long. Style 0.8 mm. long, slightly thickened at the base, bifid, the branches about 5.0 mm. long, glabrous or merely fimbriolate. Achene 0.5 mm. long, 0.5 to 0.6 mm. wide, broadly obovate, neither apiculate nor stipitate, plano-convex, bullate or rugulose, dark brown, glabrous.—On sandy beaches and marshes; West Indies, Yucatan, south to South America; pantropical.

BRITISH HONDURAS: Corozal District—Consejo, *Gentle 806*; Corozal–Orange Walk road, *Lundell 4812*. Belize District—Belize, *Lundell 1876, 4734*; Cohune Ridge, New Boston, *O'Neill 8924*; St. Georges Cay, *O'Neill 8926*. Stann Creek District—All Pines, *Schipp 665*.

8. FUIRENA Rottb.

Perennials. Culms 3- to 5-angled, bearing leaves from the base to the apex, conspicuously nodose. Inflorescence of terminal and axillary clusters. Spikelets many-flowered. Glumes spirally imbricate, awned, hirsute, the lower one or two empty, the rest bearing hermaphrodite flowers except the glumes at the apex. Perianth of 3 sessile or pedicelled scales and sometimes 3 additional retrorsely barbellate bristles. Stamens 3, antious, or 2. Style trifid, not swollen at the base, soon deciduous. Achene trigonous, smooth, obovoid or ovoid.

- | | |
|---|---------------------|
| 1. Perianth bristles present, retrorsely or antrorsely barbellate | <i>F. simplex</i> |
| Perianth bristles wanting (2). | |
| 2. Perianth scales spongy-thickened at apex; culms, leaves, and sheaths more or less hirsute or glabrate | <i>F. bulbipes</i> |
| Perianth scales not thickened at apex; plants glabrate except for the scabrellate ventral surface of leaves | <i>F. umbellata</i> |

I. FUIRENA BULBIPES Blake, Contr. U. S. Nat. Herb. 24: 2. 1922.

FIG. 3.

“Rootstock creeping, about 2 mm. thick; base of stems bulbous-thickened, about 13 mm. long, 6 mm. thick; stems approximate, erect, 60 to 90 cm. high, about 3 mm. thick below, angulate, striate, the lower internodes hispid-pilose with spreading hairs, the upper glabrous; basal sheaths short, hispid-pilose, nearly or quite bladeless; stem leaves about 4, the hispid-pilose sheaths 2.5 to 4.5 cm. long, the brown pilose-ciliate scarious ligules 2 mm. long, the lance-linear erectish blades flat, 3.5 to 14 cm. long, 5 to 8 mm. wide, about 6-nerved, pale green, rather densely ascending-hispidulous above, spreading-hispid-pilose on margin and on nerves beneath; panicle small, 8 cm. long, slightly branched; spikelets sessile in clusters of 3 to 8, ellipsoid, acutish, 5 to 6 mm. long, 2 mm. thick; scales obovate, pale brown, scarious, ciliate, rounded, about 2 mm. long, the 3 green nerves converging and abruptly produced into a spreading or recurved stiff green mucro 0.2 to 0.7 mm. long; perianth scales 3, about equaling the achene in the dried state, the slender bent stipe about one-third as long as the body, the body obovate-oval, strongly 3-ribbed, papillose-puberulous and ciliolate, membranaceous, about 0.8 mm. long, 0.4 mm. wide, at tip abruptly contracted into a bulbous-thickened blunt appendage about 0.2 mm. long, this provided with a slender incurved hispidulous awn about 0.2 mm. long; achene broadly obovoid-trigonous, pale brown, shiny, short-stiped, about 0.8 mm. long (excluding beak), 0.7 mm. wide, the whitish

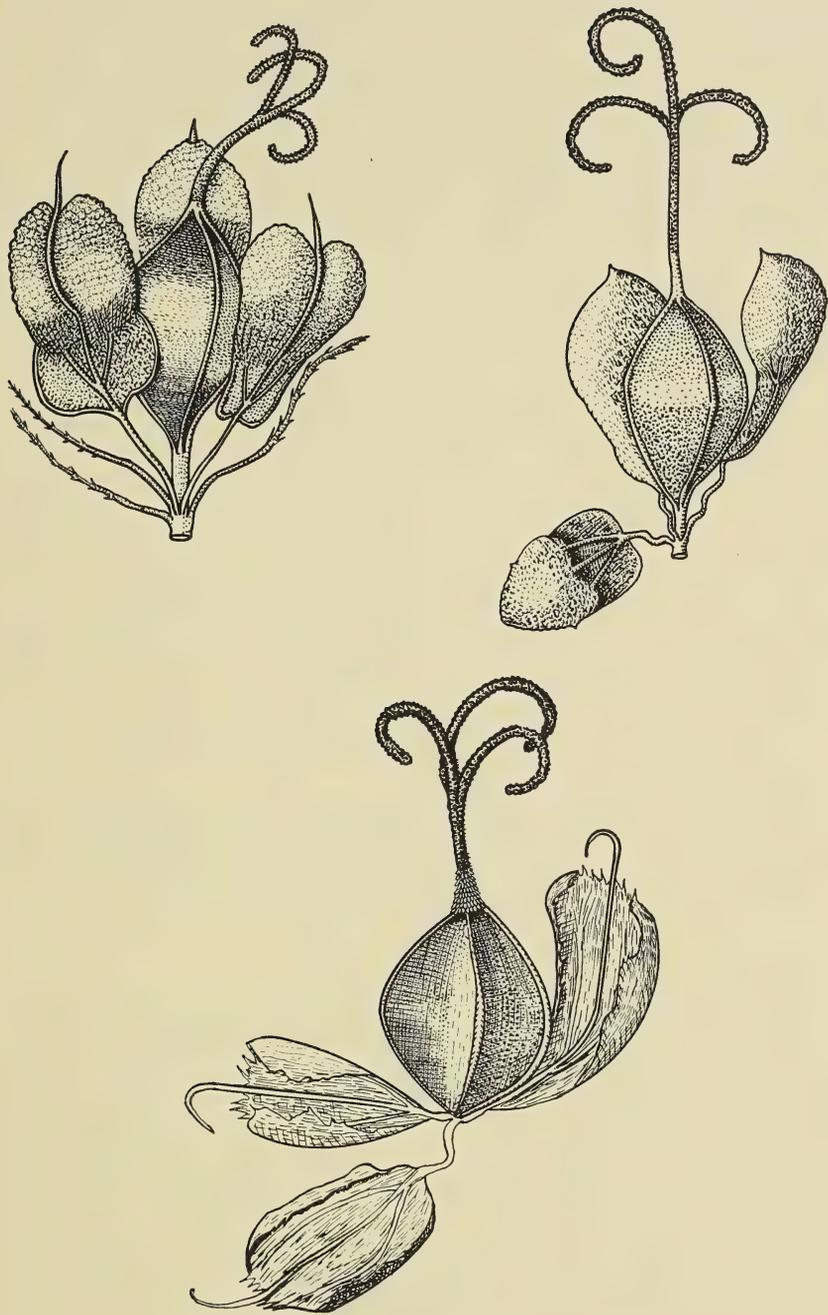


FIG. 3—*Fuirena* $\times 20$
F. simplex (upper left), *F. bulbipes* (upper right), *F. umbellata* (lower).
(Drawn by J. Kuhn.)

hispidulous beak about 0.5 mm. long."—Pine ridges, edges of forests, and ditches; Guatemala and British Honduras.

BRITISH HONDURAS: Corozal District—Pueblo Nuevo, New River, *Lundell* 4777. Orange Walk District—Honey Camp, *Lundell* 503; Orange Walk, *O'Neill* 9009. Belize District—Boomtoun, *O'Neill* 9010, 9011; Belize, *O'Neill* 9013; Salt Creek, *O'Neill* 9014; Maskall, *O'Neill* 9015; Northern River, *Gentle* 865; Maskall Pine Ridge, *Gentle* 1167, 1169.

The very high degree of variability of the pubescence of this plant suggests that it is a hybrid, possibly *F. simplex* × *F. umbellata*.

2. *FUIRENA SIMPLEX* Vahl, Enum. 2: 384. 1806.

FIG. 3.

F. squarrosa aristulata Torr. Ann. Lyc. Nat. Hist. N. Y. 3: 291. 1836.

Rhizome sometimes 5 cm. long, 2 mm. in diameter, ligneous; internodes 1 to 3 cm. long, not tuber-bearing. Culms caespitose, 10 to 80 cm. tall, 0.5 mm. thick at apex, 2 to 3 mm. thick at base, angled, multistriate, glabrous, not septate. Leaves about 6 on a culm, flat, linear, 3 to 25 cm. long, 3 to 10 mm. wide, glabrous ventrally, sometimes thinly pubescent dorsally, margins often ciliate or sometimes antrorsely scabrellate, acuminate at the apex, thick-membranous; not septate. Sheaths glabrous on upper part of stem; sometimes pubescent on lower part, green. Spikelets sessile, about 3 to 8 in a head, 6 to 12 mm. long, 5 to 8 mm. in diameter, ovoid to oblong-ovoid. Glumes 2 to 2.5 mm. long (the mucro an additional 1.5 to 2 mm.) obovate to oblong, russet brown, hirsute and puberulent, antrorsely scabrellate on the mucro, thin-hyaline except at the 3-nerved, green keel. Perianth bristles 3, retrorsely or antrorsely barbellate, usually exceeding the achene. Perianth scales 3, obtuse or retuse at apex, 3-ribbed, midrib excurrent as a short or long mucro (0.1 to 0.7 mm. long). Anthers yellow, linear, 1 mm. long. Achene 1 to 1.2 mm. long, trigonous, ovoid, stipitate, white at maturity, smooth, beaked by a small portion of style which is never hispid.—Sandy soil; Missouri to Texas, Mexico and Guatemala.

YUCATAN: Progreso, *Lundell & Lundell* 8182. Buena Vista, *Gaumer* 1339. CAMPECHE: Champoton, *Steere* 1793. BRITISH HONDURAS: Corozal District—Pueblo Nuevo, New River, *Lundell* 4776. Orange Walk District—Orange Walk, *O'Neill* 9012. El Cayo District—near Camp 6, *Gentle* 2368. GUATEMALA: Dept. Peten, Lake Peten, *Lundell* 3126.

3. *FUIRENA UMBELLATA* Rottb. Descr. et Icon. 70. 1773.

FIG. 3.

Rhizomes short and thick. Culms 60 to 150 cm. tall, 1 to 2 mm. thick at apex, about 4 to 6 mm. wide at base, angled, multistriate, not scabrellate, not septate, erect, rigid. Leaves about 5 to 8 on a culm, 6 to 16 cm. long, 5 to 25 mm. wide, linear-lanceolate, not septate; about 5- to 9-ribbed, glabrous dorsally, minutely scabrellate on the entire ventral surface, the margins scarcely scabrellate, the sheaths glabrous. Ligule collar-like, brown, about 2 mm. wide, fimbriate. Panicles 1 to 4, terminal and axillary, rather dense, the rachis and its branches conspicuously hirsute. Spikelets 6 to 10 mm. long, 2 mm. in diameter, oblong-ovoid, about 6 to 12 in capitate clusters. Glumes about 2.0 to 2.5 mm. long, 1.0 to 1.5 mm. wide, obovate, rounded or truncate or emarginate at apex, the three ribs confluent at the apex and excurrent as an antrorsely scabrellate mucro, 1 to 3 mm. long, the body of the glume brown, hyaline, strigillose, and sometimes hirsute as well. Perianth bristles wanting; perianth scales 3, 1 mm. long, 0.6 to 0.7 mm. wide at apex, very thin hyaline, conspicuously 3-nerved, truncate or rounded, not thickened at the apex, broadly cuneate, the midrib excurrent as a hook about 0.2 to 0.3 mm. long. Stamens 3, anthers yellow, 1 mm. long, linear. Style 0.5 mm. long, trifid, its branches 0.5 mm. long. Body of achene 0.8 to 1.0 mm. long, 0.5 mm. wide, trigonous-ovoid, brown, becoming white, the

angles ribbed, stipe 0.2 mm. long, beak 0.2 mm. long, not hispid.—Marshes; West Indies, Guatemala to South America; pantropical.

GUATEMALA: Dept. Peten, Lake Zotz, *Lundell* 3292.

9. HELEOCHARIS R. Br.

Glabrous, essentially leafless annuals or perennials. Culms strictly unbranched, trigonous, terete, quadrangular or compressed, with some basal sheaths rarely bearing a short lamina. Spikelet solitary, terminal, erect, several- to many-flowered, in some species the lowest 1 or 2 glumes empty. Bracts wanting. Glumes concave, spirally imbricate or subdistichous. Perianth of 6 to 8 bristles retrorsely barbellate in our species. (*H. cellulosa* has smooth bristles.) Stamens 2 or 3. Style 2- or 3-cleft. Achene lenticular or trigonous. Style-base enlarged and persistent on the achene as a tubercle.

1. Culms septate, sometimes faintly, 1 to 10 mm. thick, terete, 10 to 150 cm. tall. Spikelets 8 to 40 mm. long, many-flowered; glumes not keeled; styles 2 and 3 in each species; perianth-bristles 6 to 8, retrorsely barbellate; achenes 1 to 2 mm. long, lenticular, yellow to brown or gray, faintly or coarsely reticulate; perennials (2).
Culms nonseptate, filiform to 5 mm. thick (4).
2. Culms 1 to 2 mm. thick; spikelets 8 to 15 mm. long, several times thicker than the culm; achene 1 mm. long; bristles 1 mm. long *H. nodulosa*
Culms 3 to 10 mm. thick; spikelets 15 to 40 mm. long, not thicker than the culm; achene 1.5 to 2 mm. long; bristles 2.5 to 3 mm. long (3).
3. Spikelets straw-colored to gray; achene 2 mm. long, surfaced with transverse, linear cells; perianth-bristles 6, each with about 12 coarse barbellations *H. interstincta*
Spikelets reddish brown; achene 1.5 mm. long, faintly reticulate; perianth bristles often 8, each with about 30 to 50 fine barbellations *H. elegans*
4. Styles 2; achenes lenticular, black, lustrous. Culms less than 1 mm. thick (5).
Styles 3; achenes lenticular or trigonous, white to brown (7).
5. Rhizome elongate, the culms distant; achene 1.3 to 1.5 mm. long, minutely roughened; bristles 1.5 to 2.0 mm. long; sheaths membranous at apex *H. maculosa*
Rhizome wanting, the culms caespitose; achene 0.5 to 1.0 mm. long, smooth; bristles 0.3 to 1.5 mm. long or wanting; sheaths chartaceous at apex (6).
6. Achene 1.0 mm. long; bristles brown, slightly longer than achene; culms 3 to 40 cm. tall *H. geniculata*
Achene 0.5 mm. long; bristles translucent, colorless, shorter than achene; culm 3 to 12 cm. tall *H. atropurpurea*
7. Achene lenticular, 1.7 to 2.3 mm. long, surfaced with quadrate cells; bristles 2 to 3 mm. long; culms 1 to 5 mm. thick, 25 to 100 cm. tall; spikelets 10 to 50 mm. long (8).
Achene trigonous, 0.5 to 1.5 mm. long; bristles 0 to 1.5 mm. long; culms less than 1 mm. thick, 2 to 40 cm. tall; spikelets 1 to 10 mm. long (10).
8. Bristles nonbarbellate, smooth; culm terete, rarely trigonous, 1 to 2 mm. thick. Achene with a glazed surface *H. cellulosa*
Bristles retrorsely barbellate; culm trigonous 1 to 5 mm. thick (9).
9. Culms 2 to 5 mm. thick; spikelets 15 to 50 mm. long; glumes 5 mm. long; achene with 24 vertical rows of cells *H. mutata*
Culms 1 to 2 mm. thick; spikelets 10 to 20 mm. long; glumes 3.5 mm. long; achene with 12 vertical rows of cells *H. plicarhachis*
10. Achene 0.5 to 0.6 mm. long, smooth; spikelet 1 to 3 (rarely 5) mm. long. Glumes white with narrow green keel and brownish sides; an annual with filiform, caespitose culms 4 to 20 mm. tall; bristles wanting *H. nigrescens minutiflora*
Achene 0.7 to 1.5 mm. long, lightly to deeply reticulate; spikelets 2 to 10 mm. long (11).
11. Culms 15 to 40 cm. tall, 1 mm. or less thick. Bristles 1.5 mm. long; achene 1.0 mm. long *H. filiculmis*
Culms 2 to 70 cm. tall, often recurved (12).
12. Achene 1.5 mm. long; bristles 1.5 mm. long; culm 1 to 2 mm. thick, 50 to 70 cm. tall; spikelets 5 to 7 mm. long *H. pachystyla*

- Achene 0.7 to 1.2 mm. long; bristles less than 1.0 mm. long or wanting; culm filiform, much less than 1 mm. wide, 2 to 7 cm. tall; spikelets 2 to 4 mm. long (13).
13. Culm 10 to 25 cm. tall; achene 1.0 to 1.2 mm. long, coarsely cellular and costate on the angles *H. retroflexa*
 Culm 3 to 7 cm. tall; achene 0.7 to 1.0 long, essentially smooth, rarely shallowly cellular-reticulate or striate *H. minima*

1. HELEOCHARIS ATROPURPUREA (Retz) Kunth, Enum. 2: 151. 1837.

- Scirpus atropurpureus* Retz, Obs. Bot. 5: 14. 1789.
Isolepis atropurpurea R. and S. Syst. 2: 106. 1817.
Eleogiton atropurpurea A. Dietr. Sp. Pl. 2: 97. 1833.
Eleogenus atropurpureus Nees in Wight, Contr. Bot. Ind. 113. 1834.
Scirpus Lereschii Thomas, Cat. Pl. Suis. 44. 1837 (nomen nudum).
Eleocharis Lereschii Shuttlew. Flora 20: 241. 1837.
Aplostemon atropurpureum Raf. ex Steud. Nom. Bot. ed. 2. 113. 1840.
Eleogenus laetivirens Nees in Mart. Fl. Bras. 2¹: 103. 1842.
Scirpus erraticus Rota ex De Notaris, Ann. Sci. Nat. sér. 3. 5: 366. 1846.
Isolepis setifolia A. Rich. Tent. Fl. Abyss. 2: 498. 1851.
Eleocharis Zanardinii Parl. Fl. Ital. 2: 67. 1852.
Eleocharis monandra Hochst. ex Steud. Syn. 75. 1855.
Eleocharis erratica Rota ex Steud. Syn. 79. 1855.
Eleocharis laetivirens Nees ex Steud. Syn. 79. 1855.
Isolepis allochroa Steud. Syn. 91. 1855; fide Clarke.
Isolepis dichroa Steud. Syn. 91. 1855; fide Clarke.
Eleocharis multiflora Chapm. Fl. S. States, 517. 1860.
Eleocharis atropurpurea Schur, Enum. Pl. Transsilv. 691. 1885.
Trichophyllum atropurpureum House, Am. Midl. Nat. 6: 204. 1920.

"Dwarf annual, caespitose: culms 3 to 12 cm. high, capillary, erect or arcuate: sheaths deep brown at base; the firm apex oblique and often attenuate: spikelet oblong-ovoid, 2 to 8 mm. long; the lower scales frequently deciduous: scales ovate, membranous, blunt, with broad green midrib and deep brown sides: style 2-fid: stamens 1 to 3: achenes strongly flattened, lenticular, obovoid, widest at the summit, 0.5 mm. long, smooth, lustrous black: style-base minute, flattened, about $\frac{1}{4}$ the width of the achene: bristles slender, translucent, shorter than the achene, often reduced or wanting.—Marshes and shallow ponds; Florida, Iowa, Washington, Texas, Yucatan, Colombia, Italy, Switzerland, Africa, India, etc."

YUCATAN: Uxmal, Swallen 2620.

2. HELEOCHARIS CELLULOSA Torr. Ann. Lyc. N. Y. 3: 298. 1836.

Scirpus dictyospermus C. Wright in Sauv. Fl. Cub. 175. 1873.

"Culms terete, rarely triangular, 3 to 7 dm. high, 1 to 2 mm. wide, straw-colored or greenish: roots coarse, pale to dark brown; stolons elongated: the upper sheaths rigid, oblique, with an elongated mucronate tip, often purplish; lowest sheaths membranous and inflated or leaf-like: spikelets cylindrical, 1.5 to 4.5 cm. long, obtuse, thicker than the culm: scales orbicular or obovate, obtuse, 4 mm. long, rigid, striated, straw-colored, with a conspicuous brown border and white scarious margins, the brown coloration sometimes wanting: style 3-fid: stamens 3: mature achene shining, brown, elliptic to obovate, lenticular, with about 20 rows of quadrangular cells, overlaid by a glass-like surface, merging at the summit into a stout, spongy beak, tipped by the short dark style-base: bristles light brown, equaling the achene, involute, without teeth.—Marshes; Florida to Texas, West Indies, south to Guatemala."

YUCATAN: Progreso, Gaumer 2402; Lundell & Lundell 8211; Swallen 2922. QUINTANA ROO: Lake Chichankanab, Swallen 2733. Lake Coba, Lundell & Lundell 7796. GUATEMALA: Dept. Peten, Lake Peten, Lundell 3974.

3. HELEOCHARIS ELEGANS (H. B. K.) R. et S. Syst. 2: 150. 1817.

- Eleocharis geniculata* auct.; non (L.) R. and S.
Scirpus elegans H. B. K. Nov. Gen. et Sp. 1: 226. 1816.
Eleocharis constricta Schultes. Mant. 2: 87. 1824.
Scirpus depressus Vellozo, Fl. Fluminensis 35, t. 38. 1827.
Limnochloa crassiculmis Nees in Mart. Fl. Bras. 2¹: 99. 1842.
Limnochloa constricta Nees in Mart. Fl. Bras. 2¹: 99. 1842.
Eleocharis crassiculmis Steud. Syn. 81. 1855.
Eleocharis mexicana Peyr. Linnaea 30: 14. 1859-60.
Chlorocharis geniculata Rikli in Pringsh. Jahrb. 27: 564. 1895.

"Coarse aquatic plants, erect from a ligneous creeping rootstock; culms terete, firm, green, 1 to 15 dm. high, 3 to 10 mm. wide, with close, usually prominent septae: sheaths reddish, truncate at the summit, usually with an inconspicuous subulate mucro: spikelets many-flowered, lanceolate to cylindrical, usually acute: scales 2 mm. long, not keeled, obtuse, thin, with an opaque brown central area and broad scarious light brown margin: style 2- or 3-fid: achene 1.5 mm. long, obovate, biconvex to slightly trigonous, yellow to brown, shining, lightly punctate-reticulate: style-base dark brown, flattened, lanceolate, half as long as the achene-body: bristles deep brown, nearly equaling the tubercle, their common base forming a short stipe.—Mexico, West Indies, south to Argentina."

BRITISH HONDURAS: El Cayo District—Vaca, *Gentle* 2282; El Cayo, *Bartlett* 12994.

4. HELEOCHARIS FILICULMIS Kunth, Enum. 2: 144. 1837.

- Scirpus sulcatus* Roth. Nov. Pl. 30. 1821.
Eleocharis sulcata Nees, Linnaea 9: 294. 1834.
Scirpidium sulcatum Nees in Mart. Fl. Bras. 2¹: 98. 1842.
Limnochloa calyprata Liebm. Vidensk. Selsk. Skr. ser. 5. 2: 244. 1851.
Eleocharis calyprata Liebm. ex Steud. Syn. 81. 1855.
Eleocharis Rothiana Boeck. Flora 43: 3. 1860.
Scirpus filiculmis Schrad. ex Griseb. Goett. Abh. 24: 311. 1879.
Eleocharis Balansaiana Boeck. Flora 5: 62. 1879; fide Britton.
Eleocharis costaricensis Boeck. Allg. Bot. Zeitschr. 2: 34. 1896.
Eleocharis purpureo-vaginata Boeck. Allg. Bot. Zeitschr. 2: 34. 1896.

"Erect from an ascending caudex: culms 1.5 to 4 dm. high, flattened and sulcate, lightly punctate, rarely as much as 1 mm. wide: sheath purplish brown to stramineous, acute, sometimes slightly inflated at the apex: spikelets ovoid-cylindric, 4 to 10 mm. long, many-flowered: scales obtuse to emarginate, stramineous to reddish brown, with a lighter keel and a prominently scarious margin: anthers 0.7 mm. long: style 3-fid: achene 1.0 mm. long, trigonous with sulcate angles, glistening white, often obscurely reticulate or brown-striolate: style-base nearly as wide as the apex of the achene, irregularly pyramidal, often somewhat flattened, white to light brown, frequently with overhanging margins: bristles white, usually equaling the achene.—Marshes; West Indies, Mexico, south to Paraguay and Argentina."

BRITISH HONDURAS: Belize District—Maskall, Northern River, *Gentle* 1015. El Cayo District—Mountain Pine Ridge, *Bartlett* 11804.

5. HELEOCHARIS GENICULATA (L.) R. et S. Syst. Veg. 2: 150. 1817; non auct.

- Scirpus geniculatus* L. Sp. Pl. 1: 48. 1753, pro parte.
Scirpus caribaeus Rottb. Descr. Pl. Rar. Progr. 24. 1772.
Scirpus capitatus Willd. Sp. Pl. 1: 294. 1798, pro parte.
Scirpus geniculatus minor Vahl, Enum. 2: 251. 1806.
Eleocharis capitata R. Br. Prod. 225. 1810.
Eleocharis setacea R. Br. Prod. 225. 1810.
Eleocharis geniculata minor R. & S. Syst. 2: 150. 1817.
Eleocharis caduca Schultes. Mant. 2: 88. 1824.

- Scirpus Brownii* Spreng. Syst. **1**: 204. 1825.
Eleocharis riparia Nees ex Spreng. Syst. **4**²: 27. 1827.
Eleogenus capitatus Nees in Wight, Contr. Bot. Ind. **112**. 1834, pro parte.
Scirpus palmaris Willd. ex Kunth. Enum. **2**: 150. 1837.
Limnochloa geniculata Nees in Mart. Fl. Bras. **2**¹: 99. 1842, pro parte.
Chlorocharis capitata Rikli in Pringsh. Jahrb. **27**: 564. 1895.
Eleocharis caribaea Blake, Rhodora **20**: 24. 1918.
Eleocharis microformis Buckley apud Svenson, Rhodora **31**: 230. 1929.

"Caespitose: culms firm, 0.3 to 4 dm. high, striate and sulcate: sheaths prominent, staminate, usually with a brown base and with firm, oblique, often attenuate apex: spikelets subglobose or ovoid, obtuse, many-flowered: scales ovate-orbicular, almost cartilaginous to membranous, yellow to pale-brown: style bifid: stamens 2 or 3: achene obovoid, 1 mm. long, lustrous black; the spongy, whitened style-base variable in shape but usually much depressed: bristles 6 to 8, coarse, brown, exceeding the achene or occasionally lacking.—Muddy shores and ditches; South Carolina to California, south to Paraguay; Africa, China, Philippine Islands, Australia."

YUCATAN: Progreso, *Swallen* 2910. Izamal, *Gaumer* 424. QUINTANA ROO: San Miguel, Cozumel Island, *Swallen* 2833, 2888. Lake Chichankanab, *Swallen* 2769. BRITISH HONDURAS: Belize District—Maskall, *Gentle* 867, 1029; O'Neill 8914; Bakers Pine Ridge, *Lundell* 6980; Boomtown, O'Neill 8913; Salt Creek, O'Neill 8915. El Cayo District—Vaca, *Gentle* 2566; El Cayo, *Bartlett* 12903. Stann Creek District—Newtown, *Schipp* 913. GUATEMALA: Dept. Peten, Remate, Lake Peten, *Lundell* 2018. Fallabon, *Lundell* 2152. Nictun, Lake Peten, *Lundell* 3141. San Jose, Lake Peten, *Lundell* 3220.

6. HELEOCHARIS INTERSTINCTA (Vahl) R. et S. Syst. **2**: 149. 1817.

- Scirpus plantagineus* Swartz, Fl. Ind. Occ. **1**: 123. 1797.
Scirpus interstinctus Vahl, Enum. **2**: 251. 1806.
Eleocharis articulata Kunth, Enum. **2**: 157. 1837.
Limnochloa articulata L. et N. in Mart. Fl. Bras. **2**¹: 100. 1842.
Eleocharis septata Miq. Linnaea **17**: 58. 1843.
Eleocharis articulata Nees ex Steud. Syn. **81**. 1855.
Eleocharis plantaginea Boeck. Linnaea **36**: 474. 1869-70.
Scirpus polygamus Wright mss. ex Boeck. Flora **64**: 78. 1881.

"Culms terete, 4 to 10 dm. high, about 5 mm. thick, septate; the septations becoming approximate below the spikelet: caudex short; roots coarse, light brown or reddish brown: sheaths membranous, pointed at the summit; the basal sheaths sometimes free and elongated: style 2- or 3-fid: stamens 3: spikelets cylindric, 1.5 to 4 cm. long, many flowered: scales in several ranks, oblong, often acute, striate, straw-colored or grayish, with a scarios margin: achenes rough, 2 mm. long (excluding the style-base), yellow or gray, with prominent transverse rectangular cells often forming longitudinal ribs, and a pronounced annular thickening at the summit: style-base dark brown: bristles 6, exceeding the achene, stout, flattened, with coarse teeth.—Shallow ponds; Texas, Bermuda Islands, West Indies, south to Bolivia and Brazil."

BRITISH HONDURAS: Orange Walk District—Orange Walk, New River, O'Neill 8917. Belize District—Maskall Pine Ridge, *Gentle* 1057; Boomtown, O'Neill 8916. GUATEMALA: Dept. Peten, Subin River, *Lundell* 2656. La Libertad, *Lundell* 3263. Lake Zotz, *Lundell* 3326. Lake Peten, *Lundell* 3975.

7. HELEOCHARIS MACULOSA (Vahl) R. et S. Syst. 2: 154. 1817 (here ascribed to R. Brown).

Scirpus maculosus Vahl, Enum. 2: 247. 1806.

Eleogenus Schottianus Nees in Mart. Fl. Bras. 2¹: 102. 1842.

Eleogenus ocreatus var. β 2 *albo-ater* Nees in Mart. Fl. Bras. 2¹: 102. 1842.

Eleogenus ocreatus var. β 3 *binocreatus* Nees in Mart. Fl. Bras. 2¹: 103. 1842.

Eleocharis Schottiana Steud. Syn. 79. 1855.

Trichophyllum maculosum House, Am. Midl. Nat. 6: 205. 1920.

"Stolons elongate, castaneous: culms 7 to 35 cm. long, erect, striate, rigid: apex of upper sheath conspicuously enlarged, scarious, and rugose: spikelets 5 to 12 mm. long, ovoid to lanceolate, many-flowered, the scales densely imbricate: scales ovate, rather blunt, firm, shining, purplish brown, with scarious margins; the lowest orbicular, with a prominent green midrib: style bifid: stamens 3: achene obovoid, narrowed at the base, 1 mm. long (not including the style-base), shining black; the surface minutely roughened; style-base half as wide as the achene, light brown, with a dilated base and a narrow subulate beak: bristles 7 or 8, reddish brown, of unequal length, some usually equaling the achene; the retrorse teeth small but very numerous.—Marshes; British Honduras, West Indies, south to Brazil."

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Bartlett 11803*.

8. HELEOCHARIS MINIMA Kunth, Enum. 2: 139. 1837.

Chaetocyperus polymorphus L. et N. in Mart. Fl. Bras. 2¹: 94. 1842.

Chaetocyperus Jamesoni Steud. Syn. 74. 1855.

Heleocharis tenuissima Boeck. Linnaea 36: 365. 1869–70.

Eleocharis Wrightiana Boeck. Cyp. Nov. 1: 12. 1888.

Eleocharis Durandii Boeck. Allg. Bot. Zeitschr. 2: 34. 1896.

Eleocharis oropunchensis Britton, Bull. Torr. Bot. Club 48: 327. 1921.

Eleocharis Jamesonii N. E. Brown, Kew Bull. 256. 1921.

"Dwarf, 3 to 7 cm. tall, caespitose, with numerous whitish elongated fibrous roots: culms capillary, often recurving, quadrangular-sulcate, light green, punctate: sheaths conspicuous, light or dark brown, the apex inflated, blunt, hyaline: spikelets 2 to 4 mm. long, ovate, few-to many-flowered: scales ovate-lanceolate, mostly acute, dark brown with greenish midrib and hyaline margin: style 3-fid; achene ovate, 0.75 to 1.0 mm. long, sharply triangular with convex faces, whitish to pale or olivaceous brown, lightly reticulate to minutely striate, narrowed at the apex and base, capped by a brownish or gray, short-pyramidal style-base: bristles inconspicuous, transparent white, obscurely toothed, shorter than the achene, often greatly reduced.—Marshes and muddy shores; Texas, California, West Indies, south to Paraguay."

BRITISH HONDURAS: Belize District—Prospecto, Northern River, *Gentle 868*; Maskall, *O'Neill 8918, 8922*. GUATEMALA: Dept. Peten, La Libertad, *Lundell 2580, 3097*.

9. HELEOCHARIS MUTATA (L.) R. et S. Syst. 2: 155. 1817.

Scirpus mutatus L. Amoen. Acad. 5: 391. 1759.

Limnochloa mutata Nees, Linnaea 9: 294. 1835.

Eleocharis scariosa Steud. Syn. 80. 1855.

Eleocharis spiralis Boeck. Linnaea 36: 473. 1869–70.

"Culms sharply triangular, coarse, 4 to 10 dm. high, from a short caudex; roots very numerous, fibrous gray or brown: sheaths straw-colored or light brown, membranous, pointed at the summit, often elongated: spikelets 1.5 to 5 cm. long, cylindric, usually obtuse: scales many-ranked, straw-colored, thin, orbicular to obovate, with broad membranous sides, and an erose upper margin, often slightly keeled: style 3-fid: stamens 3: achene 1.7 to 2.3 mm. long (including the style-base), elliptical or obovate, shining, rather smooth, yellow to

brown, with about 24 rows of shallow, transversely linear cells with their margins often slightly raised, surmounted at the summit by an annular thickening which merges gradually into the short style-base: bristles 6, irregular, equaling the achene, lustrous brown, with coarse but soft teeth.—Marshes and shallow ponds; West Indies, British Honduras, south to Paraguay.”

BRITISH HONDURAS: Belize District—Sibun River, *Gentle* 1429, 1432; near Belize, *Lundell* 1816. Stann Creek District—All Pines, *Schipp* 786.

10. HELEOCHARIS NIGRESCENS (Nees) Steud. var. MINUTIFLORA (Boeck.) Svenson, *Rhodora* 39: 226. 1937.

Heleocharis minutiflora Boeck. in Engler Bot. Jahrb. 7: 274. 1886.

Heleocharis microcarpa Clarke in Urban, Symb. Antill. 2¹: 71. 1900.

Caespitose annual with fibrous roots, or perennial with lignescent (usually whitened) vertical much-branched rootstocks. Culms filiform, erect, light green, often with fibrous bases, spongy to quadrangular sulcate, 4 to 20 cm. high. Sheaths usually marcescent. Spikelets many-flowered, greenish, oblong-cylindric to elliptic, 1 to 3 (rarely 5) mm. long. Scales white with a narrow green keel, often chestnut-tinged on the sides, acute to obtuse or emarginate, appressed or sometimes spreading in fruit; styles 3-fid; achene trigonous, 0.5 to 0.6 mm. long, the mature achenes (i.e. those at the base of the spikelet), smooth, semi-translucent, light yellowish brown with prominent costulate whitened opaque angles; immature achenes (or at least those at the middle part of the spikelets) opaque, white, with obscure striolate reticulation and a pearly luster and with less costulate angles; style-base brown to light gray, pyramidal (or occasionally depressed, acute), $\frac{1}{3}$ as wide as the achene; bristles none.—Marshes; West Indies, Yucatan, and British Honduras.

CAMPECHE: Villahermosa, *Lundell* 1143. BRITISH HONDURAS: Belize District—Belize, *Bartlett* 11258; *O'Neill* 8919; Boomtown, *O'Neill* 8920, 8921.

11. HELEOCHARIS NODULOSA (Roth) Schultes. Mant. 2: 87. 1824.

Scirpus nodulosus Roth, Nov. Pl. Sp. 29. 1821.

Eleocharis consanguinea Kunth, Enum. 2: 148. 1837.

Eleogenus nodulosus Nees in Mart. Fl. Bras. 2¹: 104. 1842.

“Erect from a coarse creeping rootstock: culms green, 1 to 2 mm. thick, 3 to 8 dm. high, terete, with numerous, usually conspicuous (sometimes nearly obsolete) transverse septae: sheaths elongate, stramineous (often with a purplish red base), the truncate darkened apex with a distinct mucro: spikelets many-flowered, oblong-lanceolate, acuminate, rarely obtuse, 8 to 15 mm. long: scales appressed to slightly spreading, 2 mm. long, obtuse to acute, scarious throughout, light to dark brown, with a broad hyaline margin: the lowest sub-orbicular, firmer, and broadly scarious-margined: anthers 0.8 to 1 mm. long: style 2- (not infrequently 3-) fid: achene 1 mm. long, broadly obovate, biconvex, yellow to brown or olivaceous, distinctly pitted-reticulate: style-base flattened, brown ($\frac{1}{2}$ as wide as the achene), deltoid, acute, the surface elevated at junction of achene-body: bristles ferruginous, equaling or slightly exceeding the achene, the common base prolonged into a short stipe.—Shallow ponds and marshes; Arizona to Florida, West Indies, south to Peru and Argentina.”

BRITISH HONDURAS: Corozal District—America's Estate, *Lundell* 4946.

12. HELEOCHARIS PACHYSTYLA (C. Wright) Clarke in Urban, Symb. Antill. 2¹: 72. 1900.

Scirpus pachystylus C. Wright in Sauvelle, Fl. Cub. 174. 1873.

Scirpus melanocarpus Griseb. Cat. Pl. Cub. 239. 1886; non Torr.

“Culms numerous from a short horizontal or branched-ascending rootstock: culms 3 to 5 cm. long, 1 to 2 mm. wide, rather soft, terete to flattened-sulcate when dry: sheaths dark

reddish brown, not loose, oblique at the herbaceous, but firm, apex: spikelets obovoid, obtuse, 5 to 7 mm. long, often clavate at the base: scales obtuse, thin, scarcely keeled, stramineous with brown-flecked margins, the lowest inclined to be cartilaginous: stamens 3, anthers 0.7 mm. long: style 3-fid: achene narrowly obovoid, trigonous, 1.5 mm. long (including the elongated style-base), yellowish brown, faintly striate-reticulate: style base $\frac{1}{3}$ as long as the achene body, elongated, triangular-conic, or sometimes almost falcate: bristles dark brown, retrorsely toothed, equaling the body of the achene.—Marshes and ponds; West Indies, British Honduras, south to Colombia.”

BRITISH HONDURAS: Belize District—Bakers Pine Ridge, *Lundell* 4714. El Cayo District—*Bartlett* 11799.

13. HELEOCHARIS PLICARHACHIS (Griseb.) Svenson, *Rhodora* **31**: 158. 1929.

Scirpus plicarhachis Griseb. Cat. Pl. Cub. 239. 1866.

Eleocharis elata Boeck. Vidensk. Medd. Kjøbenh. 151. 1871.

Eleocharis variegata Boeck. Flora **64**: 78. 1881; non Presl.

Eleocharis variegata var. *laxiflora* Clarke in Urban, Symb. Antill. **2**¹: 62. 1900.

“Erect from an ascending spongy rootstock, often with slender elongate rhizomes: culms wiry, flexuous, striate and sulcate, 2.5 to 6 dm. high: sheaths usually rigid, 4 to 8 cm. long, purplish or straw-colored, oblique at the summit: spikelets 1 to 2 cm. long, about 25-flowered, narrowly cylindrical, acute: scales loose, 3.5 mm. long, linear, obtuse, striate, with an obvious midrib: style 2-fid: stamens 3: achene biconvex, 2 mm. long (including beak), light brown, orbicular to obovate, with about 12 longitudinal rows of quadrate cells with upraised edges, narrowed at the summit and surmounted by a turgid annulus-elevation from which rises the deep brown or black lanceolate style-base: bristles 6, exceeding the achene, coarse, flat, with strong scattered teeth.—Marshes; West Indies, Guatemala, south to Paraguay.”

GUATEMALA: Dept. Peten, Lake Zotz, *Lundell* 3325.

14. HELEOCHARIS RETROFLEXA (Poir.) Urban, Symb. Antill. **2**¹: 165. 1900.

Scirpus retroflexus Poir. in Lam. Encyc. **6**: 753. 1804.

Cyperus depauperatus Vahl, Enum. **2**: 305. 1805.

Bacothryon retroflexum A. Dietr. Sp. Pl. **2**: 93. 1833.

Eleocharis depauperata Kunth, Enum. **2**: 140. 1837.

Chaetocyperus polymorphus N. et L., *depauperatus* Nees in Mart. Fl. Bras. **2**¹: 94. 1842.

Chaetocyperus niveus Liebm. Vidensk. Selsk. Skr. ser. 5. **2**: 242. 1851.

Chaetocyperus viviparus Liebm. Vidensk. Selsk. Skr. ser. 5. **2**: 242. 1851.

Chaetocyperus rugulosus Nees, Bonplandia **3**: 86. 1855.

Eleocharis triflora Boeck. Flora **63**: 437. 1880; fide Britton.

Eleocharis Chaetaria Britton, Journ. N. Y. Mic. Soc. **3**: 105. 1889.

“Caespitose, often proliferous annual (?) with fibrous roots: culms green, filiform, usually recurved, 2 to 2.5 cm. long, flattened to deeply quadrangular-sulcate, obscurely punctate: sheath stramineous to reddish, obtuse, scarious and inflated at the summit: spikelets few- to many-flowered, the scales usually spreading in fruit: scales green, keeled, obtuse to acute, often with chestnut to reddish brown sides: style 3-fid: achene 1.0 to 1.2 mm. long, trigonous, cancellate, costate, obovoid to urceolate, white or stramineous: style-base light brown, as wide and $\frac{1}{3}$ as long as the body of the achene, pyramidal-acuminate, the angles decurrent on the costae of the achene: bristles white, shorter than the achene.—Marshes; Alabama, West Indies, British Honduras, to Brazil.”

BRITISH HONDURAS: Stann Creek District—All Pines, *Schipp* 690.

10. HEMICARPHA Nees et Arn.

HEMICARPHA MICRANTHA (Vahl) Pax in Engl. & Prantl. Nat. Pfl. **2**: 105. 1887.

Scirpus micranthus Vahl, Enum. **2**: 254. 1806.

Hemicarpha subsquarrosa Nees in Mart. Fl. Bras. **2**¹: 61. 1842.

H. Drummondii Nees in Mart. Fl. Bras. **2**¹: 62. 1842.

Annual, glabrous throughout. Culms densely caespitose, 2 to 12 cm. tall, 0.3 mm. thick throughout, completely flattened, not at all trigonous, with 3 or 4 striae on each surface, not scabrellate, not septate-nodulose, flaccid. Leaves 1 or 2 on a culm, reduced to purplish sheaths or sometimes with a lamina about 1 to 3 cm. long. Terminal, erect bract about 1 to 3 cm. long, 0.3 mm. thick, appearing like an extension of the culm. Lateral bracts one or two, filiform, much shorter, less than 1 cm. long. Spikelets 2 to 4, 3 mm. long, terete, ovoid, densely many-flowered, sessile in the solitary, capitate cluster. Glumes 0.8 to 1.0 mm. long, about 0.5 mm. wide, obovate, mucronulate, reddish brown, thin. Perianth a minute, hyaline scale 0.1 mm. long. Stamen 1; anther about 0.1 mm. long; filament 0.5 mm. long. Style 2-cleft, not swollen at the base, caducous. Achene obovate-oblong, 0.5 mm. long, 0.2 mm. wide, purplish brown, terete, minutely cellular.—In open pinelands and barren sandy soil; New Hampshire to Washington, south to South America.

BRITISH HONDURAS: Belize District—Boomtown, *O'Neill* 8883.

11. HYPOLYTRUM L. C. Rich.

HYPOLYTRUM NICARAGUENSE Liebm. Dansk Vid. Selsk. Skrivt. **2**: 47. 1849.

Monoecious, glabrous perennial. Roots coarse, 1 to 2 mm. in diameter. Rhizome very short. Culms 80 to 120 cm. tall, 2 mm. thick at apex, 6 to 12 mm. thick at base, trigonous, faintly striate, not scabrellate, not septate-nodulose, erect, rigid, swollen at the base. Leaves about 4 to 6 on a culm, 60 to 80 cm. long, 20 to 35 mm. wide, acuminate, flat, coriaceous, not septate-nodulose, antrorsely scabrellate on the margins and often on the 3 dorsal midribs. Lower leaf-sheaths purple. Bracts 1 or 2, like the leaves but smaller. Inflorescence a solitary, terminal, rounded corymb, 10 to 15 cm. in diameter, the linear-lanceolate spikes (i.e. false spikelets) 4.0 mm. long, 1.0 mm. wide at the ends of the branches. Spikelets 1.5 mm. long, 0.7 to 0.8 mm. wide, 0.1 mm. thick, excessively compressed, thin, nearly colorless, consisting of a trio of flowers, each of the lower pair consisting of a hyaline, brownish glume and one stamen; the terminal flower a single pistil without a glume; each such trio appearing like a single flower and subtended by a glume-like bractlet, about 12 such spikelets aggregated into a dense spike (false spikelet) closely simulating the spikelet of *Scirpus*. Bractlets glume-like, 2 mm. long, 1 to 1.2 mm. wide, elliptic, nerveless, keeled, brown. True glumes (staminate) 1.5 mm. long, 0.3 mm. wide, hyaline, linear-spatulate, nerveless, antrorsely scabrellate on the keel, boat-shaped, in opposite pairs. Perianth none. Stamens solitary; filament 4 mm. long; anther pale yellow, pilose, 0.8 mm. long, 0.2 mm. wide; connective pale, turning brown, not prolonged. Achene 3 mm. long, 1.5 mm. wide, ovoid, terete, acuminate-umbonate at apex, broadly cuneate at the base, not stipitate, light gray, red-punctulate.—In moist thickets and forests; British Honduras to Brazil.

BRITISH HONDURAS: Belize District—Belize River, *Lundell* 3969, 3978; Sibun River—Northern Lagoon road, *Gentle* 1490. Stann Creek District—Big Creek, *Schipp* 110; Melinda Pine Ridge road, *Gentle* 1901. GUATEMALA: Dept. Peten, Rio Pasion, *Aguiar* 496.

12. **LAGENOCARPUS** Nees

1. **LAGENOCARPUS GUIANENSIS** Lindl. & Nees in Mart. Fl. Bras. **2**¹: 166. 1842.

Scleria guianensis Steud. Syn. 177. 1855.

Perennial, glabrous except in the inflorescence. Roots 2 to 3 mm. in diameter, 10 to 20 cm. long, coarse, spongy. Rhizome very short. Culms 100 to 200 cm. tall, 3 mm. thick at apex, 6 to 10 mm. at base, bluntly trigonous, multistriate, not scabrellate, not septate, rigid, erect, stout, not tuberous-thickened at the base, leafy to the summit. Leaves about 10 to 20 on a culm, 60 to 100 cm. long, 8 to 20 (35) mm. wide, thick, coriaceous, somewhat spongy, flat, somewhat septate-nodulose, especially on submerged parts, antrorsely-scabrellate on the margins, on the dorsal midrib and on the pair of marginal ventral ribs, long-acuminate, gradually broadened into the sheaths. Inflorescence of about 12 to 20 panicles in the upper axils, the upper 6 to 10 panicles pistillate, the lower staminate and branching ultimately in a pseudodichotomous fashion. Staminate spikelets, 3 mm. long, cuneate-obovoid; pistillate spikelets 4 mm. long, narrowly ovoid, terete, 1-flowered, usually solitary, both kinds of spikelets on very flat, pubescent pedicels and with puberulent, brown, suborbicular glumes about 1.5 mm. in diameter, the mucro 1.5 mm. long, the veins nearly obsolete. Pistillate spikelets with usually 6 or 7 concave, empty, brownish red, chartaceous, 1-veined, suborbicular, empty, inner, sterile glumes; the outer 3 or 4, with a mucro 1 mm. long; the inner 3, merely mucronulate and nearly truncate. Style branches 3, rather stout, pubescent. Achene 3.5 to 4 mm. long, lanceolate-ovoid, brown, dull, very minutely cellular, truncate at the base, terete, very faintly grooved, the beak confluent and completely fused with the achenes.—Rooting under shallow water, ponds and marshes; British Honduras to Brazil.

BRITISH HONDURAS: Belize District—Boomtown, *O'Neill* 8902. Stann Creek District—All Pines, *Schipp* 589.

Apparently this is the first record of the genus *Lagenocarpus* in Central America.

13. **LIPOCARPHA** R. Br.

LIPOCARPHA MACULATA (Michx.) Torr. Ann. Lyc. N. Y. **3**: 288. 1836.

Kyllinga maculata Michx. Fl. Bor. Amer. **1**: 29. 1803.

Hypaelyptum sphacelatum Vahl, Enum. **2**: 283. 1806.

L. sphacelata Kunth, Enum. **2**: 267. 1837.

Glabrous annual. Roots finely fibrous. Culms caespitose, 5 to 30 cm. tall, 0.5 mm. wide, much compressed, not septate-nodulose, smooth. Leaves 5 to 15 cm. long, 1 mm. wide, always shorter than the culm, conduplicate. Sheaths purplish brown. Bracts 2 or 3 (rarely 4), very irregular, the shortest often 1 cm., the longest often 8 to 12 cm. Spikelets 5 to 8 mm. long, 2 to 3 mm. thick, ovoid-oblong, obtuse, terete, 2 to 6 sessile in the terminal, solitary head. Glumes 1.2 to 1.8 mm. long, 0.3 to 0.4 mm. wide at apex, obcuneate to lanceolate, very thin hyaline, acute, the midvein green, otherwise nerveless, mottled with purplish or brownish or colorless. Perianth of 2 glume-like, very thin, hyaline, 1-ribbed scales enveloping and longer than the achene. Stamen 1. Style 0.4 mm. long; stigmas 3, 0.4 mm. long. Achene 1.0 to 1.2 mm. long, 0.2 to 0.25 mm. wide, oblong-oblancoate, light brown, conspicuously raised-punctulate, the sides flat, apiculate at the apex, conspicuously spongy-torulose at the base.—Pinelands and sandy barrens; Virginia to Florida, West Indies, south to Panama.

BRITISH HONDURAS: Belize District—Boomtown, *O'Neill* 8884, 8885, 8887; Maskall, *O'Neill* 8886; Bakers Pine Ridge, *Lundell* 6992.

14. REMIREA Aubl.

REMIREA MARITIMA Aubl. Pl. Guian. 1: 45. 1775.

- R. pedunculata* R. Br. Prodr. 236. 1810.
Miegia maritima Willd. Sp. Pl. 1: 311. 1797.
R. Wightiana Nees in Wight, Contrib. 92. 1834.
Cyperus Kegelianus Steud. Syn. 29. 1855; teste Camus.
Mariscus pungens Steud. Syn. 60. 1855; teste Camus.
R. distichophylla Boeck. Flora 41: 410. 1858.
Mariscus capitatus Zoll. Verz. Ind. Archip. 2: 63. 1854.
Lipocarpa foliosa Miq. Fl. Ind. Bat. 3: 337. 1856-9.
Mariscus maritimus Miq. Fl. Ind. Bat. Suppl. 600. 1859.

A glabrous perennial. Rhizomes ligneous, as long as 60 cm., 1 to 3 mm. thick, the internodes about 1.5 cm. long. Culms distant or caespitose at the head of the rhizome, 5 to 30 cm. tall, 1 mm. thick, subtrigonus, rigid, not scabrellate, not septate-nodose, concealed by the numerous, overlapping, inflated sheaths. Leaves very numerous on the culm, subulate, suberect, rigid, arcuate, coriaceous, shorter or longer than the stem, triquetrous, antorsely scabrellate on the angles, not septate-nodulose. Bracts 2 to 6, like the leaves but smaller, 2 to 8 cm. long. Inflorescence a solitary, dense, terminal, ovoid head 10 to 20 mm. long. Spikelets 4 mm. long, 1.5 mm. wide, ellipsoid, 1-flowered, about 30 to 50 in a head. Glumes about 3 to 4 mm. long, 1.5 mm. wide, ovate, thin, increasing in size from base to apex of spikelets, brownish, the three lowermost empty and 9-ribbed, the uppermost nerveless, faintly keeled, closely enveloping the achene. Perianth none. Stamens 3, unilateral. Style linear, smooth, its base not dilated. Stigmas 3, linear. Achene 2.4 mm. long, 1 mm. wide, oblong-ellipsoid, trigonus, brown, densely punctulate, estipitate, not apiculate, surfaced with hexagonal cells.—On seacoasts; pantropical.

BRITISH HONDURAS: *Schipp* sine loc.

16. SCIRPUS L.

(Description of the genus as represented in our area.)

Glabrous perennials (except for the ciliate glumes). Culms trigonus, smooth, sometimes septate-nodulose. Leaves and sheaths conspicuously septate-nodulose. Spikelets in heads, many-flowered. Glumes spirally imbricate, all fertile except the lowest 1 or 2 glumes. Perianth bristles 4 to 6 or 0, retrorsely barbellate. Stamens 2 or 3. Style bifid, not thickened at the base, early and completely deciduous. Achene plano-convex, 2 mm. long.

1. Bracts 4 to 7, 3 to 60 cm. long; heads 5 to 20; rays 5 to 8; perianth bristles wanting . . . *S. cubensis*
 Bracts solitary, 1 to 3 cm. long, appearing like a continuation of the culm; inflorescence a solitary head or heads numerous in a compound umbel; perianth bristles 4 to 6, retrorsely barbellate (2).
2. Culm and bract sharply triquetrous; head solitary, containing 5 to 12 spikelets . . . *S. Olneyi*
 Culm and bract terete; heads numerous, each containing 1 to 5 spikelets . . . *S. validus*

I. SCIRPUS CUBENSIS Poepp. & Kunth, Enum. Pl. 2: 172. 1837.

Perennial. Glabrous except for the ciliate glumes. Roots coarse. Rhizome very short. Culms densely caespitose, 30 to 90 cm. tall, 1 to 3 mm. wide at apex, 3 to 6 mm. at the base, trigonus, multistriate, essentially not scabrellate, obscurely septate-nodulose, erect, rigid. Leaves 10 to 60 cm. long, 2 to 10 mm. wide, subcoriaceous, flat, conspicuously septate-nodulose, 1-ribbed, sometimes minutely antorsely scabrellate on margins and ventral midrib. Sheaths conspicuously septate-nodulose, brownish purple. Bracts 4 to 7, 3 to 60 cm. long, 1 to 7 mm. wide, very unequal, otherwise like the leaves. Rays about 5 to 8, 0 to 6 cm.

long, unequal, some of them divaricate, occasionally with 1 to 3 branches. Spikelets 4 to 8 mm. long, about 3.0 mm. wide, elliptic, obtuse, subcompressed, about 6- to 12-flowered, very densely compacted at the ends of the rays into globose heads, about 20 to 30 in a head, these latter 10 to 15 mm. in diameter. Glumes 2.5 to 4.0 mm. long, 2 to 4 mm. wide, broadly ovate, 1-ribbed, or indistinctly 3-ribbed, faintly many-nerved, coriaceous, brown, cuspidate by the rigid, excurved mucro, antrorsely spinulose on the green keel, pilose and ciliate when young. Perianth wanting. Stamens 3. Anthers 1.5 mm. long, the connective prolonged as a seta 0.2 mm. long. Style bifid, about 0.2 mm. long, its branches about 1 mm. long. Body of achene 2.0 mm. long, 0.8 to 1.0 mm. wide, its subulate beak an additional 0.5 mm., obovate-oblong, plano-convex, lustrous, pale yellow, very minutely cellular.—Rooting under shallow water; Guatemala to Brazil, West Indies, and Africa.

GUATEMALA: Dept. Peten, El Paso, *Lundell 1568*. Lake Zotz, *Lundell 3322*. Lake Peten, *Dampf 10*.

2. *SCIRPUS OLNEYI* Gray, Bost. Journ. Nat. Hist. **5**: 238. 1845.

Glabrous perennial. Rhizome often 20 to 50 cm. long, 3 to 5 mm. in diameter, covered by the overlapping, sheathing scales, these latter lanceolate, 2 to 3 cm. long, hyaline, reddish brown, many-nerved. Culm 60 to 200 cm. tall, 2 mm. wide at apex, 5 mm. wide at base, very sharply triquetrous with conspicuously concave sides, septate-nodulose, not scabrellate, erect, multistriate. Leaves 1 to 3, 2 to 12 cm. long, about 5 to 8 mm. wide at the base or reduced to sheaths, linear-lanceolate, long-acuminate, subcoriaceous, conduplicate, erect, rigid, septate-nodulose, not at all scabrellate, one-ribbed. Sheaths septate-nodulose, brown or purple, thin, more or less inflated. Bract solitary, 1 to 3 cm. long, 3 mm. wide at base, triquetrous, erect, appearing like a continuation of the culm, like the leaves. Inflorescence a solitary, sessile, terminal (appearing lateral) head, about 10 to 15 mm. in diameter. Spikelets 5 to 10 mm. long, 2 to 3 mm. wide, ovoid to oblong-ovoid, obtuse, 5 to 12 in a head, about 20- to 30-flowered, the flowers spirally imbricate. Glumes oval to orbicular, 2 to 3.5 mm. in diameter, brown, with a conspicuous midrib, obsoletely nerved, emarginate, mucronate, thin, glabrous, fimbriate-ciliate. Perianth bristles usually 6, 2 mm. long, retrorsely barbellate, brown. Stamens 3 or 2, anthers 2.0 mm. long, linear, yellow; connective red, scarcely prolonged; filaments 3 mm. long, 0.2 mm. wide. Style about 1.5 mm. long, bifid, the branches of the same length. Achene 2 mm. long, 1.5 to 1.8 mm. wide, obovate-cuneate, plano-convex, dark grayish brown, apiculate, smooth, lustrous.—Rooting under shallow water; New Hampshire to the West Indies, Oregon to Guatemala.

BRITISH HONDURAS: Corozal District—Pueblo Nuevo, New River, *Lundell 4827*.

3. *SCIRPUS VALIDUS* Vahl, Enum. **2**: 268. 1806.

Perennial. Rhizome stout about 4 to 6 mm. in diameter, often 20 to 30 cm. long. Culms 100 to 300 cm. tall, 2 to 3 mm. thick at apex, 15 to 25 mm. thick at the base, terete, very spongy, sometimes septate-nodulose when submersed, perfectly smooth, multistriate. Leaves usually reduced to sheaths, the uppermost sometimes developed as a short lamina. Sheaths about 4 to 6, closely imbricate, becoming dark, sometimes septate when submersed. Bracts solitary (or rarely 1 or 2 very short accessory bracts present), 1 to 3 cm. long, about 2 to 3 mm. wide at the base, terete, appearing like a continuation of the culm. Inflorescence of numerous heads terminating the pedicels of the compound umbel. Spikelets 1 to 5 in a head, 5 to 12 mm. long, 3 to 4 mm. in diameter, oblong to oblong-ovoid, about 20- to 40-flowered. Glumes about 2 mm. in diameter, ovate to suborbicular, brown, obsoletely veined except for the conspicuous green midrib, emarginate and mucronate at apex, more or less puberulent,

spirally imbricate, slightly ciliolate. Perianth bristles 4 to 6, 2 to 2.5 mm. long, brown, retrorsely barbellate from near the base to the summit. Stamens 3; filaments 2.5 mm. long; anthers 1 mm. long, yellow, the connective prolonged as an appendage about 0.2 mm. long. Style 0.5 mm. long, bifid, its branches 1.5 to 2 mm. long. Achenes 1.7 to 2.0 mm. long, 1.5 mm. wide, cuneate-obovate, plano-convex, grayish brown, smooth, apiculate.—Rooting under shallow water, marshes, ponds, and streams throughout the United States and south to Yucatan and West Indies.

YUCATAN: Aguada de Labcah, *Schott 566a, 567*. Sisal, *Schott 690*. Izamal, *Gaumer 423*.

17. SCLERIA Berg.

Monoecious perennials or annuals. Rhizome ligneous, conspicuously nodose. Culms trigonous, the angles in many species scabrellate, leafy. Leaves flat, linear to lanceolate, commonly 3-ribbed, their sheaths often 3-winged. Ligule usually well developed. Flowers unisexual, the staminate and pistillate in the same or separate clusters. Staminate spikelets many-flowered, with spirally imbricate glumes. Pistillate spikelets one-flowered, often borne in the axil of the lowest glume of the staminate spikelet. Perianth wanting (unless the hypogynium is a much-modified perianth). Hypogynium wanting or developed, usually 3-lobed and adherent to the achene and resting in a cupula. Stamens 1 to 3, the anthers commonly mucronate to aristate. Styles 3 (rarely 2). Achene globose to ovoid, hard, ivory-like or crustaceous, smooth or variously transverse-rugose or somewhat reticulate or tuberculate, white (in a few species discolored or clouded with purple).

1. Hypogynium wanting or very slightly developed. Leaves narrow, 1 to 3 mm. wide, 10 to 20 cm. long; achenes 1 to 2.5 mm. long, white. Culms not scabrellate (2). Hypogynium developed and evident, either 3-lobed or ciliate or fimbriate (5).
2. Achene sparingly tuberculate, 1 to 1.5 mm. long, 12-porose at the base; glomerules of inflorescence 5 to 13, sessile; an annual. Leaves 1 to 2 mm. wide; bractlets hirsute. Achene smooth, 1 to 2.5 mm. long, 0- or 6- or 9- or 12-porose at the base; glomerules of inflorescence 1 to 9; perennials (3). *S. interrupta*
3. Bractlets pilose; staminate glumes hirsute; glomerules of inflorescence 3 to 9; achene 0- or 9- to 12-porose *S. hirtella*
Bractlets and glumes glabrous; staminate glumes glabrate, glomerules of inflorescence 1 to 4; achene 0- or 6-porose (4).
4. Glomerule of the inflorescence solitary and sessile at the apex of culm; achene 6-porose at base, 2 mm. long *S. georgiana*
Glomerules of the inflorescence 1 to 4, axillary and terminal, peduncled; achene nonporous at base, 2 to 2.5 mm. long *S. lithosperma*
5. Hypogynium ciliate or fimbriate (cilia very short in *S. microcarpa*); leaves 7 to 55 mm. wide, 20 to 60 cm. long, their sheaths 3-winged. Achenes smooth, shining (6).
Hypogynium 3-lobed, the lobes entire; leaves 1 to 18 mm. wide (9).
6. Hypogynium with 1 mm. long, purple fimbriations; achene 2 to 3 mm. long, white, clouded with purple or black; leaves 25 to 55 mm. wide, their sheaths inflated . . . *S. arundinacea*
Hypogynium ciliate; achenes 1 to 3 mm. long; leaves 10 to 28 mm. wide (7).
7. Achene 1 to 2 mm. long, white; leaves 7 to 11 mm. wide, their sheaths not inflated; cilia on the hypogynium white, less than 0.3 mm. long *S. microcarpa*
Achenes 2 to 3 mm. long, white or discolored; leaves 10 to 28 mm. wide; cilia on the hypogynium brown (8).
8. Achene ovoid, white or clouded, with a persistent black style-base, the cilia of the hypogynium (0.8 to 1.2 mm.) $\frac{1}{4}$ to $\frac{1}{2}$ the length of achene *S. mitis*
Achene globose, white, not clouded, the deciduous style-base brown, the cilia of the hypogynium (less than 0.3 mm. long) about $\frac{1}{10}$ the length of the achene . . . *S. Eggersiana*
9. Inflorescence of 1 to 3 staminate panicles above and 6 to 10 pistillate panicles below. Achene white or purple-clouded, 2 to 3 mm. long, pubescent on the coarse, conspicuous reticulation; leaves 6 to 18 mm. wide, retrorsely scabrellate *S. bracteata*
Inflorescence with staminate and pistillate flowers intermixed throughout the inflorescence (10).
10. Achene perfectly smooth or slightly puberulent (11).
Achene transversely rugose or tuberculate or subreticulate (13).

- 11. Achene entirely purple or clouded with white. Leaves 3 to 10 mm. wide; antrorsely scabrellate; achene 2 mm. long *S. melaleuca*
 Achene white (12).
- 12. Ligule bearing a conspicuous, scarios appendage; leaves 2 to 5 mm. wide; achene 2 to 4 mm. long; culms excessively scabrous on the angles *S. secans*
 Ligule unappendaged; leaves 5 to 15 mm. wide; achene 1.5 to 2.5 mm. long; culms slightly scabrellate on the angles *S. pterota*
- 13. Tubercles on the hypogynium none. Achene 2 mm. long, subreticulate and transversely rugose *S. setacea*
 Tubercles on the hypogynium 3 or 6 (14).
- 14. Tubercles on the hypogynium 3; leaves 2 to 6 mm. wide, 20 to 45 cm. long; achene 2 to 3 mm. long, tuberculate to verrucose-scabrellate *S. ciliata*
 Tubercles on the hypogynium 6; leaves 1 to 2 mm. wide, 15 to 20 cm. long; achene 1 to 2 mm. long, transversely verrucose-rugose *S. pauciflora*

1. *SCLERIA ARUNDINACEA* Kunth, Enum. 2: 347. 1837.

- Scleria latifolia* Nees, Flora 11: 303. 1828; non Sw.
- Scleria sylvestris* Poepp. & Kunth; Kunth, Enum. 2: 346. 1837.
- Scleria cyanocarpa* Kunth, Enum. 2: 347. 1837.
- Schizolepis latifolia* Nees, in Mart. Fl. Bras. 2¹: 186. 1842; non Sw.
- Schizolepis trigonocarpa* Nees, in Mart. Fl. Bras. 2¹: 186. 1842.
- Schizolepis silvestris* Nees, in Mart. Fl. Bras. 2¹: 188. 1842 (misprinted *Scleria* in original).
- Scleria grandifolia* Miq. Linnaea 19: 230. 1847; fide Boeck.
- Scleria trigonocarpa* Steud. Syn. 171. 1855.
- Scleria Kappleriana* Hochst. in Steud. Syn. 172. 1855; syn.
- Schizolepis arundinacea* Palla, Denkschr. Acad. Wien 79: 196. 1908.

Rhizome short, about 8 mm. thick. Culms clustered, 40 to 200 cm. tall, 2 to 3 mm. thick at apex, 5 to 10 mm. at base, erect, smooth or faintly scabrellate on the acute angles. Leaves commonly 4 on a culm, 20 to 50 cm. long, 20 to 50 mm. wide, commonly puberulent dorsally, glabrous ventrally, flat, 2- to 6-ribbed, antrorsely spinulose-scabrellate on the margin, especially toward the apex. Bracts 5 to 25 cm. long, otherwise like the leaves. Sheaths puberulent or glabrous, sometimes colored brownish or purple, inflated, about 3 to 10 cm. long, 5 to 10 mm. wide, more or less broadly winged, the wings smooth or scabrellate. Ligule 4 to 15 mm. long, rounded-deltoid, obtuse. Inflorescence a terminal panicle, often with several in addition in the axils, about 20 cm. long, purplish. Rhachis puberulent and faintly scabrellate. Pistillate glumes ovate, purplish with scabrellate, excurrent apices. Staminate spikelets lanceolate, 3 mm. long. Hypogynium with three fimbriate lobes, the fimbriations 1 mm. long, rigid, purple. Achene 2 to 3 mm. long, depressed-globose, white, clouded with black or purple, smooth, shining.—Thickets and forests; British Honduras, Lesser Antilles, south to Paraguay and Argentina.

BRITISH HONDURAS: Stann Creek District—Big Creek, *Gentle 2148*. El Cayo District—Mountain Pine Ridge, *Bartlett 11718*.

2. *SCLERIA BRACTEATA* Cav. Ic. 5: 34. pl. 457. 1799.

- Scleria floribunda* H. B. K. Nov. Gen. et Sp. 1: 233. 1816; fide Kunth.
- Scleria papillata* Willd. in Kunth, Enum. 2: 345. 1837; syn.
- Macrolomia bracteata* Schrad. apud Nees in Mart. Fl. Bras. 2¹: 182. 1842.
- Scleria rigens* Salzm.; Steud. Syn. 171. 1855; syn.
- Scleria bracteata* f. *simplicior* Kükenth. in Fedde, Repert. 26: 253. 1929.

Rhizome 5 to 10 cm. long or longer, about 10 mm. thick, very ligneous, not moniliform. Culms 60 to 300 cm. tall, 1 mm. thick at apex, 3 to 5 mm. at base, erect but soon clambering over other plants or prostrate, glabrous or thinly puberulent, not scabrellate. Leaves 15 to 45 cm. long, 5 to 18 mm. wide, flat, thin-coriaceous, retrorsely spinulose-scabrose on the translucent, horny margins and on the midrib and on the one or two pair of lateral ribs on both dorsal and ventral surfaces, both surfaces villous-hirsute, the apex extremely long-

attenuate. Sheaths 5 to 10 mm. long, villous-hirsute, not winged, the angles not scabrellate. Ligule about 2 to 4 mm. long, deltoid, obtuse, ciliate. Terminal panicle staminate (rarely with an occasional pistillate flower). Lateral panicles about 6 to 10, pistillate, except the uppermost one or two, which are occasionally staminate. Bracts linear-subulate, much less conspicuous in the staminate panicles than in the pistillate. Staminate spikelets purple. Pistillate spikelets about 1- to 4-flowered, the glumes with broad, purple margins, ovate-lanceolate, cuspidate, puberulent. Hypogynium 3-lobed, the margins purple, erose-dentate or entire. Achene 2 to 3 mm. long, depressed-globose, white, often more or less tinged with purple, apiculate, the coarse and conspicuous reticulations pubescent.—Thickets and margins of forests and clearings; Mexico and West Indies to Paraguay and Bolivia.

BRITISH HONDURAS: Belize District—Maskall, Northern River, *Gentle 1014*; Sibun River, *Bartlett 11409*. El Cayo District—Mountain Pine Ridge, *Bartlett 11889*. Stann Creek District—All Pines, *Schipp 683*.

3. *SCLERIA CILIATA* Michx. Fl. Bor. Amer. **2**: 167. 1803.

Scleria hirtella Michx. Fl. Bor. Amer. **2**: 168. 1803; non Sw.

Scleria macrantha Boeck. Flora **41**: 647. 1858; non Boeck. Flora **62**: 572. 1879; fide Clarke.

Scleria Elliottii Chapm. Fl. S. States 531. 1860.

Scleria pauciflora Muhl. var. *Elliottii* Britton, Ann. N. Y. Acad. Sci. **3**: 234. 1885.

Rhizome 5 to 20 cm. long, 2 to 3 mm. thick, ligneous, submoniliform. Culms 20 to 70 cm. tall, 1 mm. thick at apex, 2 mm. at the base, erect, hirtellate to glabrate but not scabrellate. Leaves 20 to 45 cm. long, 2 to 6 mm. wide, flat, subcoriaceous, obtuse, 3-nerved, pubescent dorsally and ventrally, the hairs longer on the margins and ribs. Sheaths pubescent especially on the wingless angles. Ligule hemispheric, 2 mm. long or less. Glomerules of the inflorescence terminal, occasionally 1 or 2 additional in the axils. Bracts like the leaves. Bractlets lanceolate-subulate, ciliate to glabrous. Pistillate glumes brown or with patches of purple, lanceolate, pubescent, ciliate. Hypogynium a mere border with 3 low, obtuse lobes bearing 3 brown, entire or 2-lobed tubercles. Achene 2 to 3 mm. long, globose, white, lustrous, tuberculate or verrucose-scabrellate on the irregular transverse ridges, usually apiculate.—Pinelands; Virginia to Missouri south to Texas and Florida, West Indies and British Honduras.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Lundell 6711*.

4. *SCLERIA EGGERSIANA* Boeck. Cyp. Nov. **2**: 41. 1890.

Scleria Grisebachii Clarke in Urban, Symb. Antill. **21**: 150. 1900.

Scleria microcarpa Griseb. Cat. Pl. Cub. 248. 1866, pro parte; non Nees.

Rhizome 5 to 10 cm. long or longer, about 7 mm. thick, ligneous, not moniliform. Culms 100 to 200 cm. tall, erect, glabrous or minutely scabrellate on the angles. Leaves about 30 cm. long, 10 to 25 mm. wide, coriaceous, antrorsely scabrous on the translucent, horny margins and sometimes on the veins. Sheaths 5 to 10 cm. long, glabrous, the margins and midrib of leaf decurrent as 3 retrorsely scabrellate wings. Ligule 5 to 20 mm. long, deltoid to sublanceolate, brown-margined, ciliolate. Panicles 4 or 5, terminal and axillary, erect. Bracts like the leaves. Bractlets setaceous. Glumes light brown, the staminate ovate, the pistillate broader than long. Cilia of the hypogynium brown, less than 0.3 mm. long. Achene 2.5 to 3 mm. long, the hypogynium an additional 1 mm., white, globose-ovoid, smooth, lustrous, apiculate by the somewhat deciduous style-base.—Marshes, lake margins, etc.; Guatemala, West Indies to Guiana.

GUATEMALA: Dept. Peten, Lake Zotz, *Lundell 3312*.

5. *SCLERIA GEORGIANA* Core, Brittonia **1**: 243. 1934.

Scleria gracilis Ell. Sketch **2**: 557. 1824; non Rich.

Hypoporum gracile Torr. Ann. Lyc. N. Y. **3**: 381. 1836.

Rhizome 5 to 20 cm. long, 3 to 5 mm. thick, submoniliform. Culms closely set on the rhizome, 1 to 5 mm. apart, 30 to 55 cm. tall, 0.5 to 1.0 mm. thick, erect, glabrous, not scabrellate. Leaves very few, about 10 to 20 cm. long, about 1 mm. wide, involute-trigonus, the involute margins sometimes scabrellate, otherwise glabrous, their sheaths minutely puberulent or glabrous. Ligule wanting. Inflorescence a solitary glomerule of 2- to 5-spikelets, terminal but appearing lateral by reason of the erect bract, which is 1 to 9 cm. long and 1 mm. wide. Spikelets 5 mm. long. Bractlets glabrous. Glumes brownish, glabrous, acuminate, the staminate lanceolate, the pistillate broader. Hypogynium wanting. Achene 2 mm. long, white, smooth, commonly longitudinally grooved, dull, 6-porose near the base, ovoid above the trigonus base.—Pinelands and sandy marshes; North Carolina and Texas, West Indies to British Honduras.

BRITISH HONDURAS: Belize District—Bakers Pine Ridge, *Lundell 6976*; Belize, *O'Neill 8889, 8892*; Old Hector Creek, *O'Neill 8910*; Boomtown, *O'Neill 8899, 8911*. Orange Walk District—Honey Camp, *Meyer 107*.

6. *SCLERIA HIRTELLA* Sw. Prodr. Veg. Ind. Occ. 19. 1788.

Carex hirtella Gmel. Syst. Nat. **2**: 138. 1791.

Scleria interrupta Michx. Fl. Bor. Amer. **2**: 168. 1803; non Rich.

Cenchrus hirsutus Spreng. Neue Entdeck. **3**: 15. 1822; fide Kunth.

Hypoporum humile Nees, Linnaea **9**: 303. 1834.

Hypoporum hirtellum Nees, Linnaea **9**: 303. 1834; fide Britton.

Hypoporum interruptum Torr. Ann. Lyc. N. Y. **3**: 382. 1836; non Nees.

Scleria cenchroides Kunth, Enum. **2**: 352. 1837; fide Boeck.

Scleria hirta Willd. in Kunth, Enum. **2**: 352. 1837; syn.

Scleria mollis Kunth, Enum. **2**: 352. 1837; fide Boeck.

Scleria nutans Willd. ex Kunth, Enum. **2**: 351. 1837; fide Britton.

Scleria interrupta Kunth, Enum. **2**: 352. 1837, pro parte.

Scleria pulchella Nees in Mart. Fl. Bras. **2**¹: 170. 1842; syn.

Anerma hispidula Schrad. ex Nees in Mart. Fl. Bras. **2**¹: 170. 1842; syn.

Hypoporum nutans Nees in Mart. Fl. Bras. **2**¹: 170. 1842.

Scleria Michauxii Chapm. Fl. S. States 532. 1860.

Scleria hirtella var. *pauciciliata* Britton, Ann. N. Y. Acad. Sci. **3**: 236. 1885.

Scleria humilis Britton, Ann. N. Y. Acad. Sci. **3**: 235. 1885; non Nees.

Rhizome 1 to 2 mm. thick, sometimes 10 cm. long, ligneous. Culms 15 to 60 cm. tall, 0.5 to 1.0 mm. wide, erect, glabrous, sometimes pubescent but not scabrellate toward apex. Leaves 4 to 20 cm. long, 2 to 3 mm. wide, flat, not serrulate, hirsute, especially on the sheaths, by flat hairs 1 mm. long. Ligule obsolete. Inflorescence of 4 to 9 glomerules, 4 to 5 mm. in diameter, sessile on the unbranched rhachis. Bracts wanting except that the lowest glomerule is sometimes subtended by a short bract 5 to 20 mm. long. Bractlets narrowly linear, like the glumes hirsute by flat hairs 1 mm. long. Spikelets 4 to 5 mm. long, brown to black. Hypogynium wanting. Achene 1 to 1.5 mm. long, subglobose to obovoid, white, smooth, lustrous, apiculate, faintly trigonus, cuneate and nonporous at the base or faintly 9- to 12-pored.—Tropical pinelands and marshes; Georgia to northern Argentina and Chile, also Africa.

BRITISH HONDURAS: Belize District—Gracie Rock, *O'Neill 8904*; *Gentle 1555*. El Cayo District—Mountain Pine Ridge, *Lundell 6681*. GUATEMALA: Dept. Peten, La Libertad, *Lundell 3593*; *Aguilar 109*.

7. *SCLERIA INTERRUPTA* Rich. Act. Soc. Hist. Paris **1**: 113. 1792.

Hypoporum interruptum Nees, Linnaea **9**: 303. 1834.

Hypoporum distans Nees in Mart. Fl. Bras. **2**¹: 171. 1842; fide Clarke.

Scleria hirtella var. β Boeck. Linnaea **38**: 440. 1874.

Scleria distans var. *interrupta* Kükenth. in Fedde, Repert. **23**: 214. 1926.

Rhizome none. Culms 15 to 50 cm. tall, sparingly hirsute to glabrate but not scabrellate. Leaves 5 to 20 cm. long, 1 to 2 mm. wide, their margins smooth, not serrate, hirsute by flat hairs 1 mm. long, especially on the sheaths, their ligules a cluster of hairs or wanting. Inflorescence of 5 to 13 glomerules (5 mm. in diameter), sessile on the unbranched culm. Bracts wanting except that the lowest glomerule is sometimes subtended by a short bract 2 to 15 mm. long. Spikelets 2 to 4 mm. long. Bractlets linear, hirsute. Staminate glumes lanceolate; pistillate glumes ovate, purplish, mucronate, ciliate on the keel. Hypogynium wanting. Achene 1 to 1.5 mm. long, globose, white, sparingly rugose-verrucose to tuberculate, on a trigonous, 12-porose base.—Tropical pinelands; West Indies, Central America to Brazil.

BRITISH HONDURAS: Belize District—Bakers Pine Ridge, *Lundell 6991*; Boomtown, *O'Neill 8896*.

8. *SCLERIA LITHOSPERMA* (L.) Sw. Prodr. Veg. Ind. Occ. **18**. 1788.

Scirpus lithospermus L. Sp. Pl. **51**. 1753, pro parte.

Schoenus lithospermus L. Sp. Pl. ed. 2. **65**. 1762, pro parte.

Scleria tenuis Retz, Obs. Bot. **4**: 13. 1786; fide Boeck.

Scleria filiformis Sw. Prodr. Veg. Ind. Occ. **19**. 1788.

Carex subulata Gmel. Syst. Nat. **2**: 138. 1791.

Carex tenuis Gmel. Syst. Nat. **2**: 138. 1791.

Carex lithosperma Gmel. Syst. Nat. **2**: 137. 1791.

Scleria gracilis Rich. Act. Soc. Hist. Nat. Paris **1**: 113. 1792; fide Willdenow.

Scleria purpurea Poir. in Lam. Encyc. **7**: 4. 1806; fide Kunth.

Scleria capillaris R. Br. Prodr. **240**. 1810; fide Boeck.

Scleria glaucescens Presl, Rel. Haenk. **1**: 202. 1828; fide Nees.

Scleria elongata Presl, Rel. Haenk. **1**: 202. 1828.

Hypoporum purpurascens Nees, Linnaea **9**: 303. 1834; fide Kunth.

Hypoporum Sieberi Nees, Linnaea **9**: 303. 1834; fide Boeck.

Hypoporum capillare Nees, Linnaea **9**: 303. 1834; fide Boeck.

Scleria subulata Steud. Nomencl. ed. 2. **1**: 296. 1840.

Scleria Wightiana Steud. Syn. **176**. 1855.

Scleria lithosperma var. *filiformis* Britton, Ann. N. Y. Acad. Sci. **3**: 231. 1885.

Scleria Krugiana Boeck. Cyp. Nov. **1**: 35. 1888.

Hypoporum lithospermum Nees; B. D. Jackson in Ind. Kew. **1**: 1198. 1895.

Rhizome at least 5 to 10 cm. long, 3 to 5 mm. thick, submoniliform. Culms densely set in tufts on the rhizome, 30 to 70 cm. tall, 1 to 2 mm. wide, glabrous or puberulent, not scabrellate. Leaves several, commonly clustered near the middle of the culm, 10 to 30 cm. long, 1 to 3 mm. broad, flat and more or less revolute, puberulent to glabrous dorsally, glabrous to scabrellate ventrally, the margins and keel scabrellate. Sheaths minutely puberulent to glabrate. Ligule 1 to 1.5 mm. long, broadly deltoid, usually red-margined, hirsute. Inflorescence terminal and axillary, of 1 to 4 remote, sessile or stalked spikes. Spikelets 3 to 4 mm. long, few-flowered. Bracts about 5 to 15 cm. long, 1 to 2 mm. wide, like the leaves as to pubescence. Bractlets glabrous, brown. Glumes brown, ovate-lanceolate. Hypogynium wanting. Achene 2 to 2.5 mm. long, ovoid, white, smooth, shining, apiculate, its base non-porose, trigonous.—Pan-tropical.

YUCATAN: Tizimin, *Swallen 2515, 2581*. Uxmal, *Swallen 2623*. Peto, *Swallen 2676*. Chichen Itza, *Steere 1636*. Without locality, *Bequaert 91*; *Gaumer 2377*. CAMPECHE: TUX-

peña, *Lundell* 956. QUINTANA ROO: Tancah, *Swallen* 2828. San Miguel, Cozumel Island, *Swallen* 2881. BRITISH HONDURAS: Corozal District—San Andres, *Lundell* 4817. Belize District—Maskall, *Gentle* 994; *O'Neill* 8894, 8905, 8906, 8909. El Cayo District—Mountain Pine Ridge, *Lundell* 6816. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 3637, 3649. Polol, *Aguilar* 187. Dos Arroyos, *Bartlett* 12100.

9. *SCLERIA MELALEUCA* Reichb. in Schlecht. & Cham. *Linnaea* 6: 29. 1831.

Scleria communis Liebm. Vidensk. Selsk. Skr. ser. 5. 2: 71. 1850, partim; fide Clarke.

Scleria pratensis var. *melanocarpa* Boeck. Vidensk. Meddel. 153. 1870.

Rhizome 10 to 20 cm. long, about 4 mm. thick, ligneous, somewhat moniliform. Culms 30 to 90 cm. tall, 1 mm. thick at apex about 2 to 3 mm. at base, erect, glabrous or very slightly scabrellate. Leaves 20 to 30 cm. long, 3 to 10 mm. wide, flat, thin-coriaceous, abruptly acuminate but blunt at the very apex, 3-nerved, glabrous except for the antrorse scabrellations on the green, not horny margins, on the dorsal midrib, and on the two ventral, lateral ribs. Sheaths narrowly 3-winged, glabrous, or thinly pubescent, the wings retrorsely scabrellate. Ligule about 5 to 10 mm. long, glabrous, or pubescent and ciliate, deltoid to sublanceolate. Panicles about 1 to 4. Rhachis antrorsely scabrellate. Bractlets lanceolate-subulate, minutely scabrellate on the margins, more or less purple. Glumes purplish, the staminate lanceolate, the pistillate ovate-orbicular, cuspidate, darker in color than the staminate. Hypogynium of three, broad, nonciliate lobes. Achenes 2 mm. long, globose-ovoid, lustrous, smooth, occasionally pubescent near the base, mucronate, blackish purple, sometimes white at the base or entirely white when young.—Margins of forests and clearings; Mexico and West Indies to Brazil and Peru.

CAMPECHE: Tuxpeña, *Lundell* 1100. BRITISH HONDURAS: Belize District—Prospecto, Northern River, *Gentle* 919; Maskall, *O'Neill* 8888, 8898; Sibun River, *O'Neill* 8890. El Cayo District—San Antonio, *Bartlett* 13043; Chalillo Crossing, *Lundell* 6506. Stann Creek District—Big Creek, *Schipp* 891; Stann Creek, *O'Neill* 8895. GUATEMALA: Dept. Peten, La Libertad, *Lundell* 2547, 3725; *Aguilar* 62. La Libertad—Flores road, *Lundell* 3977.

10. *SCLERIA MICROCARPA* Nees, *Linnaea* 9: 302. 1834; non Griseb.

Scleria ovuligera Reichb. in Nees, *Linnaea* 9: 303. 1834; fide Kunth.

Ophryoscleria microcarpa Nees in Mart. Fl. Bras. 2¹: 184. 1842.

Scleria foliosa Wright in Sauv. Anal. Acad. Cienc. Habana 8: 154. 1871; non Rich.

Scleria latifolia Balb. in Boeck. *Linnaea* 38: 517. 1874.

Scleria microcarpa var. *latifolia* Boeck. *Linnaea* 38: 517. 1874.

Scleria microcarpa var. *foliosa* Clarke in Urban, Symb. Antill. 2¹: 149. 1900.

Rhizome elongate, 5 to 10 cm. or more long, 3 to 5 mm. thick, ligneous, not moniliform. Culms about 5 to 20 mm. apart, essentially glabrous, scarcely or not at all minutely scabrellate, 50 to 200 cm. tall, 1 mm. thick at apex, 3 mm. at the base, erect or drooping. Leaves 20 to 40 cm. long, 7 to 11 mm. wide, glabrous or puberulent dorsally, antrorsely scabrellate on the thickened, translucent margins and on the (commonly 2) dorsal veins. Sheaths 3 to 8 cm. long, not inflated, conspicuously 3-winged by the decurrent margins and midrib of the leaf, the wings antrorsely scabrellate on upper part of sheath, retrorsely scabrellate on the lower part. Ligule lanceolate, 5 to 10 mm. long, puberulent or glabrate. Panicles commonly 4 or 5, terminal and axillary, distant, narrow and spike-like, loosely flowered. Lowest bract of the inflorescence like the leaves. Bractlets linear-subulate. Glumes obtuse, pale brown, the staminate ovate, the pistillate ovate-orbicular. Cilia of the hypogynium very short, less than 0.3 mm. long or nearly obsolete, white. Achene 1 to 2 mm. long, ovoid, white, lustrous, stout-apiculate.—Marshes, lake margins and thickets; Cuba and British Honduras to Paraguay.

BRITISH HONDURAS: Orange Walk District—New River at Orange Walk, *O'Neill* 8903. Belize District—Mussell Creek, *O'Neill* 8897. El Cayo District—El Cayo, *Lundell* 6114. GUATEMALA: Dept. Peten, Lake Zotz, *Lundell* 3317.

11. *SCLERIA MITIS* Berg. Vet. Akad. Handl. Stockh. **26**: 145. *pl.* 5. 1765.

Schoenus lithospermus L. Sp. Pl. ed. 2. 65. 1762, pro parte; fide Clarke.

Carex lithosperma L. Syst. Veg. **13**: 706. 1774; fide Clarke.

Carex mitis Gmel. Syst. Nat. **2**: 138. 1791.

Scleria riparia Poepp. & Kunth in Kunth, Enum. Pl. **2**: 341. 1837.

Scleria latifolia Reichb. apud Nees in Mart. Fl. Bras. **2**¹: 183. 1842; syn.

Ophryoscleria lucida Nees in Mart. Fl. Bras. **2**¹: 183. 1842.

Ophryoscleria riparia Nees in Mart. Fl. Bras. **2**¹: 184. 1842.

Ophryoscleria mitis Nees in Mart. Fl. Bras. **2**¹: 185. 1842.

Scleria praealta Salzm. in Schlecht. Bot. Zeit. **3**: 461. 1845; syn.

Scleria lucida Steud. Syn. 168. 1855.

Scleria trialata Bertero in Boeck. Linnaea **38**: 521. 1874; syn.

Scleria trinitatis Boeck. Cyp. Nov. **2**: 31. 1890; fide Clarke in Urban, Symb. Antill. **2**: 150. 1900.

Rhizome elongate (5 to 20 cm.), about 5 mm. thick, ligneous, not moniliform. Culms 1 to 3 cm. apart, 100 to 300 cm. tall, 1 to 3 mm. thick at apex, 5 to 7 mm. at base, smooth or somewhat scabrellate, erect. Leaves 20 to 60 cm. long, 10 to 28 mm. wide, flat, coriaceous, glabrous, or puberulent on one or both sides, with translucent, indurated, pale, minutely antrorsely scabrellate margins and with one to several pairs of conspicuous nerves similarly scabrellate. Sheaths about 5 to 15 cm. long, not inflated, conspicuously 3-winged by the decurrent margins and midrib of the leaf, which here become retrorsely scabrellate. Ligule 5 to 15 mm. long, lanceolate, puberulent or glabrate. Panicles axillary and terminal, usually 3 to 4 on a culm, slender, erect. Lowest bract like the leaves, but shorter. Bractlets subulate. Staminate spikelets oblong-ovate. Staminate glumes oblong-ovate; pistillate glumes ovate, both pale brown. Cilia of the hypogynium 0.7 to 1.2 mm. long, lustrous, reddish brown. Achene 2 to 3 mm. long, ovoid, smooth, white or partially or entirely clouded with black, lustrous, apiculate by the persistent, black style-base.—Marshes; British Honduras and Cuba to Paraguay and Bolivia.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, San Agustin, *Lundell* 6718. Stann Creek District—Stann Creek, *Schipp* 887.

12. *SCLERIA PAUCIFLORA* Mühl. in Willd. Sp. Pl. **4**: 318. 1806.

Scleria caroliniana Willd. Sp. Pl. **4**: 318. 1805.

Scleria pauciflora var. *caroliniana* Wood, Bot. and Flora 368. 1871.

Scleria Oakesiana Robbins apud Britton, Ann. N. Y. Acad. Sci. **3**: 234. 1885; syn.

Scleria pauciflora var. *effusa* Clarke in Urban Symb. Antill. **2**: 143. 1900.

Scleria pauciflora var. *hansana* Fernald, Rhodora **8**: 165. 1906.

Scleria ciliata var. *pauciflora* Kükenth. in Fedde, Repert. **23**: 215. 1926.

Rhizome 5 to 10 mm. long, 2 to 4 mm. wide, ligneous, often twisted and gnarled. Culms 20 to 50 cm. tall, 0.5 to 1.0 mm. thick at apex, 1 to 2 mm. at the base, erect, pubescent with longer cilia or glabrate, not scabrellate, caespitose. Leaves 15 to 20 cm. long, 1 to 2 mm. wide, pubescent dorsally and ventrally or glabrate, scabrellate on the margins, not 3-ribbed. Sheaths not 3-winged, pubescent, not retrorsely scabrellate. Ligule rounded deltoid, 1 to 2 mm. long, pubescent. Glomerules of the inflorescence terminal or occasionally 1 or 2 additional in the axils. Bracts like the leaves. Bractlets linear-subulate, ciliate, pubescent or glabrate. Pistillate glumes ovate-lanceolate, acuminate, purplish, pubescent especially on the margins and keel. Hypogynium a narrow, triangular disc bearing 6 finely muricate, irregularly globose or deltoid tubercles arranged in pairs. Achene 1 to 2 mm. in diameter, globose,

lustrous, white, verrucose-papillate in transverse ridges, the basal papillae reflexed and elongate.—Pinelands and barrens; New Hampshire to Missouri, Florida, Texas, Cuba, and British Honduras.

BRITISH HONDURAS: Belize District—Boomtown, *O'Neill* 8901; Bakers Pine Ridge, *Lundell* 3800.

13. *SCLERIA PTEROTA* Presl, *Isis* **21**: 268. 1826.

Schoenus latifolius Vahl, *Enum.* **2**: 226. 1806; fide Kunth.

Scleria latifolia Sieber apud Presl, *Isis* **21**: 268. 1828; fide Boeck.

Scleria asperata Presl, *Isis* **21**: 268. 1828.

Scleria margaritifera Presl, *Isis* **21**: 268. 1828; fide Boeck.

Dichromena Vahlü Dietr. *Sp. Pl.* **2**: 169. 1833; fide Clarke.

Scleria communis Kunth, *Enum. Pl.* **2**: 340. 1837, pro parva parte; fide Clarke.

Scleria affinis Presl in Steud. *Nomencl. ed. 2.* **2**: 542. 1841.

Scleria Selloana Schrad. apud Nees, in *Mart. Fl. Bras.* **2**¹: 179. 1842; syn.

Scleria conspersa Sellow apud Nees, in *Mart. Fl. Bras.* **2**¹: 179. 1842.

Scleria pratensis Lindl. apud Nees, *Nova Acta Acad. Leop. Carol.* **19**: Suppl. **1**: 121. 1843.

Scleria simplicior Steud. *Syn.* 169. 1855.

Scleria Ottonis Boeck. *Linnaea* **38**: 490. 1874.

Scleria flagellata Sw. apud Boeck. *Linnaea* **38**: 506. 1874; syn.

Scleria Pittieri Boeck. in Tonduz, *Bull. Herb. Boiss.* **3**: 7. 1895; nomen, *Allg. Bot. Zeitschr.* **2**: 159. 1896.

Scleria boliviana Palla in Buchtein, *Contrib. Fl. Boliv.* **1**: 90. 1910 (nomen).

Rhizome tuberous-moniliform, sometimes 10 cm. long, the nodes subglobose, about 5 mm. in diameter, 50 to 300 cm. tall, 1 to 2 mm. thick at apex, slender, erect, glabrous, sparingly scabrelate on the angles. Leaves 15 to 45 cm. long, 5 to 15 mm. wide, flat, subcoriaceous, acute, 3-nerved, glabrous, antrorsely scabrelate on the margins. Sheaths narrowly 3-winged, glabrous or retrorsely strigose, retrorsely scabrelate on the angles. Ligule about 3 to 10 mm. long, deltoid, glabrous or ciliate. Panicles 3 or 4, 5 to 15 cm. long, terminal and axillary. Rhachis somewhat 3-winged, puberulent when young. Bracts like the leaves. Bractlets subulate-filiform. Staminate glumes lanceolate. Pistillate glumes broadly ovate, cuspidate-aristate, sometimes mottled with purple. Hypogynium shallowly 3-lobed, glabrous, sometimes ciliate. Achene 1.5 to 2.5 mm. long, subglobose, lustrous, white often purple-blotched, apiculate.—Damp clearings, margins of forests; West Indies and Mexico to Paraguay and Argentina.

BRITISH HONDURAS: Corozal District—Corozal–Pachacan road, *Lundell* 4915. Belize District—Salt Creek, *O'Neill* 8900; Maskall, *O'Neill* 8891, 8893, 8908; Boomtown, *O'Neill* 8912.

14. *SCLERIA SECANS* (L.) Urban, *Symb. Antill.* **2**¹: 169. 1900.

Schoenus secans L. *Syst. ed. 2.* 865. 1759; excl. syn. Rumpf.

Carex lithosperma L. *Syst. ed. 12.* 618. 1767, partim; fide Sw.

Schoenus lithospermus L. *Sp. Pl. ed. 2.* 65. 1762, partim; fide Sw.

Arundo farcta Aubl. *Pl. Guian.* **1**: 52. 1775; fide Poir.

Scleria reflexa H. B. K. *Nov. Gen. et Sp.* **1**: 232. 1816.

Scleria caricifolia Schrad. apud Nees, in *Mart. Fl. Bras.* **2**¹: 177. 1842; syn.

Mastigoscleria reflexa Nees in *Mart. Fl. Bras.* **2**¹: 177. 1842.

Scleria Renggeriana Steud. *Syn.* 173. 1855.

Scleria Weigeltiana Schrad. apud Boeck. *Linnaea* **38**: 504. 1874; syn.

Rhizome 5 cm. or more long, submoniliform, of hard, globose, ligneous, corm-like nodes about 10 mm. in diameter. Culms 100 to 1000 cm. long, 1 mm. thick at apex, about 3 to 5 mm. at base, weak, reclining on shrubs, forming an impenetrable tangle, retrorsely scabrelate to spinulose-scabrous on the angles, otherwise glabrous. Leaves about 20 to 50 cm. long,

3 to 6 mm. wide, long-acuminate, 3-ribbed, flat, revolute, sometimes pilose dorsally, commonly glabrous ventrally except for some pubescence near the sheath, retrorsely scabrellate on the margins and ribs. Sheaths not winged, retrorsely scabrous on the angles; sometimes pubescent near the apex. Ligule ovate, scarious-margined, brown. Inflorescence terminal and axillary in the upper leaves. Peduncle antrorsely scabrellate on the angles, the ancipital rhachis villous on the edges. Bracts like the leaves. Bractlets setaceous, ciliate. Pistillate glumes ovate, acute, glabrous, deep purple. Hypogynium flat, subglobose, scarcely lobed, the margin merely reflexed and undulate. Achene 2 to 4 mm. long, broadly ovoid, white, shining, smooth.—Margins of forests and clearings, forming impenetrable barriers; West Indies and Mexico to Bolivia and Brazil.

BRITISH HONDURAS: Belize District—Maskall, *Gentle* 912; *O'Neill* 8907. GUATEMALA: Dept. Peten, La Libertad, *Aguilar* 308.

15. *SCLERIA SETACEA* Poir. in Lam. Encyc. **7**: 4. 1806.

Scleria reticularis Mühl. Descr. Gram. 266. 1817; non Michx.

Scleria micrantha Poir. in Lam. Encyc. Suppl. **5**: 108. 1817.

Scleria reticularis Spreng. Syst. **3**: 831. 1826, pro parte; fide Boeck.

Scleria reticularis J. & C. Presl in Presl, Rel. Haenk. **1**: 202. 1828.

Scleria laxa Torr. Ann. Lyc. N. Y. **3**: 376. 1836; non R. Br.

Scleria Mühlenbergii Steud. Nom. ed. 2. **2**: 543. 1841.

Scleria oligantha A. Rich. in Sagra, Hist. Cuba. **11**: 295. 1850.

Scleria Mühlenbergiana Liebm. Vidensk. Selsk. Skr. ser. 5. **2**: 258. 1850.

Scleria Torreyana Walp. Ann. **3**: 696. 1852.

Scleria hemitaphra Steud. Syn. 169. 1855.

Scleria dictyocarpa Wright in Griseb. Cat. Pl. Cub. 249. 1866.

Scleria bracteata var. *angusta* Griseb. Cat. Pl. Cub. 249. 1866, pro parte.

Scleria debilis Wright in Sauv. Anal. Acad. Cienc. Habana **8**: 154. 1871.

Scleria reticularis var. *pubescens* Britton, Ann. N. Y. Acad. Sci. **3**: 232. 1885.

Scleria trichopoda Wright in Britton, Ann. N. Y. Acad. Sci. **3**: 232. 1885; syn.

Scleria setacea var. *hemitaphra* Kükenth. in Fedde, Repert. **23**: 215. 1926.

Scleria latilacunosa Kükenth. Bot. Jahrb. **56**: Beibl. 125: 21. 1921.

Rhizome very short. Culms approximate, caespitose, 15 to 80 cm. tall, 1 mm. thick at the apex, 2 to 3 mm. at the base, erect, or decumbent, glabrous. Leaves about 10 to 15 cm. long, 1 to 4 mm. wide (rarely 8 mm.), flat, membranaceous, acuminate, more or less plainly 3-nerved, glabrous or sparingly pubescent, occasionally antrorsely scabrellate on the margins and midribs. Sheaths glabrous, the lower sheaths sometimes pubescent, slightly if at all winged. Ligule about 1 mm. long, obtuse, pilose. Panicles terminal and axillary. Peduncles in the axils, very long, filiform, pendent, ancipital, ciliate. Spikelets 2 to 4 mm. long. Bracts like the leaves. Bractlets linear-lanceolate, sometimes ciliate. Pistillate glumes ovate-lanceolate, acuminate, pale brown or purplish. Hypogynium deeply 3-lobed, the lobes ovate-lanceolate. Achene 2 mm. long, globose-ellipsoid, reticulate, the transversal ridges pubescent, white tinged with brown, apiculate.—Open pinelands; New York to Indiana, West Indies, Bolivia, Brazil.

BRITISH HONDURAS: Belize District—Bakers Pine Ridge, *Lundell* 6991, in part.

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SCHIPP, W. A., 106 (*Calyptracarya glomerulata*), 108 (*Dichromena radicans*), 110 (*Hypolytrum nicaraguense*), 217 (*Dichromena ciliata*), 361 (*Cyperus odoratus*), 382 (*Cyperus peruvianus*), 589 (*Lagenocarpus guianensis*), 615 (*Fimbristylis spadicea*), 665 (*Fimbristylis spathacea*), 683 (*Scleria bracteata*), 690 (*Heleocharis retroflexa*), 786 (*Heleocharis mutata*), 887 (*Scleria mitis*), 891 (*Scleria melaleuca*), 902 (*Cyperus ligularis*), 903 (*Fimbristylis autumnalis*), 904 (*Fimbristylis autumnalis*), 906 (*Cyperus Haspan*), 908 (*Cyperus polystachyos*), 913 (*Heleocharis geniculata*), 919 (*Bulbostylis tenuifolia*), 921 (*Cyperus articulatus*), 922 (*Cyperus surinamensis*), S-960 (*Dichromena Watsoni*), 1380

(*Calyptracarya glomerulata*); STEERE, W. C., 1636 (*Scleria lithosperma*), 1753 (*Cyperus rotundus*), 1790 (*Cyperus ochraceus*), 1839 (*Cladium jamaicense*), 1842 (*Dichromena colorata*), 1973 (*Cyperus ochraceus*).

SWALLEN, J. R., 2374 (*Cyperus elegans*), 2515 (*Scleria lithosperma*), 2581 (*Scleria lithosperma*), 2598 (*Dichromena ciliata*), 2599 (*Cyperus flavus*), 2601 (*Cyperus flavus*), 2620 (*Heleocharis atropurpurea*), 2623 (*Scleria lithosperma*), 2638 (*Dichromena ciliata*), 2653 (*Cyperus lentiginosus*), 2675 (*Cyperus lentiginosus*), 2676 (*Scleria lithosperma*), 2730 (*Dichromena colorata*), 2733 (*Heleocharis cellulosa*), 2760 (*Cladium jamaicense*), 2769 (*Heleocharis geniculata*), 2786 (*Cyperus planifolius*), 2788 (*Cyperus planifolius*), 2789 (*Cyperus planifolius*), 2806 (*Cyperus lentiginosus*), 2814 (*Cyperus lentiginosus*), 2820 (*Cyperus planifolius*), 2828 (*Scleria lithosperma*), 2830 (*Cyperus planifolius*), 2831 (*Cyperus planifolius*), 2833 (*Heleocharis geniculata*), 2835 (*Fimbristylis spadicea*), 2836 (*Cladium jamaicense*), 2872 (*Dichromena ciliata*), 2881 (*Scleria lithosperma*), 2882 (*Cyperus elegans*), 2888 (*Heleocharis geniculata*), 2890 (*Cyperus planifolius*), 2909 (*Dichromena colorata*), 2910 (*Heleocharis geniculata*), 2912 (*Fimbristylis spadicea*), 2922 (*Heleocharis cellulosa*), 2939 (*Cyperus aristatus*), 2950 (*Cyperus rotundus*), 2962 (*Cyperus surinamensis*), 2973 (*Cyperus planifolius*), 2980 (*Cyperus planifolius*).

XX

The Melastomaceae of the Yucatan Peninsula

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THE MELASTOMACEAE OF THE YUCATAN PENINSULA

On the basis of actual herbarium material available, the flora of the Yucatan region includes 83 species of Melastomaceae. It is entirely probable that this number will be conspicuously increased by further exploration in the higher parts of the interior, especially in southern British Honduras and the Department of Peten. Several widespread species of the Cordilleran flora have not yet been noted in the region, but may be confidently expected from the mountains. Three genera, *Centradenia*, *Heterocentron*, and *Monochaetum*, best represented in the mountains, will also probably be added to the known flora.

In proportion to the size of the region, the variety of available habitats, and the length of botanical exploration, the number of known species is about what would be expected. In comparison, there may be cited the small Lancetilla Valley of Honduras with 24 species (1931); Jamaica, 69 (1926); Cuba, 166 (unpublished manuscript); Hispaniola, 74 (1920); Puerto Rico, 43 (1925); Trinidad, 92 (1934); British Guiana, 172 (1932); and Surinam, 111 (1935). Southward in Central America the number of species increases and Costa Rica has 188 (1938). In South America, Colombia and Peru each have about 500 species, while in Brazil the number far exceeds a thousand.

It is not wise to attempt any phytogeographical generalizations from evidence derived from a single family, yet the extralimital distribution of the Yucatan melastomes is in certain instances provocative of thought and raises questions as to past ranges and migration of plants in the Caribbean region.

From the 83 species there may first be excluded a considerable group which range nearly throughout tropical America. These are:

<i>Clidemia dependens</i>	<i>Miconia ciliata</i>	<i>Miconia lacera</i>
<i>Clidemia hirta</i>	<i>Miconia dodecandra</i>	<i>Miconia obovalis</i>
<i>Clidemia rubra</i>	<i>Miconia ibaguensis</i>	<i>Miconia prasina</i>
<i>Conostegia icosandra</i>	<i>Miconia impetiolearis</i>	<i>Nepsera aquatica</i>

Three other species are fairly widely distributed in Central America and the West Indies, but do not extend so far south in South America:

<i>Acisanthera quadrata</i>	<i>Miconia chrysophylla</i>	<i>Miconia laevigata</i>
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The two groups together constitute the "wide" element of the family and number slightly less than a fifth of the whole. Four-fifths of the species are therefore more or less restricted in their range.

Another fifth of the species are primarily Amazonian in their distribution; all but three are rather widely distributed in northern South America, mostly at low altitudes. *Clidemia tocoicoidea* is apparently restricted to western and *Henriettea succosa* to eastern Amazonia; *Miconia disparilis* is known only from widely scattered localities in Panama, Colombia, Trinidad, and the Guianas. Ten of the species extend north in Central America at least as far as British Honduras, avoiding the West Indies. Six occur also in the West Indies and it is worthy of note that five of them are in the Greater Antilles only, indicating that they reached the West Indies from the west or southwest. The first group, Amazonian and Central American, are:

<i>Arthrostemma macrodesmum</i>	<i>Miconia disparilis</i>	<i>Miconia pteropoda</i>
<i>Clidemia dentata</i>	<i>Miconia longifolia</i>	<i>Miconia stenostachya</i>
<i>Clidemia tococoidea</i>	<i>Miconia nervosa</i>	<i>Pterolepis pumila</i>
<i>Henriettea succosa</i>		

The second group, extending also into the West Indies, includes:

<i>Bellucia grossularioides</i>	<i>Clidemia strigillosa</i>	<i>Miconia tomentosa</i>
<i>Clidemia neglecta</i>	<i>Miconia albicans</i>	<i>Tibouchina longifolia</i>

There follows a group of nine species which are primarily Amazonian and which appear in Central America only in British Honduras:

<i>Acisanthera bivalvis</i>	<i>Miconia amplexans</i>	<i>Miconia Matthaei</i>
<i>Clidemia involucrata</i>	<i>Miconia calvescens</i>	<i>Miconia mucronata</i>
<i>Henriettella flavescens</i>	<i>Miconia Chamissois</i>	<i>Tococa guianensis</i>

Two of the above, *Miconia amplexans* and *Tococa guianensis*, are known also from Panama, which is botanically a part of South America, although usually included geographically in North America for political convenience. *Henriettella flavescens* is otherwise known only from French Guiana; *Clidemia involucrata* only from Trinidad and the Guianas. *Miconia Matthaei* is also an excellent example of disjunct distribution. Besides its area in British Honduras, it is known from Trinidad and is relatively abundant in the Amazon watershed of Peru. It thus occupies the apices of a huge triangle, the sides of which measure approximately 1400, 1800, and 1900 miles, and in each area it preserves its characteristic structure in every detail. *Miconia amplexans* has the same disjunct distribution as *M. Matthaei* but adds Panama as a fourth area. It is obvious that further exploration of Central America, particularly in the wet lowlands along the Caribbean coast, may show that some of these nine species are more generally distributed and demote them to the preceding class.

The next groups, of eight and four species, are widely distributed in Central America and also extend south along the Andes to various distances in South America. Five apparently stop with Colombia, two with Ecuador, three with Peru, while two extend as far south as Bolivia. In general, these species do not appear to be Andean in origin, migrating thence northward, but rather of Central American or Amazonian origin. Eight of these species are unknown in the West Indies:

<i>Clidemia capitellata</i>	<i>Miconia oinochrophylla</i>	<i>Mouriria parvifolia</i>
<i>Leandra dichotoma</i>	<i>Miconia reducens</i>	<i>Ossaea trichocalyx</i>
<i>Leandra mexicana</i>	<i>Miconia Schlimii</i>	

Four occur also in the Greater Antilles:

<i>Conostegia xalapensis</i>	<i>Miconia punctata</i>	<i>Ossaea micrantha</i>
<i>Heterotrichum octonum</i>		

With still more restricted range, four species occur rather widely in Central America and also appear in the Greater Antilles:

<i>Adelobotrys adscendens</i>	<i>Henriettella fascicularis</i>	<i>Miconia elata</i>
<i>Arthrostemma fragile</i>		

Eight species are restricted to Central America:

<i>Aciotis Levyana</i>	<i>Clidemia setosa</i>	<i>Miconia paleacea</i>
<i>Aciotis rostellata</i>	<i>Henriettella densiflora</i>	<i>Tibouchina Schiedeana</i>
<i>Clidemia Deppeana</i>	<i>Miconia argentea</i>	

Lastly, the endemic element comprises nineteen species. While it may easily be increased by the discovery of new species, it is also subject to reduction by further collection elsewhere in Central America. Seven of the species are restricted to northern Central America and adjacent states of southern Mexico:

<i>Arthrostemma parvifolium</i>	<i>Miconia involucrata</i>	<i>Miconia Schlechtendalii</i>
<i>Miconia hondurensis</i>	<i>Miconia oligocephala</i>	<i>Pterolepis stenophylla</i>
<i>Miconia hyperprasina</i>		

Twelve are known now only in the Yucatan region:

<i>Acisanthera Bartlettii</i>	<i>Conostegia Lundellii</i>	<i>Miconia ochroleuca</i>
<i>Blakea cuneata</i>	<i>Henriettea strigosa</i>	<i>Miconia Schippii</i>
<i>Clidemia reticulata</i>	<i>Henriettella cuneata</i>	<i>Mouriria exilis</i>
<i>Conostegia caelestis</i>	<i>Miconia belizensis</i>	<i>Topobea rosea</i>

MELASTOMACEAE

Flowers regular, mostly 4- to 6-merous, rarely 3-merous or 7- to 10-merous. Hypanthium subglobose to tubular, bearing the petals, stamens and sepals at its margin. Sepals small (rarely foliaceous), open or closed in the bud, rarely connate into a calyptra deciduous at anthesis. Petals large or small, usually white to pink or purple, rarely yellow. Stamens normally twice as many as the petals, often dimorphic, rarely just as many by abortion, rarely more numerous. Anthers ovoid to subulate, inflexed in the bud, usually opening by a terminal pore, rarely by two pores or by longitudinal slits; connective often enlarged at the base, or prolonged below the thecae, frequently bearing one or more lobes, spurs, or appendages. Ovary one, free or partly inferior or wholly inferior, 2- to 10-celled, usually with many ovules on axile placentae, in one tribe with few ovules on basal placentae; style 1, more or less elongate; stigma 1, punctiform to peltate, simple or rarely radiately lobed. Fruit enclosed within the persistent hypanthium, capsular and loculicidally dehiscent or rupturing irregularly or baccate. Seeds minute, ovoid to linear, often cochleate. Herbs, shrubs, trees or vines; leaves simple, opposite, often anisophyllous and hence appearing alternate, entire or toothed, usually 3—several-nerved or plinerved (in one genus 1-nerved; 1-nerved in various species with linear leaves). Inflorescence cymose, the flowers solitary or clustered, axillary or terminal.

About 145 genera and 4000 species, distributed throughout the tropics of both hemispheres and rarely extending into temperate zones, ascending to alpine heights but avoiding deserts. About 3000 species are American, most abundant in southern Brazil. The family is divided into fourteen tribes, based primarily on the nature of the fruit, the placentae, and the stamens. Eight tribes are exclusively American, five are restricted to the Old World; in the fourteenth tribe a single genus is American. Of the twenty genera in the flora of the Yucatan region, Nos. 1 to 6 belong to tribe Tibouchineae, No. 7 to tribe Merianieae, Nos. 8 and 9 to tribe Blakeae, Nos. 11 to 19 to tribe Miconieae, and No. 20 to tribe Memecyleae.

Fruit capsular; ovary usually wholly superior.

Seeds ovoid or oblong, cochleate; appendages of the connective on the inner side or none.

Hairs of the upper leaf-surface, if present, not adnate to the epidermis for a portion of their length.

Petals acute; flowers 4-merous.

Connective prolonged at the base into 2 conspicuous ascending lobes 1. NEPSERA

Connective simple at the base, or with 2 very short rounded lobes 2. ACIOTIS

Petals obtuse or rounded at the tip.

Connective of the episepalous stamens bearing a single anterior appendage 2- to 3-toothed or 2- to 3-setose at its apex; flowers 4-merous 3. ARTHROSTEMMA

Connective of the episepalous stamens 2-lobed below the attachment of the filament; flowers normally 5-merous in our species 4. ACISANTHERA

Hairs of the upper leaf-surface adnate to the epidermis for a portion of their length.

Flowers 4-merous 5. PTEROLEPIS

Flowers 5-merous 6. TIBOUCHINA

Seeds linear; appendage of the connective on the outer side, cleft or toothed 7. ADELOBOTRYS

Fruit a berry; ovary wholly or partly inferior.

Flowers subtended individually by 2 pairs of bracts closely subtending and more or less enclosing the hypanthium.

Anthers stout, short, oblong, obtuse, laterally compressed 8. BLAKEA

Anthers linear or subulate 9. TOPOBEA

Flowers not subtended individually by 2 pairs of enclosing bracts.

Leaves 3- several-nerved; anthers not glandular on the back.

Flowers lateral or axillary, solitary or clustered at the nodes.

Petals acute.

Flowers at defoliated nodes below the existing leaves.

Exterior teeth not exceeding the sepals 10. HENRIETTELLA

Exterior teeth much exceeding the sepals 11. OSSAEA

Flowers in the axils of existing leaves.

Petioles 1 to 3 mm. long 10. HENRIETTELLA

Petioles 15 to 30 mm. long 11. OSSAEA

Petals obtuse or rounded.

Anthers linear to oblong or subulate, erect at anthesis, opening by a single pore.

Flowers from defoliated nodes below the existing leaves 12. HENRIETTEA

Flowers or flower-clusters from the axils of existing leaves 13. CLIDEMIA

Anthers broadly oblong or dolabriform, more or less coherent in a ring, opening by 2 minute pores 14. BELLUCIA

Flowers in terminal inflorescences.

Petals acute 15. LEANDRA

Petals obtuse to retuse.

Calyx calyptiform, deciduous at anthesis 16. CONOSTEGIA

Calyx not fully covering the corolla in the bud, persistent at anthesis, usually lobed.

Formicaria present at the base of the larger leaf-blades or the summit of the petioles 17. TOCOCA

Formicaria none.

Exterior teeth conspicuously surpassing the sepals; anthers subulate.

Younger stems and petioles at once stellate, glandular, and hirsute 18. HETEROTRICHUM

Younger stems and petioles not glandular-pubescent 19. MICONIA

Exterior teeth not surpassing the sepals 19. MICONIA

Leaves 1-nerved; anthers glandular on the back 20. MOURIRIA

1. **NEPSERA** Naud.

Flowers 4-merous; hypanthium campanulate to subglobose; sepals triangular, about as long as the hypanthium, acuminate, persistent; petals ovate to ovate-lanceolate, pink or white, acute; stamens isomorphic, slightly different in size, the anthers linear or nearly subulate, the connective barely prolonged below the thecae, bearing two erect slender anterior appendages; ovary free, glabrous, 3-celled; style straight, slender; stigma punctiform; capsule 3-valved, the seeds semi-ovoid, cochleate, tuberculate. Freely branched erect herbs, with slender stems and very numerous small flowers in a large, diffusely branched paniculiform cluster.

A monotypic genus.

1. *NEPSERA AQUATICA* (Aubl.) Naud. Ann. Sci. Nat. III. **13**: 28. 1849.

Melastoma aquatica Aubl. Pl. Guian. **1**: 430. 1775.

Stem 3 to 10 dm. high, glabrous or minutely pubescent; petioles slender, 5 to 10 mm. long; leaf-blades ovate to ovate-lanceolate, 2 to 6 cm. long, acute or acuminate, minutely serrulate, rounded to subcordate at the base, 5- to 7-nerved, glabrous or nearly so; panicle 10 to 40 cm. long; pedicels elongate and very slender; petals 5 to 7 mm. long.—In moist open places, abundant as a weed about villages; British Honduras to Panama; West Indies; widely distributed in tropical South America; perhaps introduced into North America.

BRITISH HONDURAS: Belize District—Big Falls Pine Ridge, *Lundell 4450* (UM, NY). Stann Creek District—Mullins River road, *Schipp 29* (UM, NY).

2. **ACIOTIS** D. Don

Flowers 4-merous, sessile or short-pedicelled in terminal panicles, subtended by minute, subulate to ovate bracts; hypanthium thin-walled, narrowly campanulate at anthesis, becoming subglobose in fruit; sepals minute, broadly triangular, obtuse to acute, often glandular-setose at the apex; petals ephemeral, lanceolate to obovate, acute and often glandular-setose at the apex; stamens isomorphic or weakly dimorphic; filaments flattened, glabrous; anthers narrowly oblong or elliptic (in our species) to semiglobose; connective more or less prolonged below the thecae, simple, swollen, or more or less 2-lobed at the base on the anterior side; ovary free, 2-celled; style straight, slender; stigma truncate or subcapitate; fruit a thin-walled capsule, rupturing irregularly; seeds cochleate-reniform, rugose. Sparsely branched herbs with thin leaves and small or minute, white to pink flowers.

A genus of about 30 species, mostly in equatorial South America. Besides the following widespread species of Mexico and Central America, three others are known from Central America and a fourth from the West Indies.

Stems strongly angled, not winged; stem, inflorescence, and hypanthium densely pubescent with glandular hairs 0.3 to 0.5 mm. long 1. *A. rostellata*
 Stems conspicuously winged, the wings ciliate with often simple hairs; hypanthium and inflorescence sparsely pubescent 2. *A. Levyana*

1. *ACIOTIS ROSTELLATA* (Naud.) Triana, Trans. Linn. Soc. Bot. **28**: 51. 1871.

Spennera rostellata Naud. Ann. Sci. Nat. III. **14**: 143. 1850.

Stems rather stout, 4 to 8 dm. high, sharply angled, densely glandular-pubescent, at least when young; petioles hirsute, 1 to 2 cm. long; leaf-blades thin, ovate or ovate-oblong, 5 to 10 cm. long by about half as wide, acuminate, obtuse to rounded at the base, minutely pubescent on both sides, mostly 7-nerved; panicle often 10 cm. long, glandular-pubescent;

hypanthium about 2 mm. long, freely and uniformly glandular; petals gland-tipped, 2 to 3 mm. long; stamens almost isomorphic, the connective prolonged about 0.3 mm.—In moist shaded ground; Veracruz to Panama, at low altitudes.

BRITISH HONDURAS: Stann Creek District—Stann Creek—Mullins River road, *Gentle 1916* (UM, NY); Mullins River road, *Schipp 46* (UM, NY, US, GH).

2. *ACIOTIS LEVYANA* Cogn. in Mart. Fl. Bras. **14**³: 460. 1885.

Stems stout, up to a meter high, with 4 herbaceous, strongly ciliate wings sometimes 5 mm. wide; petioles stout, hirsute, more or less winged, 1 to 2 cm. long; blades thin or firm, ovate to ovate-lanceolate, 5 to 10 cm. long, acuminate, rounded to cordate at the base, 7-nerved, pubescent on both sides with hairs mostly 1 to 2 mm. long; panicle 5 to 10 cm. long, sparsely pubescent, the hairs mostly 0.5 to 1 mm. long, simple or glandular; hypanthium about 2 mm. long, pilose toward the summit or often throughout; petals gland-tipped, 2 to 3 mm. long; stamens almost isomorphic, the connective prolonged about 0.3 mm.—In moist shaded ground; Guatemala and British Honduras to Panama, becoming more abundant southward.

BRITISH HONDURAS: Stann Creek District—Stann Creek, *Gentle 1894* (UM, NY); Sittee River, *Peck 870* (GH).

3. *ARTHROSTEMMA* Pav.

Flowers 4-merous; hypanthium slenderly obconic to narrowly campanulate, elongate, glabrous or nearly so; sepals very short; petals conspicuous; stamens more or less dimorphic, the episealous anthers linear or oblong, straight or curved, their connective prolonged below the thecae and bearing an anterior appendage, the epipetalous anthers shorter, their connective shorter or not prolonged, bearing a relatively short appendage; ovary free or nearly so, 4-celled; style elongate, somewhat bent; stigma punctiform; capsule enclosed by the fruiting hypanthium; seeds semiovoid, with about 8 rows of tubercles. Herbs, erect or somewhat scandent, slender and sparsely branched, with showy, pink to purple, short-lived flowers in loosely branched terminal cymes.

A fourth species occurs from Salvador southward and three or four others in South America.

Flowers and capsules sessile or nearly so; anthers ovate or oblong, 2 mm. long or less
Flowers and capsules on pedicels 5 to 10 mm. long; anthers linear-oblong, 2.5 to
4 mm. long.

Connective of the episealous stamens as long as or longer than the thecae . . . 2. *A. macrodesmum*
Connective of the episealous stamens much shorter than the thecae 3. *A. fragile*

1. *ARTHROSTEMMA PARVIFOLIUM* Cogn. Monog. Phan. **7**: 143. 1891.

Arthrostemma apodocarpum Donn. Sm. Bot. Gaz. **37**: 210. 1904.

Erect, often freely branched, 3 to 6 dm. high; stems stout, very sparsely glandular-setose; petioles glabrous, 1 to 2 cm. long; leaf-blades rather firm, pale green, ovate-lanceolate to elliptic, 2 to 8 cm. long, 1 to 5 cm. wide, short-acuminate to obtuse, acute to cuneate at the base, 3- to 5-nerved, glabrous or very sparsely setose; inflorescence sparsely branched, the flowers few and sessile; hypanthium 8 mm. long, glabrous; petals 15 mm. long; filaments glandular-pilose; episealous anthers stoutly oblong, the connective about 0.3 mm. long, with a quadrate-obovate spur 0.3 to 0.5 mm. long; epipetalous anthers oval, the connective not prolonged, the spur similar.—A perennial herb in dense forests; southern Mexico, British Honduras, and Guatemala.

BRITISH HONDURAS: Toledo District—Camp 32, British Honduras—Guatemala boundary survey, *Schipp S-590* (NY).

2. *ARTHROSTEMMA MACRODESMUM* Gleason; Williams, Fl. Trin. & Tob. 356, 357. 1934.

Heteronoma campanulare Naud. Ann. Sci. Nat. III. 14: 153. 1850.

Arthrostemma campanulare Triana, Trans. Linn. Soc. Bot. 28: 35. 1871. Not *A. campanularis* DC. Prodr. 3: 136. 1828.

Stem weak or reclining on bushes, 1 to 3 m. long, glabrous below, sparsely glandular-setose above; leaf-blades thin, ovate or ovate-lanceolate, 3 to 7 cm. long, 1.5 to 3 cm. wide, acuminate, truncate to subcordate at base, 5-nerved, glabrous or very sparsely setose; inflorescence loosely branched and few-flowered, the pedicels about 5 mm. long, or longer in fruit; hypanthium narrowly obconic, 8 mm. long; petals 15 to 20 mm. long; episealous anthers linear, 4 to 5 mm. long, the connective 5 to 7 mm. long with an appendage 2 to 3 mm. long; epipetalous anthers 2.5 to 3 mm. long, the connective not prolonged, with two subulate appendages about 1 mm. long.—In forests at low or moderate altitudes; from Chiapas southward into northern South America.

BRITISH HONDURAS: Stann Creek District—Middlesex, *Schipp* 317 (NY).

3. *ARTHROSTEMMA FRAGILE* Lindl. Jour. Hort. Soc. 3: 74. 1847.

Erect or semiscandent, 1 to 3 m. high, more or less glandular-setose above; petioles 1 to 2 cm. long, usually setose at the apex; leaf-blades ovate or ovate-lanceolate, 3 to 8 cm. long, 1.5 to 3 cm. wide, long-acuminate, truncate to subcordate at the base, 5-nerved, glabrous or nearly so; inflorescence lax and few-flowered, the pedicels 5 to 10 mm. long; hypanthium narrowly obconic, 8 mm. long; petals 25 mm. long; episealous anthers more or less curved, about 4 mm. long, the connective prolonged about 0.4 mm. and bearing an appendage 1.2 to 1.7 mm. long; epipetalous anthers similar, the connective not prolonged, bearing two subulate appendages about 1 mm. long.—The most abundant species in North America, ranging from Central Mexico southward; also in Jamaica and reported from Cuba.

BRITISH HONDURAS: Belize District—Sibun River, *Gentle* 1380 (UM, NY).

A. fragile and *A. macrodesmum* can be distinguished with certainty only when in flower by the striking characters of the stamens.

4. *ACISANTHERA* P. Br.

Flowers 4-merous or 5-merous, axillary or terminal, solitary or in small cymes, sessile or short-pedicelled; hypanthium thin-walled, campanulate to hemispheric, usually 8- to 10-ribbed; sepals narrowly triangular to ovate, erect or spreading; petals pink to purple; stamens dimorphic; anthers oblong to subulate, truncate, attenuate or rostrate at the apex; connective of the larger anthers conspicuously prolonged and bearing two basal anterior lobes, that of the smaller anthers proportionately shorter with shorter lobes; ovary free, 2- to 4-celled; style slender, often bent laterally, attenuate to the punctiform stigma; seeds small, reniform or cochleate, minutely pitted. Low herbs of various habit, usually with small leaves.

A genus of about 20 species, most abundant in tropical South America. Besides the following, two others are known from Costa Rica and Panama and a third from Cuba.

- Stems widely and freely branched; leaves oval or elliptic, short-petioled, denticulate or crenate 1. *A. quadrata*
 Stems erect, simple or sparingly branched above, often conspicuously thickened at the base; leaves sessile, entire.
 Hypanthium, stem, and foliage glabrous 2. *A. bivalvis*
 Hypanthium glandular-pubescent; stems glandular at least above 3. *A. Bartlettii*

1. *ACISANTHERA QUADRATA* Pers. Syn. Pl. 1: 477. 1805.

Rhexia Acisanthera L. Syst. Nat. ed. 10. 998. 1759.

Acisanthera Acisanthera Britton, Sci. Surv. Porto Rico 6: 2. 1925.

Stem widely branched, 2 to 4 dm. high, sharply 4-angled or narrowly 4-winged, setose at the nodes, glabrous to glandular-pubescent on the internodes; leaf-blades ovate to oblong, 1 to 2 cm. long, 5 to 10 mm. wide, acute or subacute, finely and sharply denticulate, acute or cuneate at base into a short petiole, 3-nerved, glabrous, pubescent, or glandular; flowers numerous, solitary in the axils, on pedicels 1 to 4 mm. long; hypanthium broadly campanulate, 2 mm. long, usually glabrous, sometimes pubescent or glandular; sepals triangular, about 2 mm. long; petals pink to purple or violet, 5 to 6 mm. long; episepalous anthers truncate, the connective about equaling the anther, its appendages about 1 mm. long; epipetalous anthers smaller, the connective proportionately shorter, bearing 2 basal tubercles.—In moist, usually sandy soil; Veracruz to Panama; West Indies; Peru.

BRITISH HONDURAS: Belize District—Sibun River, *Bartlett 11380* (UM, NY), *11382* (UM, NY), *11411* (UM, NY); Belize, *Bartlett 11269* (UM); Maskall, *Gentle 996* (UM, NY); Belize River, *Lundell 1979* (UM). Stann Creek District—All Pines, *Schipp 639* (UM, NY).

2. *ACISANTHERA BIVALVIS* (Aubl.) Cogn. in Mart. Fl. Bras. 14³: 216. 1885.

Melastoma bivalvis Aubl. Pl. Guian. 1: 404. 1775.

Melastoma trivalvis Aubl. Pl. Guian. 1: 406. 1775.

Acisanthera trivalvis Cogn. in Mart. Fl. Bras. 14³: 217. 1885.

Stem erect, simple or sparsely and virgately branched above, 2 to 5 dm. high, glabrous, sharply 4-angled; leaves sessile, erect or ascending, oblong, 5 to 15 mm. long, 2 to 6 mm. wide, acute, entire or serrulate, 3-nerved, glabrous; flowers mostly terminal, short-pedicelled; hypanthium glabrous, 2.5 to 3 mm. long; sepals triangular, 3.5 to 4 mm. long, setose at the apex; petals purple, 6 to 10 mm. long; episepalous anthers narrowly oblong, 2.5 mm. long, the connective 1.7 mm. long, its appendages oblong, blunt; epipetalous anthers subulate, 1.8 mm. long, the connective scarcely prolonged, 2-tuberculate at the base.—In marshes; British Honduras and northern South America.

BRITISH HONDURAS: Belize District—Sibun River, *Gentle 1811* (UM, NY); Belize, *Bartlett 11215* (UM, NY), *11235* (UM, NY). Stann Creek District—All Pines, *Schipp 707* (UM, NY).

3. *ACISANTHERA BARTLETTII* Gleason, Papers Mich. Acad. 17: 145. pl. 19. 1933.

Stem slender, often simple, 1 to 2 dm. high, sharply 4-winged, sparsely glandular-pubescent above; leaves sessile, rounded or obtuse at the base, obscurely 3-nerved, glandular-ciliate, the lower rotund, deflexed, 2 to 5 mm. long, somewhat crowded, the upper widely separated, progressively narrowed to ovate or elliptic, spreading or erect; flowers short-pedicelled, terminal, hypanthium about 2 mm. long, glandular-pubescent; sepals 2.5 mm. long, acuminate, glandular-pubescent; petals white, obovate, 5 mm. long; episepalous anthers broadly truncate, the thecae about 0.5 mm. long, the connective somewhat longer, bearing a fleshy cordate appendage 0.7 mm. long; epipetalous anthers sterile, 0.2 mm. long, the 2-tuberculate connective not prolonged.—In wet open ground; endemic.

BRITISH HONDURAS: Belize District—Sibun River, *Gentle 1793* (UM, NY), *Bartlett 11387* (UM, NY); Belize, *Bartlett 11260* (UM, NY). Stann Creek District—All Pines, *Schipp 677* (UM, NY).

5. **PTEROLEPIS** (DC.) Miq.

Flowers 4-merous; hypanthium campanulate, often 4-ribbed, pubescent with simple, branched, or glandular hairs, persistent; sepals erect, triangular, ciliate, persistent and coriaceous in fruit; petals small, obovate; stamens dimorphic, the anthers subulate to ovoid or obovoid, the connective more or less prolonged below the thecae, terminating in two small anterior lobes or appendages; ovary free, 4-celled, crowned with a circle of stiff erect setae surrounding the base of the slender style; stigma small, capitate; capsule 4-valved, the small seeds minutely tuberculate. Erect, freely branched herbs with small, ovate to linear leaves, and cymose or glomerate, sessile or subsessile, pink or white flowers. Hairs of the stem often geniculate or prolonged backwards at the base; hairs of the hypanthium often branched from the end of a short stipe.

About 30 species, chiefly South American. Besides the two species known from the Maya region, two others are known from the West Indies or Central America. Because of its weedy habit, *P. hispida* may be expected around seaports and it has been included in the key.

- Anthers of the episepalous stamens linear-subulate, 3 to 5 mm. long, the connective prolonged 2 to 3 mm. below the thecae *P. hispida*
- Anthers of the episepalous stamens oblong or ovoid, blunt, 2 mm. long or less; their connective rarely more than 1 mm. long.
 - Anthers broadest below the middle, the connective distinctly prolonged; leaves lanceolate to oval 1. *P. pumila*
 - Anthers broadest above the middle, the connective barely prolonged; leaves narrowly linear-lanceolate 2. *P. stenophylla*

1. **PTEROLEPIS PUMILA** (Bonpl.) Cogn. in Mart. Fl. Bras. 14³: 263. 1885.

Rhexia pumila Bonpl. Rhex. pl. 35. 1818.
Pterolepis exigua Triana, Trans. Linn. Soc. Bot. 28: 39. 1871.

Stem erect, freely branched, 1 to 6 dm. high; strigose; petioles densely strigose, 1 to 5 mm. long; leaf-blades lanceolate to ovate, 2 to 5 cm. long, 0.5 to 2 cm. wide, acute or acuminate, rounded or obtuse at the base, 3- to 5-nerved, pubescent; flowers numerous, terminating the stem and all its branches, soon appearing lateral by proliferation; hypanthium 3 to 3.5 mm. long, pilose, some of the hairs stoutly stipitate with 3 to 6 branches; petals pink, 4 to 5 mm. long, glandular-ciliate; larger anthers 1 to 2 mm. long, the connective prolonged 1 mm. or less, bearing 2 minute lobes at its base; fruiting hypanthium 5 mm. long.—In open ground and waste places, abundant; from southern Mexico to Panama and northern South America.

GUATEMALA: Dept. Peten, La Libertad, *Aguilar H.* 238 (UM, NY).

Without the characteristic stamens, this species can not be distinguished with certainty from *P. hispida* (L. C. Rich.) Gleason (*P. trichotoma* Cogn.).

2. **PTEROLEPIS STENOPHYLLA** Gleason, Papers Mich. Acad. 17: 146. pl. 20. 1933.

Stem erect, freely branched, narrowly 4-winged, 3 to 5 dm. high; petioles 1 to 2 mm. long; leaf-blades narrowly lanceolate, as much as 25 mm. long by 4 mm. wide, cuneate at the base, 3-nerved, strigose on both sides; flowers numerous, on pedicels 1 to 2 mm. long; hypanthium broadly campanulate, hirsute with branched hairs; sepals triangular, equaling the hypanthium; petals 5 mm. long; episepalous anthers oblong, obtuse, 1.5 mm. long, opening by a wide ventro-terminal pore, the connective barely prolonged, with 2 rounded anterior lobes.—British Honduras and Veracruz.

BRITISH HONDURAS: Belize District—Maskall, *Gentle* 998 (NY); Belize, *Bartlett* 11268 (UM), 11259 (UM, NY); Maskall Pine Ridge, *Gentle* 960 (UM, NY); Sibun River, *Bartlett* 11378 (UM, NY).

6. TIBOUCHINA Aubl.

Flowers 5-merous; hypanthium broadly campanulate, thin-walled, often costate at maturity; calyx-tube briefly prolonged, erect; sepals erect, or at the apex spreading or recurved, linear or narrowly lanceolate; exterior teeth none; petals ciliate; anthers isomorphic or weakly dimorphic, but differing in size; thecae stoutly subulate to narrowly elliptic, the connective briefly or conspicuously prolonged at the base and bearing two small anterior lobes below the filament; ovary free, 5-celled, setose at the summit; style slender; stigma punctiform. Herbs or shrubs, freely branched, with hirsute or strigose stems and foliage; flowers white or purplish, small but conspicuous, in terminal cymes aggregated into large panicles; hairs of the upper leaf-surface adnate to the epidermis at base.

A large genus of more than 200 species, ranging throughout tropical America from Mexico and Cuba to Argentina and Bolivia. Eighteen other species are known from Mexico and Central America, mostly from mountainous regions, and four others occur in the West Indies. Our species, which alone are considered in the generic description, belong to the section *Diotanthera*, characterized by narrow anthers, persistent sepals, ebracteate 5-merous flowers, and indument of hairs instead of scales. Two other sections are also represented in Central America.

Connective of the larger anthers, including the basal appendages, 1 mm. long or longer;
 petals about 1 cm. long 1. *T. Schiedeana*
 Connective of the larger anthers, including the basal appendages, about 0.5 mm. long;
 petals about 5 mm. long 2. *T. longifolia*

1. TIBOUCHINA SCHIEDEANA (Cham. & Schlecht.) Cogn. in DC. Monog. Phan. 7: 261. 1891.

Rhexia Schiedeana Cham. & Schlecht. *Linnaea* 5: 565. 1830.

A shrub 1 to 2 m. high, the branches densely strigose with appressed or ascending hairs; petioles 5 to 12 mm. long, strigose like the stem; leaf-blades lanceolate, 6 to 10 cm. long, 1 to 2 cm. wide, acuminate, acute or cuneate at the base, 5-nerved, the lateral nerves scarcely confluent at the base, densely substrigose above, densely and softly villous beneath; flowers numerous, in several-flowered terminal cymes; hypanthium 3 to 4 mm. long, densely hirsute with ascending hairs; sepals subulate, equaling the hypanthium, densely ciliate; petals white, about 1 cm. long.—In thickets or open places; southern Mexico and Central America.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Barlett 11707* (UM, NY). Stann Creek District—Sittee River, *Schipp 706* (UM, FM).

2. TIBOUCHINA LONGIFOLIA (Vahl) Baillon, Adans. 12: 74. 1877.

Rhexia longifolia Vahl, *Ecl.* 1: 39. 1796.

Tibouchina Bourgaeana Cogn. in DC. Monog. Phan. 7: 264. 1891.

Erect branching shrub 1 to 2 m. high, the stems densely hairy with ascending bristles; petioles 5 to 20 mm. long, pubescent like the stem; leaf-blades thin or firm, lanceolate, 6 to 12 cm. long, 1 to 3 cm. wide, long-acuminate, acute or cuneate at the base, 5-nerved, the lateral nerves usually conspicuously confluent above the base, densely hirsute or substrigose above, densely villous beneath; panicles large and freely branched, with numerous flowers; hypanthium villous, 2.5 to 3.5 mm. long; sepals linear or subulate, about equaling the hypanthium; petals white, about 5 mm. long.—In thickets and open ground, abundant and highly variable; from Mexico to Bolivia.

BRITISH HONDURAS: Belize District—Sibun River, *Gentle 1485* (UM, NY), *1516* (UM, NY). Stann Creek District—Stann Creek Valley, *Schipp 953* (NY, FM); Stann Creek, *Gentle 1891* (UM, NY).

7. ADELOBOTRYS DC.

Flowers 5-merous; hypanthium campanulate to obconic or subtubular, becoming strongly ribbed in fruit. Calyx-tube spreading, its lobes short or obsolete; exterior teeth sometimes present; obovate; stamens 10, isomorphic or dimorphic; filaments flattened, adherent to the petals at the base; anthers linear or subulate, deflexed, often arcuate; connective briefly prolonged below the thecae into a short, erect, conic or 2-toothed basal spur, bearing dorsally a long, antrorse appendage cleft at its apex, deflexed nearly parallel to the thecae; ovary free, 3- to 5-celled; style elongate, slender; stigma minutely capitate; fruit capsular, many-seeded; seeds linear-cuneate, winged at the apex, winged or caudate at base, bearing the embryo near the center. Woody lianas, with oblong to ovate or rotund leaves and conspicuous, pink, white, or yellow flowers in paniced umbels or capitate clusters.

About twenty species of tropical America, ranging from Mexico and Jamaica to Bolivia.

1. ADELOBOTRYS ADSCENDENS (Sw.) Triana, Trans. Linn. Soc. Bot. 28: 67. 1871.

Melastoma adscendens Sw. Fl. Ind. Occ. 2: 772. 1800.

Davya adscendens Griseb. Fl. Brit. W. Ind. 265. 1864.

Stems climbing several meters high by adventitious roots, the younger parts, inflorescence, and petioles thinly brown-strigose; petioles slender, 1 to 2 cm. long, strigose; blades firm or fleshy, subrotund, 6 to 10 cm. long, abruptly short-acuminate, entire or serrulate, rounded or truncate at the base, 5-nerved, glabrous above, barely strigose on the veins beneath; inflorescence terminal and from the upper axils, forming a large panicle 2 to 4 dm. long; umbels 2- to 6-flowered; pedicels 2 to 5 mm. long, or much longer in fruit; hypanthium obconic, 5 mm. long; calyx-tube flaring; petals white, obovate, 10 mm. long; filaments about 7 mm. long; anthers 6 to 10 mm. long, the bifid dorsal spur 3 to 4 mm. long; fruit 8 mm. long, prominently 10-ribbed, long persistent.—In forest; Jamaica; Mexico to Panama.

BRITISH HONDURAS: Stann Creek District—Maya mounds, alt. 160 m., *Schipp* 534 (UM, NY).

8. BLAKEA P. Br.

Flowers 6-merous, each closely subtended by 2 pairs of bracts; hypanthium broadly campanulate or hemispheric; calyx truncate or with 6 short lobes; petals conspicuous, mostly obovate; stamens isomorphic, the filaments short and stout, the anthers short, stout, laterally compressed, usually declined or horizontal, the connective scarcely or not prolonged, bearing a stout, dorsal, basal, spreading or retrorse, obtuse or acute spur; ovary inferior, mostly 6-celled; style punctiform or capitate. Trees or shrubs, erect or climbing by adventitious roots, with conspicuous, axillary, solitary or fascicled flowers, and ample leaves with closely crowded, parallel secondary veins.

A genus of perhaps forty species, most numerous in the northern Andes and southern Central America. Several species have large handsome flowers.

1. BLAKEA CUNEATA Standley, Carnegie Inst. Wash. Publ. No. 461: 76. 1936.

Small tree, the smaller twigs slender and rugose; petioles 1 to 2 cm. long, soon glabrous; blades firm, elliptic-oblong to narrowly obovate, about 10 cm. long by half as wide, abruptly short-acuminate, entire, acute at the base, glabrous or essentially so, minutely white-punctate on the upper side, 3-ply-nerved; pedicels about 1 cm. long; outer bracts foliaceous, acuminate, about 2.5 cm. long, the inner obtuse, about half as long; sepals 4 to 5 mm. long; petals bright rose color, 15 mm. long.—In forest, usually growing as an epiphyte; recently discovered and apparently endemic.

BRITISH HONDURAS: Toledo District—Rio Viejo, alt. 300 m., *Schipp S-604* (FM); Camp 32, British Honduras—Guatemala boundary survey, alt. 800 m., *Schipp 1237* (NY).

9. TOPOBEA Aubl.

Flowers 6-merous in most species, each closely involucred by two pairs of opposite bracts; hypanthium thick-walled, campanulate; calyx erect or somewhat flaring, truncate or shallowly lobed, the exterior teeth minute or none; petals oblong to obovate, mostly obtuse; stamens isomorphic; filaments slender; anthers linear to subulate, often curved; connective not prolonged, simple or with a single dorsal lobe; ovary inferior or superior, 4- to 6-celled; style slender; stigma punctiform. Shrubs, trees, or root-climbers, with conspicuous white to pink flowers solitary or fascicled in the axils; leaves entire, often caudate-acuminate, the secondary veins numerous and parallel.

About thirty species, most numerous in the northern Andes, extending with a few species into the highlands of Central America and barely represented in the Amazonian lowlands and the coastal region of Central America. The genus closely resembles *Blakea*, in which the anthers are short, oblong, blunt, and laterally flattened.

1. *Topobea rosea* Gleason, sp. nov.

Arbuscula; caules juniores furfuracei leviter 4-angulati; folia elliptica caudata basi obtusa subtus ad venas 3 furfuracea; pedicelli in axillis solitarii breves; bracteae ext. vix basi connatae ovatae acuminatae, bracteas int. late rotundatas paulo excedentes; calyx 6-lobatus, dentibus exterioribus prominulis.

Shrub or small tree, up to 8 meters high; twigs conspicuously furfuraceous when young, glabrescent in age, obscurely 4-angled; petioles slender, 1 to 2 cm. long; leaf-blades thin, chartaceous, elliptic or elliptic-oblong, up to 13 cm. long and 6 cm. wide, abruptly caudate, the appendage acute, about 1 cm. long, abruptly narrowed to an obtuse base, furfuraceous on the veins beneath, 3-nerved, the smaller veins very close, spreading at right angles; flowers solitary in the axils, on pedicels 5 to 10 mm. long; outer bracts ovate, 8 mm. long, barely connate at the base, acuminate, distinctly 3-nerved; inner bracts slightly shorter, broadly rounded or minutely apiculate; flowers 6-merous; hypanthium and calyx at anthesis about 9 mm. long, enlarging later; calyx distinctly 6-lobed, the exterior teeth small but conspicuous; petals rose or white and rose.

BRITISH HONDURAS: Toledo District—Dolores—Crique Seca trail, *Schipp S-496* (UM); Temash River, *Schipp 1320* (NY, type).

Much resembling *T. calycularis* Naud. in superficial aspect, but easily differentiated by its furfuraceous leaves obtuse at the base, the distinct and acuminate exterior bracts, and the prominently 6-lobed calyx.

10. HENRIETTELLA Naud.

Flowers 4- or 5-merous; hypanthium small, globose to campanulate; calyx-tube obsolete or briefly prolonged; sepals ovate, triangular, depressed-semicircular, or obsolete; exterior teeth minute, conic or short-subulate, or none; petals ovate to lanceolate, acuminate, acute, or subacute, usually thickened or cucullate toward the apex or appendaged on the upper side; stamens isomorphic; filaments slender, glabrous; anthers oblong, obtuse or retuse, never rostrate; connective simple, or rarely prolonged briefly below the thecae, in some species produced below the filament into a short dorsal appendage; ovary inferior, 4- or

5-celled; style slender; stigma capitellate, truncate or punctiform. Shrubs or small trees, bearing clusters of small, white, sessile or short-pedicelled flowers at the defoliated nodes or rarely in the axils of the leaves.

Cogniaux recognized twenty species in 1891; the number has since been doubled, but some species may be invalid. The genus is poorly represented in Central America, but has many species, often highly localized, in the West Indies. Most of the others are Andean or Amazonian.

The genus is intimately related on the one hand to *Henriettea* and on the other to *Ossaea*. From the former it is distinguished by its smaller flowers and short blunt anthers; from the latter primarily by its habit. The vast majority of species produce flowers from the leafless nodes, while *Ossaea* regularly bears them in the leaf-axils. In both genera the petals often exhibit laminar appendages, or cucullate apex, or exterior teeth. The striations on the surface of the leaves in several species (e.g. *H. flavescens*) are caused by elongate six-sided crystals of calcium oxalate.

- Leaves glabrous above; flowers 4-merous.
 - Petioles 1 to 3 mm. long; hypanthium densely furfuraceous-tomentose 1. *H. densiflora*
 - Petioles 10 to 20 mm. long; hypanthium apparently glabrous 2. *H. flavescens*
- Leaves hirsute above; flowers 4- or 5-merous.
 - Blades 10 to 22 cm. long, bearing formicaria at the base 3. *H. cuneata*
 - Blades 6 to 12 cm. long, without formicaria 4. *H. fascicularis*

1. HENRIETTELLA DENSIFLORA Standley, Field Mus. Publ. Bot. 4: 247. 1929.

Shrub 1 to 3 meters high, the young stems, petioles, and hypanthia densely furfuraceous-tomentose with crooked subpaleaceous hairs up to 1 mm. long; petioles 1 to 3 mm. long; leaf-blades thin, narrowly elliptic to elliptic-oblong, 12 to 20 cm. long, 4 to 8 cm. wide, acuminate, entire or barely undulate, gradually narrowed to the base, 3-nerved, with an additional pair of submarginal veins, glabrous and shining above, beneath densely furfuraceous on the primary nerves, decreasingly so on the smaller veins, glabrous on the surface; flowers few, sessile in the axils of foliage leaves; hypanthium cup-shaped, 2 to 2.5 mm. long; sepals ascending, triangular, 1.3 mm. long from the torus, acute, furfuraceous within; exterior teeth 0.2 mm. long; petals oblong, 2.8 mm. long, subacute, somewhat cucullate at the apex; anthers oblong, 2 mm. long, the connective prolonged below the filament into a minute, glandular, dorsal appendage; style 4 mm. long; stigma punctiform.—In primary forest; British Honduras and Panama.

BRITISH HONDURAS: Stann Creek District—Middlesex, *Schipp* 264 (UM, NY).

Scanty material makes it impossible to refer this species to a genus accurately and it is here maintained as first described. It may belong to *Henriettea*, *Clidemia*, or *Ossaea*.

2. HENRIETTELLA FLAVESCENS (Aubl.) Triana, Trans. Linn. Soc. Bot. 28: 143. 1871.

Melastoma flavescens Aubl. Pl. Guian. 1: 423. pl. 164. 1775.

Shrub or small tree, up to 8 m. high, the younger stems and petioles thinly short-strigose; petioles slender, 5 to 15 mm. long; leaf-blades thin, bright green, elliptic to oblong, 7 to 13 cm. long, 3 to 6 cm. wide, acute or obscurely acuminate, entire, minutely ciliate, acute at the base, 3-plexi-nerved, glabrous above and on the surface beneath, minutely strigose on the veins beneath, finely striolate on both sides when dry; pedicels 4 to 8 mm. long; hypanthium subglobose, 3 mm. long, essentially glabrous; sepals obsolete or nearly so; petals 2.5 mm. long.—In forests; British Honduras and French Guiana.

BRITISH HONDURAS: Toledo District—Camp 31, British Honduras—Guatemala boundary survey, alt. 630 m., *Schipp* S-701 (NY).

3. HENRIETTELLA CUNEATA (Standley) Gleason, Bull. Torrey Club 58: 75. 1931.

Maieta cuneata Standley, Field Mus. Publ. Bot. 8: 30. 1930.

Shrub 3 m. high, the stems, petioles, and leaves densely but softly hirsute with simple hairs 3 to 7 mm. long; petioles stout, 10 to 15 mm. long; formicaria on the base of the blade, didymous, about 15 mm. long; blades thin, elliptic-obovate, 10 to 22 cm. long, about half as wide, rounded above to a caudate tip 1 to 2 cm. long, broadly cuneate to the base, 5-plied; flowers 5-merous; hypanthium globose, 2 to 2.5 mm. long, hirsute with slender hairs 2 mm. long; sepals triangular, 0.4 to 0.5 mm. long from the torus; petals ovate-lanceolate, 2 mm. long, inflexed-cucullate at the apex, with a subapical exterior tooth 0.3 mm. long; anthers oblong, 2 mm. long.—Endemic.

BRITISH HONDURAS: Stann Creek District—Middlesex, along creek bank in dense shade, *Schipp* 320 (UM, NY).

This is the only species of the genus so far known to bear formicaria, and for this reason it was originally described in the genus *Maieta*. Its position in *Henriettella* is clearly indicated by the acute cucullate petals bearing each an exterior tooth.

4. HENRIETTELLA FASCICULARIS (Sw.) Triana, Trans. Linn. Soc. Bot. 28: 143. 1871.

Melastoma fascicularis Sw. Prodr. 71. 1788.

Small tree, up to 10 m. high; young stems densely hirsute with stout hairs, glabrescent in age; petioles stout, 6 to 12 mm. long, hirsute like the stem; leaf-blades firm, dark-colored when dry, elliptic or oblong, 8 to 15 cm. long, about half as wide, acute, entire, obtuse or acute at the base, 3-plied with an additional pair of marginal nerves, scabrously pubescent on the surface above and hirsute on the nerves, densely pubescent beneath; pedicels slender, 3 to 6 mm. long; hypanthium campanulate, 3 mm. long, pubescent with glandular hairs only 0.06 mm. long; sepals depressed-ovate, 0.8 mm. long from the torus, the exterior teeth reduced to thickened ridges; petals ovate, acute, 4 mm. long; anthers oblong, about 2 mm. long; style about 5 mm. long.—In forests; British Honduras, Panama, and the Greater Antilles.

BRITISH HONDURAS: Stann Creek District—Stann Creek Railway, alt. 30 m., *Schipp* 59 (UM, NY).

II. OSSAEA DC.

Flowers 4- or 5-merous; hypanthium urceolate, subglobose, or campanulate; calyx-tube more or less prolonged, the sepals depressed or obsolete; exterior teeth tuberculiform, conic, or subulate, often conspicuous; petals ovate to lanceolate, acute or acuminate, usually with a distinct exterior tooth, often cucullate or inflexed at the summit; stamens isomorphic; filaments slender, glabrous; anthers linear or oblong, sometimes 2-pored; connective simple or briefly prolonged below the attachment of the filament into a dorsal appendage; ovary inferior, 3- to 5-celled; style filiform; stigma punctiform or capitellate; fruit baccate; seeds angular, pyramidal or obovoid. Shrubs or small trees, with small white flowers in axillary panicles or fascicles.

Cogniaux recognized 45 species in 1891, ranging from southern Mexico and the West Indies to Bolivia and southern Brazil. Since then more than 50 species have been described, of which 40 are highly localized forms of the West Indies.

Exterior calyx-teeth conspicuous, 1.3 mm. long, tipped with glandular hairs 1. *O. trichocalyx*
 Exterior teeth minute or obsolete 2. *O. micrantha*

1. *OSSAEA TRICHOCALYX* Pittier, Jour. Wash. Acad. Sci. **13**: 391. 1923.

Shrub 1 to 2 m. high, the younger branches obscurely 4-angled, densely but very finely brown-furfuraceous; petioles slender, 1 to 4 cm. long, furfuraceous; leaf-blades thin, ovate-lanceolate or narrowly oblong, 10 to 22 cm. long, 4 to 8 cm. wide, long-acuminate, abruptly narrowed below to a long cuneate base, 5- to 7-ply-nerved, the uppermost pair arising 2 to 5 cm. above the base, glabrous above, minutely and sparsely furfuraceous beneath; flowers 4-merous, short-pedicelled, crowded in dense clusters 10 to 15 mm. wide at the leafless nodes; hypanthium urceolate, 2.5 mm. long, minutely furfuraceous; calyx-tube erect, 0.4 mm. high, irregularly erose; exterior teeth subulate, spreading, 1.3 mm. long, tipped with a few glandular setae 0.5 to 1.3 mm. long; petals ovate-oblong, 1.6 mm. long, strongly cucullate and incurved, the exterior tooth very minute; anthers linear, 1.2 mm. long; connective very minutely 2-spurred at the base; style 4.3 mm. long.—In dense forest; British Honduras to Ecuador.

BRITISH HONDURAS: Stann Creek District—Middlesex, alt. 60 m., *Schipp* 240 (UM, NY).

2. *OSSAEA MICRANTHA* (Sw.) Macfadyen, Fl. Jam. **2**: 49. 1850.

Melastoma micranthum Sw. Prodr. **71**. 1788.

Shrub or small tree, even the youngest branches almost glabrous; petioles very slender, 15 to 30 mm. long; leaf-blades thin, narrowly oblong-elliptic, 10 to 16 cm. long, 3.5 to 6 cm. wide, long-acuminate, entire or obscurely undulate, cuneate at the base, 3-ply-nerved, with an additional pair of marginal nerves, essentially glabrous on both sides; panicles lax, divaricate, 2 to 4 cm. long; flowers 4-merous, apparently on pedicels 2 to 5 mm. long, actually sessile and minutely bracted; hypanthium subglobose, 2 mm. long to the torus, nearly smooth; calyx-tube erect, 0.4 mm. high, entire or slightly erose; exterior teeth minute tubercles or obsolete; petals narrowly lanceolate, 3 to 4 mm. long; anthers fusiform, 2 mm. long, obtuse and often 2-pored; connective prolonged dorsally below the filament into an ovate glandular appendage 0.3 mm. long; style about 4 mm. long; fruiting hypanthium conspicuously 8-ribbed.—Southern Mexico to Panama; Jamaica; Venezuela, Colombia, Ecuador, and Peru.

BRITISH HONDURAS: Stann Creek District—Middlesex, alt. 60 m., *Schipp* 235 (UM, NY).

12. *HENRIETTEA* DC.

Flowers 5- or 6-merous; hypanthium thick-walled, campanulate; calyx-tube prolonged; sepals triangular, ovate, or almost obsolete, the small exterior teeth subapical; petals unguiculate at the base, ovate to obovate, usually erose on the covered margin, with a minute subapical seta or tooth; stamens isomorphic; filaments slender, glabrous; anthers linear to subulate, in many species rostrate, opening by a minute terminal pore; ovary inferior, 5- or 6-celled, rarely setose at the summit; style stout, enlarged distally; stigma truncate or punctiform; fruit baccate, many-seeded. Shrubs or small trees, with large, usually pli-nerved leaves and medium-sized flowers in small axillary clusters from the defoliated nodes.

The hairs of the lower leaf-surface in many species, including the two below, are of a structure peculiar to this genus. The base of the hair is stellate with numerous horizontal branches. Above the base the branches decrease abruptly in length, while the shaft is prolonged as a straight or curved, simple seta. This structure is described here by the term *stellate-hirsute*.

Sixteen species have been described, of which ten are limited to the Amazonian region,

including Trinidad and the Guianas. Two are native to southern Brazil, one to Costa Rica, and one to British Honduras. The other two are primarily Amazonian, but the one ranges northward into the West Indies, and the other extends as far as British Honduras.

Anthers linear; lower leaf-surface not completely covered by stellate hairs; leaves more than half as long as wide, obtuse or rounded at the base 1. *H. strigosa*
 Anthers subulate, rostrate; lower leaf-surface completely covered by stellate hairs; leaves less than half as long as wide, cuneate at the base 2. *H. succosa*

1. **Henriettea strigosa** Gleason, sp. nov.

Arbuscula, caulibus et petiolis densiter strigosis; folia subcoriacea, obovato-elliptica, apiculata, basi obtusa vel rotundata, 3-plicinervia, jugo marginali excepto; flores pauci, 5-meri, subsessiles; hypanthium campanulatum densiter strigosum, pilis basi incrassatis pubescentibus; sepala late ovata obtusa, dentibus exterioribus minutis; petala mediocria triangulari-ovata unguiculata, latere tecto valde irregularia; antherae lineares nec rostratae; stylus glaber superne incrassatus.

Tall shrub or small tree, with densely strigose stems; petioles stout, strigose, 1 to 2 cm. long; leaf-blades subcoriaceous, obovate-elliptic, 9 to 18 cm. long, 5 to 11 cm. wide, abruptly apiculate, entire and ciliate, obtuse or rounded at the base, 3-plicinerved with an additional pair of marginal veins, glabrous and rugose above when mature, beneath strigose on the primary veins, stellate-hirsute on the surface; flowers few, on strigose pedicels 1 to 2 mm. long; hypanthium campanulate, about 6 mm. long, densely strigose; calyx-tube prolonged nearly 1 mm.; sepals broadly ovate, 3 mm. long from the torus, pubescent within, the exterior teeth minute; petals triangular-ovate, clawed at base, 8 to 9 mm. long, very erose on one side; filaments 4.5 to 5 mm. long; anthers linear or slightly subulate, about 4.5 mm. long; style glabrous, 11 to 12 mm. long.

BRITISH HONDURAS: El Cayo District—San Agustin, Mountain Pine Ridge, *Lundell 6623* (UM, NY). Stann Creek District—Stann Creek—Mullins River road, in high ridge, *Gentle 1947* (NY, type; UM).

2. **HENRIETTEA SUCCOSA** (Aubl.) DC. Prodr. 3: 178. 1828.

Melastoma succosa Aubl. Pl. Guian. 1: 418. pl. 162. 1775.

Henriettea macrocalyx Standley, Field Mus. Publ. Bot. 8: 31. 1930.

Henriettea macrocalyx Gleason, Brittonia 2: 324. 1937.

Small tree, the younger stems densely strigose; petioles stout, 5 to 15 mm. long, channeled above, densely strigose on the back, with a row of spreading hairs along each margin; leaf-blades firm, narrowly obovate, 8 to 20 cm. long, nearly half as wide, short-acuminate or apiculate, entire, conspicuously ciliate, cuneate to the base, 3-plicinerved with an additional pair of marginal nerves, scabrous above with short subulate hairs, strigose on the nerves beneath, the surface stellate-hirsute; flowers few, sessile or nearly so; hypanthium campanulate, very densely strigose, 8 to 9 mm. long; sepals round-ovate, 4 to 5 mm. long from the torus, villous within, the exterior teeth projecting about 1.5 mm.; style sparsely villous, about 12 mm. long.—In forests; British Honduras and Costa Rica; Trinidad, the Guianas, and eastern Brazil.

BRITISH HONDURAS: Belize District—Gracie Rock, Sibun River, *Gentle 1713* (NY, UM). El Cayo District—Mountain Pine Ridge, *Lundell 6826* (NY, UM). Stann Creek District—Stann Creek Valley, *Gentle 2125* (NY, UM); *Schipp 388* (NY, UM). Toledo District—Rio Grande, *Schipp 1184* (NY, UM).

The last specimen cited is the type of *H. macrocalyx* (Standley) Gleason. The collector noted that it had white petals and yellow stamens, while his later collection, no. 1184, had

bright rose petals and purple stamens. This difference is probably of no taxonomic importance, since no other differences between them have been detected, while Lundell noted in no. 6826 a combination of white petals with blue anthers.

13. CLIDEMIA D. Don

Flowers 4- to 7-merous; hypanthium cup-shaped to tubular; calyx-tube none or briefly prolonged; sepals erect or spreading, usually ovate, triangular, or oblong, or in some species obsolete; exterior teeth conic to filiform, often much exceeding and concealing the sepals; petals ovate to obovate, small, obtuse; stamens isomorphic; anthers subulate, linear, semi-ovoid, or rarely obovoid, the connective simple, or briefly prolonged below the thecae, or rarely produced into a short lobe below the filament; ovary partly or wholly inferior, 4- to 7-celled, often glandular or setose at the summit; style slender; stigma punctiform to capitate; fruit a globular many-seeded berry, usually blue; seeds ovoid or semiovoid, smooth or granular. Herbs or shrubs, or in extralimital species sometimes trees, more or less branched or simple when young; flowers white to pink, sessile and glomerate in the axils, or in various types of axillary clusters; foliage and flowers in all our species hirsute, glandular, or stellate-pubescent.

A genus of about 160 species, distributed through tropical America from Mexico and the West Indies to Bolivia and northern Argentina. More than 30 other species are known from Mexico and other parts of Central America and numerous endemic species exist in the West Indies. The following key is artificial.

Formicaria present.

- Formicaria on the stem at the base of the petiole 1. *C. tococoidea*
 Formicaria at the summit of the petiole 2. *C. setosa*

Formicaria none.

- Flowers sessile in the axils, 4-merous 3. *C. rubra*
 Flowers in branched clusters, 5- to 7-merous.

Leaves pubescent beneath with simple hairs only.

Leaves 5-plexi-nerved.

- Stems glandular-hirsute 4. *C. involocrata*
 Stems hirsute with simple hairs 5. *C. dentata*

Leaves 3- to 7-nerved.

- Hairs of the stem ascending or subappressed; leaves usually acute or obtuse at the base 6. *C. Deppeana*

- Hairs of the stem spreading; leaves usually rounded or subcordate at the base 7. *C. hirta*

Leaves pubescent beneath with stellate hairs (simple hairs may also be present and more or less conceal the stellate ones).

Principal leaves 7-nerved, cordate at the base.

- Inflorescence compact, its internodes rarely 1 cm. long 8. *C. strigillosa*
 Inflorescence lax, its internodes 1 to 3 cm. long 9. *C. reticulata*

Principal leaves 5-nerved, obtuse or rounded at the base.

- Leaves only stellate-tomentose on the surface beneath 10. *C. neglecta*

Leaves both stellate and setose on the surface beneath.

- Inflorescence 1 cm. long or less, densely long-hirsute and inconspicuously glandular 11. *C. dependens*

- Inflorescence slender, the lateral clusters separated by internodes 1 to 2 cm. long, sparsely hirsute and conspicuously glandular 12. *C. capitellata*

1. CLIDEMIA TOCOCOIDEA (DC.) Gleason, Bull. Torrey Club 58: 81. 1931.

Calophysa tococoidea DC. Prodr. 3: 166. 1828.

Maieta tococoidea Cogn. in Mart. Fl. Bras. 14^a: 465. 1888.

A small shrub; stems, formicaria, and petioles long-hirsute; formicaria at the base of the petiole; petioles slender, 1 to 4 cm. long; leaf-blades thin, ovate or ovate-oblong, 12 to 20 cm.

long, 7 to 12 cm. wide, more or less unequal in each pair, abruptly acuminate, finely serrulate, ciliate, rounded to subcordate at the base, 5- to 7-nerved, thinly pilose on both sides, especially on the veins beneath; cymes small, compact, few-flowered, sessile or nearly so in the axils of the upper leaves, the setaceous bracts 1 to 3 mm. long; pedicels 1 to 2 mm. long; hypanthium cylindric, 3 to 3.5 mm. long, sparsely hirsute; sepals minute, triangular; exterior teeth spreading horizontally, stout, nearly 1 mm. long; petals 4, obovate-oblong, about 2 mm. long, white; anthers linear; style 7 to 8 mm. long.—In forests; British Honduras, Costa Rica, Panama, and the upper Amazon valley of Brazil and adjacent Peru.

BRITISH HONDURAS: Stann Creek District—Middlesex, alt. 200 m., *Schipp* 470 (UM, NY).

2. *CLIDEMIA SETOSA* (Triana) Gleason, Bull. Torrey Club **58**: 82. 1931.

Calophysa setosa Triana, Jour. Bot. **5**: 209. 1867.

Maieta setosa Cogn. in Mart. Flor. Bras. **14**⁴: 462. 1888.

Low shrub, the stems densely hirsute with retrorse setae 7 to 10 mm. long; petioles stout, 2 to 5 cm. long, hirsute like the stem; formicaria at the summit of the petiole, semiovoid, hirsute, 15 to 20 mm. long; leaf-blades ovate or ovate-oblong, up to 20 cm. long by about half as wide, short-acuminate, entire or serrulate, ciliate, rounded to subcordate at the base, 5- to 7-nerved, long-hirsute above, densely hirsute near the base beneath; inflorescence long-peduncled, trichotomous, 3 to 8 cm. long; hypanthium campanulate, 2 to 2.5 mm. long, 4-angled, very minutely puberulent or sparsely setose at the summit; calyx sparsely long-hirsute, the exterior teeth subulate, about 1.5 mm. long; petals 4, obovate-oblong, about 5 mm. long; anthers linear, 2.5 mm. long; ovary half inferior, 4-celled; style 6 mm. long.—In wet forests; Veracruz to Oaxaca and Costa Rica.

BRITISH HONDURAS: Belize District—Belize, *Cook & Martin* 23 (U. S. Nat. Herb.).

3. *CLIDEMIA RUBRA* (Aubl.) Mart. Nov. Gen. & Sp. **3**: 152. 1829.

Melastoma rubrum Aubl. Pl. Guian. **1**: 416. 1775.

Suffrutescent or woody, up to 2 m. high, the stem and foliage densely hirsute or villous throughout; petioles none, or up to 3 cm. long, averaging about 5 mm.; leaf-blades thick, varying from oblong-lanceolate to broadly elliptic, variable in size, usually about 10 cm. long by half as wide, broadly obtuse to short-acuminate, cuneate to broadly rounded or subcordate at the base, 5-plexi-nerved; flowers few, sessile in the axils; hypanthium cylindric, 3.5 to 4 mm. long; exterior teeth triangular below, with a subulate tip, divergent, 1 to 1.5 mm. long from the torus, equaling or slightly exceeding the sepals; petals obovate-oblong, 2 to 3 mm. long; anthers linear-subulate, 3 to 4 mm. long; ovary two-thirds inferior, glabrous or glandular-setose at the summit; style 6 to 8 mm. long.—Tropical Mexico to Panama, mostly at low altitudes, and widely distributed in South America to Bolivia and southern Brazil; a common species of the rain forest.

BRITISH HONDURAS: Orange Walk District—Honey Camp, *Lundell* 654 (NY). Belize District—Manatee Pine Ridge, *Gentle* 87 (UM); Churchyard Pine Ridge, *Gentle* 1816 (NY, UM); Big Falls, *Lundell* 3850 (UM, NY); Sibun River, *Bartlett* 11386 (UM, NY), *Peck* 406 (NY); Cornhouse Creek, *Bartlett* 11294 (UM, NY). El Cayo District—Mountain Pine Ridge, *Bartlett* 11666 (UM, NY), 11667 (UM). Stann Creek District—All Pines, *Schipp* 555 (UM, NY). GUATEMALA: Dept. Peten, La Libertad, *Aguiar* H. 269 (UM, NY).

Exceedingly variable in the size and shape of the leaves, the length of the petiole, and the quantity of pubescence. Forms with leaves narrowed to both ends have been distinguished as variety *biacuta* Cogn., but intergrade freely with the more typical form.

4. *CLIDEMIA INVOLUCRATA* DC. Prodr. **3**: 163. 1828.

Shrub, about 1 m. tall, the stems densely pubescent and sparsely glandular; leaves often unequal in each pair, the hirsute petioles 5 to 20 mm. long, the thin blades ovate to oblong, 6 to 13 cm. long by about half as wide, acuminate, sharply serrate and ciliate, broadly obtuse to rounded at the base, 5-plex-nerved, sparsely pilose on both sides; flowers few, in short-peduncled, bracted, capitate clusters; peduncles 5 to 10 mm. long; bracts 3 to 5 mm. long; hypanthium narrowly campanulate, 3.5 to 4 mm. long, softly villous; sepals triangular-ovate, 1 to 1.5 mm. long, the exterior teeth stoutly subulate, projecting about 0.5 mm.; petals white, narrowly obovate, 4 mm. long; anthers subulate, 4.5 mm. long; style stout, 3.5 to 4 mm. long, the stigma capitate.—In forests; British Honduras, Trinidad, and the Guianas.

BRITISH HONDURAS: Stann Creek District—Middlesex, *Schipp* 474 (UM, NY).

5. *CLIDEMIA DENTATA* D. Don, Mem. Wern. Soc. **4**: 308. 1823.

A shrub 1 to 4 m. high, the stem, petioles, inflorescence, and hypanthium densely hirsute with simple hairs; petioles stout, 10 to 15 mm. long; leaf-blades thin, oblong-ovate or ovate-lanceolate, often unequal in each pair, 6 to 20 cm. long, 2 to 8 cm. wide, acuminate, entire or minutely serrulate, acute to rounded and usually oblique at the base, sparsely pilose on both sides, 5-plex-nerved, the inner pair of primary nerves usually alternate; inflorescence short-stalked, 1 to 3 cm. long, usually 3- to 7-flowered, the pedicels 5 to 15 mm. long; hypanthium campanulate, about 3 mm. long; calyx truncate, 1 mm. long, the exterior teeth subulate, erect, 2 to 5 mm. long, hirsute; petals white, obovate, 6 to 7 mm. long, filaments strongly arcuate near the summit; anthers subulate, about 3 mm. long, the connective not appendaged at the base; ovary 5-celled, glabrous on its summit; style 4 to 5 mm. long.—In moist, preferably open ground; southern Mexico to Panama, and southward to Bolivia and Brazil.

BRITISH HONDURAS: Belize District—Sibun River, *Gentle* 1452 (UM, NY). Stann Creek District—Mullins River road, *Schipp* 26 (UM, NY). Toledo District—Toledo, *Peck* 654 (NY).

6. *CLIDEMIA DEPPEANA* Steud. Nom. Bot. 384. 1840.

Melastoma petiolare Cham. & Schlecht. Linnaea **5**: 562. 1830.

Clidemia petiolaris Triana, Trans. Linn. Soc. Bot. **28**: 135. 1871.

A shrub 1 to 2 m. high, rather freely branched, the slender stems loosely hirsute with ascending or subappressed hairs; petioles slender, hirsute, about one-third as long as the blade; leaf-blades ovate-oblong to obovate-oblong, 6 to 10 cm. long by half as wide, acute or acuminate, distinctly serrulate, conspicuously ciliate, obtuse or rounded at the base, 3-nerved, densely pilose on both sides, the hairs often purplish; cymes short-peduncled, freely branched from near the base, several-flowered, 2 to 4 cm. long, hirsute; hypanthium urceolate to tubular, 3 to 3.5 mm. long, densely hirsute with eglandular hairs, or a very few of the hairs glandular; petals white, oblong-obovate, 4 to 5 mm. long; anthers stoutly subulate, 2 to 2.5 mm. long, ovary almost free to half inferior, its summit minutely pubescent or glabrous; style about 4 mm. long.—In forests and savannas, at low or moderate altitudes; Veracruz and Oaxaca to Panama.

BRITISH HONDURAS: Belize District—Big Falls, Belize River, *Lundell* 3848 (UM, NY); Sibun River, *Bartlett* 11372 (UM, NY); Prospecto-Maskall road, *Gentle* 896 (UM, NY). El Cayo District—Mountain Pine Ridge, *Lundell* 6674 (UM, NY). GUATEMALA: Dept. Peten, near Lake Zotz, *Lundell* 1652 (UM, NY).

7. *CLIDEMIA HIRTA* (L.) D. Don, Mem. Wern. Soc. 4: 309. 1823.

Melastoma hirta L. Sp. Pl. 390. 1753.

Clidemia hirta var. *elegans* Griseb. Fl. Brit. W. Ind. 247. 1860.

Shrub 1 to 3 m. high, long-hirsute throughout with eglandular hairs; leaves often unequal in each pair; petioles stout, 5 to 30 mm. long; blades firm, ovate, 5 to 15 cm. long, 3 to 8 cm. wide, short-acuminate, serrulate or entire, rounded or emarginate at the base, 5- to 7-nerved; flowers numerous in loosely branched cymes 3 to 5 cm. long, mostly 6-merous; hypanthium campanulate, about 5 mm. long; calyx about 1 mm. long, truncate or obscurely lobed, the slender exterior teeth projecting about 3 mm.; petals white, oblong-obovate, 8 to 11 mm. long; anthers somewhat arcuate, nearly 5 mm. long, the connective minutely prolonged dorsally at the base below the summit of the filament; ovary glabrous, one-third inferior; style about 8 mm. long.—In moist open ground; Mexico to Panama, throughout the West Indies, and southward to Bolivia and southern Brazil; introduced as a weed in many parts of the Old World tropics.

BRITISH HONDURAS: El Cayo District—Vaca, *Gentle 2503* (UM, NY). Stann Creek District—Mullins River road, *Schipp 16* (UM, NY); Melinda Pine Ridge road, *Gentle 1902* (UM, NY). Toledo District—Toledo, *Peck 674* (NY).

A form with leaf-blades round-ovate, conspicuously serrate, and cordate at the base is known as var. *elegans* (Aubl.) Griseb., and may be expected in the Maya region.

8. *CLIDEMIA STRIGILLOSA* (Sw.) DC. Prodr. 3: 159. 1828.

Melastoma strigilloso Sw. Fl. Ind. Occ. 793. 1800.

A shrub 1 to 2 m. high, its stout stems densely stellate-tomentose and sparsely glandular-hirsute; petioles about 1 cm. long, pubescent like the stem; leaf-blades firm, ovate-lanceolate, 8 to 14 cm. long, 3 to 6 cm. wide, acuminate, minutely serrulate, cordate at the base, 7-nerved, densely setose above, the hairs with large conic bases, finely reticulate and densely stellate-tomentose beneath and more or less setose on the larger veins; inflorescence oblong, congested, 3 to 5 cm. long, the 5-merous flowers sessile along the axis or on very short lateral branches; hypanthium hemispheric, 3 mm. long, densely glandular-hirsute, the hairs 2 to 3 mm. long, and densely stellate-tomentose; sepals oblong, about 2 mm. long, exceeded by the subulate exterior teeth; petals narrowly obovate, 4 to 5 mm. long, white; ovary half inferior, crowned by erect glandular setae; style 3.5 to 4 mm. long.—In open ground and among bushes; British Honduras, the West Indies, and northern South America.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Bartlett 11931* (UM, NY), *Lundell 6872* (UM, NY). Stann Creek District—Mullins River road, *Schipp 219* (UM, NY).

9. *CLIDEMIA RETICULATA* Gleason, Brittonia 3: 110. 1939.

A shrub 1 to 3 m. high, the slender stems thinly and sparsely glandular-hirsute and stellate-pubescent, with some simple hairs; petioles 1 to 2 cm. long, glandular-hirsute and stellate-tomentose; leaf-blades firm, ovate-lanceolate, 8 to 15 cm. long, 3 to 7 cm. wide, long-acuminate, minutely serrulate, cordate at the base, 7-nerved, above densely pubescent with hairs from enlarged conic bases, beneath reticulate, foveolate, and thinly cinereous-stellate; inflorescence 5 to 15 cm. long, the divaricate lateral branches 2 to 5 cm. long; hypanthium cup-shaped, 4 to 5 mm. long, densely stellate-tomentose, glandular-hirsute with hairs about 1 mm. long; sepals 2 to 2.5 mm. long, the exterior teeth projecting 1 to 1.5 mm.; petals oblong-obovate, 5 to 6 mm. long; ovary half inferior, its rounded summit freely stellate-pubescent; style about 5 mm. long.—In thickets and open places; British Honduras.

BRITISH HONDURAS: Belize District—Sibun River, *Bartlett 11414* (UM, NY), *Gentle 1714* (UM, NY); Manatee Pine Ridge, *Gentle 110* (UM); near Manatee Lagoon, *Peck 32* (NY), *161* (NY). Stann Creek District—Mullins River road, *Gentle 1919* (UM, NY), *Schipp 80* (UM, NY).

10. *CLIDEMIA NEGLECTA* D. Don, Mem. Wern. Soc. 4: 307. 1823.

A shrub 1 to 2 m. high, the stems, petioles, inflorescence, and hypanthium densely glandular-pubescent, stellate-tomentose, and simply setose; petioles 5 to 15 cm. long; leaf-blades firm, oblong-ovate, 7 to 15 cm. long by half as wide, acuminate, serrulate, broadly rounded at the base, 5-nerved, densely pubescent on both sides and more or less rugose or bullate above; inflorescence peduncled, mostly 3 to 6 cm. long, the lateral branches 5 to 15 mm. long; hypanthium broadly tubular, 5 to 6 mm. long, densely stellate beneath the longer hairs, and more or less setose distally with eglandular hairs 2 to 3.5 mm. long; sepals oblong-ovate, 2.5 to 3 mm. long, the subulate exterior teeth about 1 mm. longer; petals oblong-obovate, white or greenish, 6 to 7 mm. long; anthers stoutly subulate, 3.5 to 4 mm. long; ovary half inferior, 5-celled, its summit tipped with glandular bristles; style 7 mm. long.—In swampy open places; British Honduras to Panama; Cuba; Trinidad and Colombia to southern Brazil.

BRITISH HONDURAS: Belize District—Cornhouse Creek, *Bartlett 11300* (UM, NY). El Cayo District—Mountain Pine Ridge, *Lundell 6741* (UM, NY), *6870* (UM, NY). Toledo District—Machaca, *Schipp 1213* (NY).

11. *CLIDEMIA DEPENDENS* D. Don, Mem. Wern. Soc. 4: 307. 1823.

Clidemia spicata DC. Prodr. 3: 159. 1828.

A shrub 1 to 3 m. high; stems thinly stellate-tomentose and densely hirsute, especially above, with eglandular hairs mostly 2 to 4 mm. long; glandular hairs none; petioles 5 to 20 mm. long, densely long-hirsute; leaf-blades firm, ovate to ovate-oblong, 7 to 12 cm. long, 3 to 7 cm. wide, usually more than half as wide as long, very abruptly short-acuminate, entire or minutely serrulate, broadly rounded at the base, 5-nerved, hirsute above, densely pubescent beneath; inflorescence compact, 2 to 6 cm. long, densely villous with eglandular hairs 3 to 6 mm. long, the lateral glomerules nearly or quite contiguous; flowers white, essentially as in the next species but longer-hirsute, the bristles up to 6 mm. long.—Widely distributed in tropical America; in open places and thickets.

BRITISH HONDURAS: Belize District—Cornhouse Creek, *Bartlett 11302* (UM, NY); Sibun River, *Bartlett 11377* (UM, NY). El Cayo District—Mountain Pine Ridge, *Lundell 6574* (UM, NY), *6684* (UM, NY); Duck Run, *Bartlett 12978* (UM, NY). GUATEMALA: Dept. Peten, Monte Polol, *Lundell 3038* (UM, NY).

Note: This species and the following are very closely related and perhaps only varietally distinct. Nevertheless, *C. dependens* can usually be distinguished at a glance by its shorter, proportionately broader leaves and its congested, densely hirsute spikes.

12. *CLIDEMIA CAPITELLATA* (Bonpl.) D. Don, Mem. Wern. Soc. 4: 310. 1823.

Melastoma capitellata Bonpl. Melast. 5. pl. 3. 1806.

A shrub 1 to 3 m. high; the stems thinly stellate-tomentose, pilose with simple bristles 1 to 2 mm. long, and distally more or less glandular with very short hairs; petioles densely pubescent, 1 to 2 cm. long; leaf-blades firm, ovate-oblong to ovate-lanceolate, 10 to 20 cm. long, 4 to 9 cm. wide, acuminate, minutely serrulate, obtuse to rounded at the base, 5- to 7-nerved, short-hirsute above, thinly short-pubescent beneath; inflorescence spicate, or rarely

branched from the base, 5 to 15 cm. long, bearing several, sessile, lateral clusters of flowers separated by internodes 1 to 2 cm. long and densely glandular; hypanthium cup-shaped, 3.5 to 4 mm. long, densely hirsute with simple hairs 0.5 to 1.5 mm. long; sepals 2 mm. long, the exterior teeth projecting about 1 mm., petals obovate-oblong, white, about 5 mm. long; anthers about 2.5 mm. long, the connective with a minute dorsal protuberance near the base; ovary crowned with 10 to 15 mostly eglandular setae; style 5 to 7 mm. long.—In thickets and open ground; Guatemala and British Honduras to Colombia.

BRITISH HONDURAS: Belize District—Sibun River, *Gentle 1495* (UM, NY); Big Falls, *Lundell 3846* (UM, NY). Stann Creek District—Mullins River road, *Gentle 1907* (UM, NY), *Schipp 30* (UM, NY).

14. BELLUCIA Neck.

Flowers 5- to 8-merous, axillary; hypanthium hemispheric, thick-walled; calyx large, at anthesis divided into 2 to 6 regular or irregular lobes; petals large, coriaceous, obovate or oblong, obscurely clawed at the base; stamens isomorphic, more or less coherent in a ring; filaments short and stout; anthers short, broadly oblong or dolabriform, laterally compressed, opening by two minute pores, the connective neither prolonged nor appendaged; ovary wholly inferior, 5- to 15-celled; style stout, terete, terminated by a large capitate stigma; fruit a large, many-seeded berry. Trees or tall shrubs, with large white or pink flowers.

A genus of about ten species, most numerous in tropical South America. One or two other species occur in Central America.

1. BELLUCIA GROSSULARIOIDES (L.) Triana, Trans. Linn. Soc. Bot. **28**: 141. 1871.

Melastoma grossularioides L. Sp. Pl. 390. 1753.

A tree up to 15 m. high, the younger stems 4-angled and ringed at the nodes; petioles stout, 2 to 4 cm. long; blades firm, ovate to obovate-oblong, 20 to 30 cm. long by 10 to 20 cm. wide, acute or short-acuminate, entire, rounded to broadly cuneate at base, glabrous above, glabrous or minutely strigillose beneath, 5-nerved or 5-ply-nerved; flowers solitary by abortion, or rarely two from the same axil, the pedicels about 2 cm. long, nearly glabrous; hypanthium about 15 mm. wide; calyx-lobes 2 to 5, irregular in shape, acute or rounded, 5 to 8 mm. long; petals 15 to 20 mm. long.—In secondary forest, at low or moderate altitudes; British Honduras and Panama; Martinique and Guadeloupe, probably introduced; widespread in northern South America.

BRITISH HONDURAS: Stann Creek District—Middlesex, alt. 60 m., *Schipp 319* (UM, NY); Stann Creek—Capon road, *Gentle 1940* (UM, NY).

15. LEANDRA Raddi

Flowers 4- to 8-merous; hypanthium globose, campanulate, or tubular, often constricted at the mouth; sepals small, the exterior teeth varying from tuberculiform to subulate; petals linear-lanceolate to ovate, or rarely obovate, acute or acuminate, usually erect at anthesis; stamens isomorphic or nearly so; filaments slender, smooth; anthers linear or oblong, rarely subulate; connective simple or rarely minutely prolonged, often gibbous or tuberculate on the back near the base; ovary wholly or partly inferior, the cells usually of the same number as the petals; style slender, often tapering; stigma punctiform to capitate; fruit baccate,

many-seeded, the seeds of various shapes, in one section bearing an apical appendage. Shrubs or small trees, almost always pubescent, frequently hirsute or hispid, with terminal panicles or bracted heads of small, usually white flowers.

More than 200 species of *Leandra* have been described. The genus is especially well represented in southern Brazil. Numerous species occur both in Amazonia and the Andes, becoming progressively less numerous toward the north. Only a few are found in Central America and southern Mexico and none in the West Indies. Our two species belong to section *Secundiflorae*, with flowers sessile and secund along the divaricate branches of the large panicles.

Stem and hypanthium with both simple and glandular hairs; flowers mostly 7-merous 1. *L. mexicana*
Stem and hypanthium with simple hairs only; flowers 5-merous 2. *L. dichotoma*

1. *LEANDRA MEXICANA* (Naud.) Cogn. in Mart. Fl. Bras. 14⁴: 77. 1886.

Clidemiastrum mexicanum Naud. Ann. Sci. Nat. III. Bot. 18: 87. pl. 4, fig. 5. 1852.

Shrub 1 to 3 m. high, the slender stems densely pubescent with simple hairs slightly exceeded by glandular ones; petioles slender, mostly 2 to 6 cm. long, pubescent like the stem; leaf-blades thin, ovate, 12 to 20 cm. long, 4 to 16 cm. wide, acuminate, irregularly crenate, cordate at the base, 7-nerved, sparsely pubescent above with slender simple hairs 0.2 to 1 mm. long and with stiff setae 1 to 1.6 mm. long; panicle loosely branched, 6 to 10 cm. long, pubescent like the stem; flowers 7-merous, rarely 6- or 8-merous, sessile; hypanthium broadly tubular, 3 to 3.5 mm. long to the torus, densely short-villose and sparsely glandular-pubescent with longer hairs; sepals round-ovate, about 1.3 mm. long; exterior teeth triangular, slightly exceeding the sepals; petals ovate, 3 mm. long, acute; filaments 2.5 to 3 mm. long; anthers linear, 2 mm. long; connective simple; ovary inferior, 7- (6- or 8-) celled, pubescent at the summit; style 5 mm. long.—In woods and thickets; Veracruz to Oaxaca, and southward to Colombia.

BRITISH HONDURAS: Belize District—Gales Point, *Bartlett 11343* (UM, NY). El Cayo District—near Vaca, *Gentle 2509* (UM, NY). Stann Creek District—Stann Creek—Mullins River road, *Gentle 1900* (UM, NY).

2. *LEANDRA DICHOTOMA* (D. Don) Cogn. in Mart. Fl. Bras. 14⁴: 200. 1886.

Clidemia dichotoma D. Don, Mem. Wern. Soc. 4: 307. 1823.

Shrub 1 to 3 m. high, the stems, petioles, and inflorescence densely hirsute with spreading or crisped simple hairs 1 to 2 mm. long; petioles 2 to 5 cm. long; leaf-blades thin, ovate-oblong, 10 to 20 cm. long, 5 to 11 cm. wide, acuminate, irregularly dentate, rounded or broadly obtuse at the base, usually 7-nerved, hirsute above with simple hairs 1 to 2 mm. long, pubescent below, especially on the nerves, with similar hairs; panicles loosely branched, 10 to 20 cm. long, the branches often crooked or flexuous; flowers 5-merous, sessile; hypanthium subglobose, 2.5 mm. long, densely hirsute; sepals minute, 0.3 mm. long, triangular; exterior teeth hirsute, subulate, exceeding the sepals by 1 mm.; petals lanceolate, acuminate, 2.5 to 3 mm. long; anthers linear, 1.5 to 2 mm. long, the connective elevated into a dorsal protuberance at the base; ovary 5-celled; style about 4 mm. long.—In forests, thickets, and open places; Guatemala and British Honduras, and southward to Peru.

BRITISH HONDURAS: Stann Creek District—Mullins River road, *Schipp 18* (UM, NY).

The leaves of the specimen cited are narrower than usual and the pubescence is somewhat shorter. The collector noted that the indument was scarlet when fresh.

16. *CONOSTEGIA* D. Don

Flowers 5- to 10-merous; calyx calyptrate, deciduous near the torus at anthesis; hypanthium cup-shaped, thick-walled; petals usually obovate or obcordate, thickened toward the base, many-nerved; stamens isomorphic, two to five times as many as the petals; filaments slender, glabrous; anthers linear or oblong, 4-celled, laterally compressed; connective neither appendaged nor prolonged; ovary wholly inferior, often concave at the summit or prolonged into a ring around the base of the style, the number of cells as many or somewhat more than the number of petals; style columnar; stigma truncate, capitate, or broadly peltate; fruit a many-seeded berry; seeds obovoid, angled. Shrubs or trees, with large, usually pli-nerved leaves, and terminal panicles of conspicuous white flowers.

More than fifty species have been described, ranging from southern Mexico and the West Indies southward to Brazil and Ecuador; most abundant in Central America, where numerous endemics occur.

Mature leaves glabrous on the surface beneath, thinly furfuraceous on the veins; stigma peltate, retuse, 3 to 4 mm. wide.

- | | | |
|--|----|----------------------|
| Leaves about twice as long as wide, 5-ply-nerved; petals obcordate | 1. | <i>C. icosandra</i> |
| Leaves about three times as long as wide, 3-ply-nerved; petals obovate | 2. | <i>C. Lundellii</i> |
| Mature leaves densely pubescent beneath; stigma capitate, about 1 mm. wide, or truncate. | | |
| Leaves closely stellate-tomentose beneath, soon glabrous above | 3. | <i>C. xalapensis</i> |
| Leaves with stipitate stellate hairs beneath, hirsute above with simple hairs | 4. | <i>C. caelestis</i> |

1. *CONOSTEGIA* *ICOSANDRA* (Sw.) Urban, Rep. Sp. Nov. 17: 404. 1921.

Melastoma icosandrum Sw.; Wikstr. Sv. Vet.-Akad. Handl. 1827: 64. 1827.

Conostegia subhirsuta DC. Prodr. 3: 174. 1828.

Tall shrub or small tree, up to 10 m. high; young stems and petioles thinly stellate-tomentose, soon glabrescent; petioles 1 to 3 cm. long; leaf-blades firm, elliptic, 10 to 20 cm. long, 5 to 10 cm. wide, acute or abruptly acuminate, entire or obscurely undulate, acute to rounded at the base, 5-ply-nerved, glabrous above, thinly stellate on the veins beneath, eventually glabrate; panicles small, few-flowered, pubescent like the stem; buds broadly obovoid, 7 to 9 mm. long, 6 to 7 mm. thick, rounded above to a minute apiculus; petals usually 8, broadly obcordate, 8 to 10 mm. long; anthers 16 to 28, oblong, about 3.5 mm. long; ovary wholly inferior, about 12-celled, its flat summit elevated in a ring around the style-base; style columnar, 5 mm. long; stigma peltate, about 3 mm. wide, retuse, radiately 12-lobed.—In forests; Mexico to Panama, throughout the West Indies, and reported to extend as far south as Paraguay.

BRITISH HONDURAS: Stann Creek District—Stann Creek, *Schipp* 145 (UM, NY).

2. *Conostegia Lundellii* Gleason, sp. nov.

Frutex trimetralis; caules superiores 4-sulcati dense stellato-setosi; petioli breves mox glabrescentes; laminae oblongae vel anguste oblongae, subcoriaceae, flavescentes, abrupte acuminatae, integrae, ad basin inaequilateralem acutatae vel rotundatae, 3-nerviae, supra glabrae, subtus punctatae; panicula pauciflora tenuiter stellata, pedicellis 2-5 mm. longis; alabastra pyriformia superne rotundata, fere glabra; petala obovata, retusa, margine saepe undulata; stamina 24; filamenta 5-5.5 mm. longa; antherae oblongae, poro terminali, thecis infra basin filamentis productis; ovarium 16-loculare; stylus columnaris; stigma peltatum, medio retusum, radiatum 16-lobatum, quoque lobo elliptico.

Shrub 3 m. high; stems 4-ribbed, 4-sulcate, densely pubescent with stalked stellate hairs up to 1 mm. long; petioles 1 to 2 cm. long, soon glabrous; leaf-blades oblong, flavescent, 8 to 14 cm. long, 2.5 to 5 cm. wide, abruptly acuminate, acute to rounded at the usually

inequilateral base, entire, glabrous above, thinly stellate-pubescent beneath when very young, soon becoming glabrous and red-punctate, 3-ply-nerved; inflorescence few-flowered, thinly stellate; buds 10 to 11 mm. long, broadly pyriform, rounded at the summit; petals 8, obovate, 8 to 9 mm. long; stamens 24, the anthers 3.5 to 4 mm. long; ovary 16-celled; style 4.5 to 5 mm. long; stigma peltate, 3 to 3.5 mm. wide.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, San Agustin, *Lundell 6587* (NY, type; UM), *Lundell 6587A* (NY, UM).

3. *CONOSTEGIA XALAPENSIS* (Bonpl.) D. Don, Mem. Wern. Soc. 4: 317. 1823.

Melastoma xalapensis Bonpl. Mélast. 126. pl. 54. 1816.

Shrub or small tree, 1 to 5 m. high; upper parts of the stem, petioles, lower leaf-surface, inflorescence and flowers closely but thinly brownish stellate-tomentose; petioles stout, 1 to 4 cm. long; leaf-blades firm, narrowly ovate-lanceolate to ovate, 8 to 20 cm. long, 2 to 7 cm. wide, acute or abruptly acuminate, finely but conspicuously denticulate, acute to rounded at the base, 5-ply-nerved, finely stellate above when young, glabrescent and rugulose with age; inflorescence widely branched, many-flowered, usually 10 to 20 cm. long; buds pyriform, 5 to 7 mm. long, acute; hypanthium cup-shaped, 3 to 3.5 mm. long; petals 5, elliptic-obovate, 4 to 6 mm. long; stamens 10; anthers 2.5 to 3 mm. long; ovary wholly inferior, 5-celled; style bent near the summit, 4 to 5 mm. long, the small stigma truncate.—In open places, fields, second-growth forest, and along hedges; southern Mexico to Panama, abundant; Cuba and Colombia.

BRITISH HONDURAS: Orange Walk District—Honey Camp, *Lundell 506* (NY). Belize District—Maskall Pine Ridge, *Gentle 1051* (NY, UM); Sibun River, *Bartlett 11407* (UM, NY). El Cayo District—Mountain Pine Ridge, *Bartlett 11663* (UM, NY); Duck Run, *Bartlett 11550* (UM, NY). Stann Creek District—Stann Creek—Mullins River road, *Gentle 1898* (UM, NY); Stann Creek, *Schipp 17* (UM, NY). Toledo District—Toledo, *Peck 548* (NY). GUATEMALA: Dept. Peten, near Chiche, *Lundell 1654* (UM, NY), *1658* (UM, NY). La Libertad, *Aguilar H. 424* (UM, NY), *Lundell 2186* (UM, NY), *2245* (UM, NY), *2558* (UM, NY), *3208* (UM, NY).

4. *CONOSTEGIA CAELESTIS* Standley, Field Mus. Publ. Bot. 4: 318. 1929.

Small tree, the buds, inflorescence, younger stems, and petioles densely pubescent with stipitate stellate hairs up to 1 mm. long; petioles stout, 1 to 2 cm. long; leaf-blades thin, elliptic-oblong, 10 to 20 cm. long, 4 to 7 cm. wide, abruptly acuminate, finely denticulate, obtuse to rounded at the base, 3-nerved, with an additional pair of marginal veins, hirsute above with short unbranched hairs, stellate-subtomentose beneath, the hairs of the actual surface short-stipitate; panicle freely branched, 5 to 10 cm. long; buds obovoid, obtuse, 6 to 7 mm. long; petals ("6 to 8") 5, obcordate, very inequilateral, about 6 mm. long; stamens 20; anthers narrowly oblong, 2.5 mm. long; ovary 10-celled; style columnar, 3.5 mm. long; stigma capitate, about 1 mm. wide.—In dense shade in the primary forest; endemic.

BRITISH HONDURAS: Stann Creek District—Big Creek, *Schipp 63* (UM, NY).

17. *TOCOCA* Aubl.

Flowers mostly 5-merous; hypanthium turbinate to campanulate; calyx-tube more or less prolonged, erect or flaring; sepals mostly short or obsolete, the exterior teeth always developed and often conspicuous; petals obovate to oblong, inequilateral, usually retuse; stamens isomorphic or nearly so; filaments stout; anthers linear or subulate, more or less incurved at the tip; connective elevated into a low ridge, often bearing a rounded basal protuberance;

ovary half-inferior, 3- to 5-celled, often setose or annulate at the summit; style stout, glabrous or pubescent; stigma capitate or subpelate; fruit a berry. Shrubs or small trees, the ample leaves often unequal in each pair and frequently bearing formicaria at the summit of the petiole or base of the blade; flowers white to pink, medium-sized, in terminal racemes, panicles or heads.

A genus of about 60 described species, with its center of distribution in the lowlands of Amazonia. A few species extend southward into southern Brazil, and several others ascend to moderate elevations in the Andes; none is known from the West Indies.

1. *TOCOCO GUIANENSIS* Aubl. Pl. Guian. 1: 438. pl. 174. 1775.

Tococa coriacea Moore, Jour. Bot. 18: 3. 1880.

Tococa Peckiana Robinson, Proc. Am. Acad. 45: 395. 1910.

Shrub 1 to 3 m. high; younger stems strongly flattened, glabrous or sparsely setose, more or less setose at the nodes; petioles stout, 1 to 6 cm. long, densely pubescent on the back, the longer ones usually bearing a didymous, semirhomboid, glabrous or setose formicarium near the summit; blades firm or subcoriaceous, ovate-lanceolate to oblong or broadly elliptic, 12 to 25 cm. long, 6 to 15 cm. wide, acuminate, often toothed, usually ciliate, narrowed or rounded below to a small cuneate base with naked veins, 5-nerved, sparsely setose above, thinly pubescent beneath, especially on the veins; panicle 10 to 18 cm. long; flowers sessile; hypanthium campanulate or turbinate, about 5 mm. high, glabrous, punctate, or sparsely setose; calyx scarcely lobed; exterior teeth broadly triangular, more or less spreading, glandular-setose; petals obovate, pink, about 8 mm. long.—In wet forests at low altitudes; British Honduras; Panama; the Guianas, and throughout the Amazon Valley as far south as Bolivia; the commonest and most widely distributed species of the genus, and correspondingly variable.

BRITISH HONDURAS: Belize District—Manatee Lagoon, *Peck 68* (NY); Manatee Pine Ridge, *Genile 93* (UM), *106* (UM); Big Falls, *Lundell 3849* (UM, NY); Cornhouse Creek, *Barlett 11297* (UM); Gracie Rock, Sibun River, *Genile 1749* (UM, NY). El Cayo District—Mountain Pine Ridge, *Lundell 6880* (UM, NY). Stann Creek District—Mullins River road, *Schipp 227* (UM, NY).

18. HETEROTRICHUM DC.

Flowers 5- to 9-merous; hypanthium cup-shaped or broadly campanulate, pubescent; calyx bearing exterior teeth surpassing the sepals; petals obovate, rounded or retuse at the summit; stamens isomorphic; filaments slender, smooth; anthers linear to subulate, 2-celled, the pore terminal; connective elevated basally into a dorsal ridge, simple or very briefly prolonged below the thecae; ovary nearly free, 5- to many-celled, the summit usually truncate-conic around the style-base; style slender; stigma punctiform to capitate; fruit baccate, with numerous, minute, ovoid seeds. Shrubs or small trees, usually hispid or glandular-hirsute, with large petioled leaves and terminal panicles of conspicuous, white or pink flowers.

The distinction between *Heterotrichum*, as defined by Cogniaux, and *Miconia* section *Octomeris* is slight and perhaps trivial. In *Miconia* the exterior calyx-teeth are shorter than the sepals, while in *Heterotrichum* they are longer. The latter genus has normally larger flowers, with petals 7 to 15 mm. long, in contrast to the small flowers of most species of *Miconia*. About a dozen species are known: four in Venezuela, three in the West Indies, one each in Mexico, Costa Rica, Ecuador, and Brazil, and the following one of wide range.

1. *HETEROTRICHUM OCTONUM* (Bonpl.) DC. Prodr. 3: 173. 1828.

Melastoma octona Bonpl. Mélast. 7. pl. 4. 1806.

Branching shrub 1 to 5 m. high, the stem, petioles, inflorescence, and hypanthium densely covered with three types of pubescence, short, subsessile stellate hairs, longer, spreading glandular hairs, and very long (4 to 8 mm.) simple bristles; petioles slender, 3 to 8 cm. long; leaf-blades thin, ovate, 12 to 18 cm. long, 6 to 13 cm. wide, acuminate, obscurely denticulate, cordate at the base, 7-nerved, long-setose above, gray with stellate pubescence beneath; panicle freely branched, many-flowered, 5 to 10 cm. long; flowers 5- to 8-merous; hypanthium 4 to 5 mm. long, the simple bristles sometimes few; calyx-tube prolonged 1.5 mm.; sepals triangular-ovate, 2 mm. long from the torus; exterior teeth subulate, 3.5 to 4 mm. long from the torus; petals white, 8 to 10 mm. long; anthers subulate, 5 to 6 mm. long; connective prolonged nearly 0.5 mm. at the base; style 7 to 10 mm. long.—In open places, thickets, and secondary forest; southern Mexico to Peru; also in Cuba.

BRITISH HONDURAS: Belize District—Maskall Pine Ridge, *Gentle 1003* (UM, NY). El Cayo District—Arenal-Valentin road, *Lundell 6177* (UM, NY); Chalillo Crossing, *Lundell 6529* (UM, NY); San Agustin, *Lundell 6635* (UM, NY); San Agustin, *Lundell 6678* (UM, NY). Stann Creek District—Stann Creek-Mullins River road, *Gentle 1954* (UM, NY); Stann Creek, *Schipp 15* (UM, NY).

19. *MICONIA* R. & P.

Flowers 4- to 8-merous, usually 5-merous; hypanthium tubular to urceolate; calyx-tube usually developed but short, the sepals obsolete or present, variable in shape and size, the exterior teeth usually minute and seldom exceeding the sepals; petals small or medium in size, often inequilateral, usually retuse or notched at the apex, mostly flabellately veined; stamens all perfect, isomorphic or dimorphic; filaments slender or flattened; anthers subulate, linear, oblong, obovate, or obovoid, 2-celled or 4-celled, opening by 1 or 2 pores or by 2 longitudinal clefts; connective simple or variously prolonged or appendaged at the base; ovary wholly or partly inferior, 2- to several-celled, usually with numerous ovules; style straight or bent, usually elongate; stigma punctiform, truncate, capitate, or peltate; fruit a berry. Shrubs or trees, with opposite, usually isomorphic leaves and terminal racemes or (usually) panicles or paniced glomerules of sessile or short-pedicelled, usually white flowers.

About 900 species have been described, ranging throughout tropical America except the southern extremity of Florida and ascending to high elevations in the mountains. As may be expected in a genus of such size, the variation in size, habit, foliage, and indument is extreme, while the range of structure in the stamens, the calyx, and the inflorescence strongly suggests that the genus, as now accepted, is a heterogeneous assemblage greatly in need of segregation. Various smaller genera, especially *Tococa*, *Heterotrichum*, and *Tetrazygia* can not logically be kept separate from it. The genus is ordinarily divided into 11 sections, based chiefly on the shape and dehiscence of the anthers. Two or three of these sections scarcely merit recognition as such and an additional section (*Hartigia*, based on the genus *Hartigia* Miq.) may here be added.

The subjoined key is wholly artificial, based primarily on vegetative characters and designed to facilitate identification of the local species without dissection. The four groups are based on the nature of the pubescence on the lower side of the leaves.

- Leaves green and glabrous beneath, at least at maturity, often minutely stellate-furfuraceous along the veins, especially when young Group A
- Leaves permanently pubescent to tomentose beneath, the indument sometimes so close that the surface may appear glabrous to the unaided eye.
- Pubescence of straight or curved unbranched hairs Group B
- Pubescence of loose stellate hairs, not numerous enough to conceal the actual surface of the leaf Group C
- Pubescence of densely matted hairs or scales, forming a close indument completely concealing the actual surface of the leaf, the apparent surface therefore white, silvery, cinereous, golden, or brown Group D

GROUP A

- Stem square, sharply 4-angled; leaf-bases connected by an arcuate elevated ridge . . 17. *M. reducens*
- Stem round or obscurely angled or somewhat compressed.
- Panicles very slender, racemiform, most of the lateral branches 1-flowered . . 27. *M. ochroleuca*
- Panicles freely branched, most of the lateral branches many-flowered.
- Leaves 3- to 5-nerved.
- Flowers distinctly secund, closely crowded, subtended by short persistent bracts.
- Leaves green beneath, obtuse to subrotund at the base; petioles pilose, at least toward the summit 13. *M. ciliata*
- Leaves purple-red beneath, acute at the base; petioles glabrous 14. *M. oinochrophylla*
- Flowers not secund.
- Flowers 4-merous; hypanthium glabrous 1. *M. disparilis*
- Flowers 5-merous; hypanthium minutely stellate.
- Leaves 3 or 4 times as long as wide.
- Leaves acute at the base; connective of the larger stamens dilated into a quadrate truncate appendage 24. *M. hyperprasina*
- Leaves obtuse or rounded at the base; connective of the larger stamens prolonged into a truncate, collar-shaped structure surrounding the filament 23. *M. laevigata*
- Leaves about twice as long as wide, rounded at the base 33. *M. calvescens*
- Leaves 3- to 5-ply-nerved.
- Petals 6, about 10 mm. long 12. *M. Schlimii*
- Petals 5, not more than 5 mm. long.
- Leaf-blade not decurrent on the petiole.
- Leaves mostly whorled; panicle-branches 4 to 6 from the principal nodes 11. *M. longifolia*
- Leaves strictly opposite; panicle-branches opposite or occasionally with a pair of infraposed, much reduced branches.
- Leaves acute at the base 6. *M. hondurensis*
- Leaves broadly rounded at the base 26. *M. Chamissois*
- Leaf-blade more or less decurrent on the petiole.
- Inner pair of lateral veins situated (at the middle of the leaf) about four-fifths of the distance from the midvein to the margin 26. *M. Chamissois*
- Inner pair of lateral veins situated (at the middle of the leaf) about two-thirds of the distance from the midvein to the margin.
- Sepals depressed-semicircular.
- Leaves 5-ply-nerved 31. *M. pteropoda*
- Leaves 3-ply-nerved 32. *M. Schlechtendalii*
- Sepals sharply triangular.
- Stigma truncate, no wider than the style 30. *M. prasina*
- Stigma capitate, wider than the style 29. *M. obovalis*

GROUP B

- Leaves 5- to 7-ply-nerved.
- Leaves obtuse to rounded at the base; innermost pair of lateral nerves arising 5 to 10 mm. from the base 28. *M. ibaguensis*
- Leaves cuneate to the base, innermost pair of lateral nerves arising 3 to 7 cm. from the base 19. *M. nervosa*
- Leaves 3- to 5-nerved.
- Pubescence of the internodes bristly, deflexed 7. *M. paleacea*
- Pubescence of the internodes spreading 15. *M. lacera*
- Pubescence of the internodes curved-ascending 34. *M. Matthaei*
- Pubescence of the internodes very sparse or none 16. *M. Schippii*

GROUP C

- Leaves nearly or quite sessile.
 - Leaves 3-nerved 22. *M. impetiolearis*
 - Leaves 3-ply-nerved, the innermost pair of lateral nerves arising 5 to 10 cm. above the base.
 - Leaves broadest above the middle, broadly clasping at the base 8. *M. amplexans*
 - Leaves broadest below the middle, tapering to a narrow base 9. *M. tomentosa*
- Leaves distinctly petioled 12. *M. Schlimii*

GROUP D

- Leaves 5- to 7-ply-nerved.
 - Petioles well developed; leaf-blades obtuse or acute at the base.
 - Leaf-blades elliptic to obovate, 6 to 14 cm. wide 2. *M. mucronata*
 - Leaf-blades lanceolate, 2 to 5 cm. wide 18. *M. oligocephala*
 - Petioles none or less than 1 cm. long; leaf-blades rounded at the base 3. *M. involuocrata*
- Leaves 3- to 5-nerved.
 - Leaves golden brown and lepidote beneath, 3-nerved.
 - Leaf-blades lanceolate, 2 to 4 cm. wide 10. *M. chrysophylla*
 - Leaf-blades oblong-obovate, 4 to 8 cm. wide or more 21. *M. punctata*
 - Leaves stellate beneath, brown or gray or silvery.
 - Petals 6 to 9 mm. long; flowers not secund.
 - Bracts minute or none 4. *M. belizensis*
 - Bracts 5 to 8 mm. long, deciduous, obovate 5. *M. dodecandra*
 - Petals 2 to 5 mm. long; flowers usually secund along the branches of the panicle.
 - Younger stems strongly flattened and 2-edged 20. *M. argentea*
 - Younger stems terete or subterete 25. *M. albicans*
 - Younger stems and axis of the panicle prominently and sharply 4-angled.
 - Ordinary well-grown foliage leaves 2 to 3 dm. long, dull yellowish brown beneath 35. *M. elata*
 - Ordinary well-grown foliage leaves 1 to 1.5 dm. long, silvery or canescent beneath 36. *M. stenostachya*

KEY TO THE SECTIONS

- Anthers subulate, opening by a minute terminal pore.
 - Leaves petioled; connective usually glabrous I. Tamonea
 - Leaves sessile; connective densely glandular at the base II. Adenodesma
- Anthers linear to oblong.
 - Anthers opening by short terminal slits III. Chaenantha
 - Anthers opening by a pore as wide as the anther IV. Glossocentrum
 - Anthers opening by a pore rarely more than half as wide as the anther.
 - Anthers 4-celled V. Amblyarrhena
 - Anthers 2-celled.
 - Anthers oblong, blunt; style bent horizontally at the apex; connective simple VI. Hartigia
 - Anthers linear; style straight or slightly curved; connective of most species prolonged below the thecae VII. Eumiconia

I. SECTION TAMONEA

Flowers 4- to 6-merous, usually medium-sized or large; anthers subulate, usually conspicuously arcuate or sigmoid, the connective simple or somewhat prolonged or lobed, glabrous or minutely glandular; leaves petioled.

As here defined, including the section Jucunda, the group includes about 70 species, most abundant in northern South America, but extending north and south over essentially the entire range of the genus.

Exterior teeth or sepals or both well developed in proportion to the hypanthium, the exterior teeth either greatly exceeding and more or less concealing the sepals, or the sepals 3 to 4 mm. long measured from the torus (sect. Jucunda).

- Flowers 4-merous; leaves 3-nerved 1. *M. disparilis*
- Flowers mostly 6-merous; leaves pty-nerved.
 - Leaves 3- to 5-ply-nerved; bracts deciduous, 3 to 4 mm. long 2. *M. mucronata*
 - Leaves 7- to 9-ply-nerved; bracts persistent, about 10 mm. long 3. *M. involuocrata*

Exterior teeth and sepals poorly developed in proportion to the hypanthium, the exterior teeth minute or none, the sepals small or obsolete.

- Flowers at anthesis unknown, 5-merous 4. *M. belizensis*
 Flowers subtended by obovate bracts 5 to 8 mm. long 5. *M. dodecandra*
 Flowers with minute or subulate bracts.
 Flowers 5-merous; stem and foliage glabrous 6. *M. hondurensis*
 Flowers 6-merous; stem and leaf-veins beneath hispid 7. *M. paleacea*

1. *MICONIA DISPARILIS* (Standley) R. O. Williams, Fl. Trin. & Tob. **1**: 388. 1934.

Ossaea ciliata Cogn. Monog. Phan. **7**: 1067. 1891.

Ossaea disparilis Standley, Contr. Arnold Arb. **5**: 120. pl. 17. 1933.

A shrub 2 m. high with glabrous stems and foliage; petioles slender, 5 to 25 mm. long; blades thin, shining, broadly elliptic, 10 to 25 cm. long, 5 to 10 cm. wide, sharply acuminate, cuneate at base, minutely crenulate and setose in the crenulations, 3-nerved; inflorescence loosely paniculate, few-branched, minutely furfuraceous at the nodes; flowers 4-merous, sessile in terminal cymules; hypanthium tubular, smooth or minutely punctate, 3.6 mm. long; sepals almost obsolete, the exterior teeth narrowly triangular, acuminate, 1.6 mm. long; petals obovate, 1.6 mm. long; stamens isomorphic, the filaments 2.5 mm. long; anthers subulate, 3 to 3.5 mm. long; connective minutely 4-lobed at base; ovary nearly free, 4-celled; style 7 mm. long; stigma truncate; fruit 8-costate, glandular-pilose.—In forests; British Honduras, Panama, Colombia, Trinidad, British Guiana, and Surinam; apparently local.

BRITISH HONDURAS: Stann Creek District—Middlesex, *Schipp* 239 (UM, NY).

2. *MICONIA MUCRONATA* (Desf.) Naud. Ann. Sci. Nat. III. Bot. **16**: 120. 1851.

Melastoma holosericea L. Sp. Pl. 390. 1753.

Melastoma mucronata Desf. in Lam. Encyc. **4**: 46. 1796.

Miconia holosericea Triana, Trans. Linn. Soc. Bot. **28**: 101. 1871. Not *M. holosericea* DC. 1828.

Shrub or small tree 3 to 5 m. tall, the smaller twigs more or less flattened, closely and finely tomentulose; petioles stout, 15 to 25 mm. long, pubescent like the stem; leaf-blades elliptic to ovate or obovate, 13 to 42 cm. long, 6 to 14 cm. wide, abruptly acuminate, broadly acute to rounded at base, glabrous above, densely but finely stellate-tomentose beneath, 3- to 5-nerved or often 3- to 5-ply-nerved; panicle 5 to 15 cm. long, pedunculate, tomentulose like the stem, its branches fascicled; flowers mostly 6-merous, sessile, subtended by lanceolate to ovate, early deciduous bracts 3 to 4 mm. long; hypanthium tubular, 6 mm. long, finely stellate-tomentulose; sepals ovate to lanceolate, 2.5 to 3.5 mm. long, deciduous at anthesis; petals obovate-oblong, 9 mm. long, obliquely truncate and slightly retuse; filaments 6 to 8 mm. long; anthers isomorphic, subulate, 6 to 8 mm. long; connective prolonged into 2 obtuse basal lobes below the filament and with a short erect dorsal spur; ovary almost free, usually 4-celled; style about 18 mm. long; stigma truncate.—In forests; British Honduras; in South America from the Caribbean Sea south to Rio de Janeiro and Bolivia.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Bartlett* 11833 (UM). Stann Creek District—Stann Creek—Melinda Pine Ridge road, *Gentle* 2168 (UM).

3. *MICONIA INVOLUCRATA* Donn. Sm. Bot. Gaz. **37**: 209. 1904.

Tree; younger stems very thinly tomentose; leaves sessile or on petioles 5 to 10 mm. long; leaf-blades oblong-elliptic, 25 to 35 cm. long, 10 to 17 cm. wide, briefly caudate-acuminate, entire or undulate, rounded at the base, 7- to 9-ply-nerved, the inner pair arising 5 to 10 cm. from the base, glabrous above, canescent beneath with a very fine stellate tomentum; panicle pyramidal, 10 to 20 cm. long, including the long peduncle; flowers 6-merous, sessile, aggregate, when young almost concealed by broadly ovate bracts 1 cm. long; hypanthium narrowly campanulate, thick-walled, 5.5 to 6 mm. long, gray-stellate-tomentose; calyx-tube

prolonged about 1 mm.; sepals oblong, apiculate, 2 mm. long, wholly adnate to and concealed by the narrowly triangular, acuminate exterior teeth, the latter 4 to 4.5 mm. long; petals oblong, 7 mm. long; anthers subulate, 10 mm. long, the connective thickened toward the base but not appendaged; ovary 4-celled; style 17 mm. long. [Description partly compiled.]—In forests; British Honduras and Guatemala.

BRITISH HONDURAS: Stann Creek District—Middlesex, *Schipp* 377 (NY).

4. *MICONIA BELIZENSIS* Standley, Field Mus. Publ. Bot. 8: 30. 1930.

Small tree; younger stems somewhat compressed, densely brown-stellate-tomentose; petioles slender, 2.5 to 7 cm. long, stellate-tomentose; leaf-blades thin, oblong-elliptic, 12 to 24 cm. long, 4.5 to 10 cm. wide, slenderly acuminate, sharply repand-denticulate, obtuse to rounded at the base, 5-nerved, glabrous above, beneath very closely and finely brown-stellate-tomentose; panicle pedunculate, pyramidal, about 5 cm. long, stellate-tomentose; flowers 5-merous, crowded, sessile or subsessile; hypanthium campanulate, about 5 mm. long, densely stellate-tomentulose; calyx-tube nearly 1 mm. long; sepals depressed-triangular or semicircular, about 0.5 mm. long; petals and stamens unknown. [Description partly compiled.]—Endemic.

BRITISH HONDURAS: Stann Creek District—Middlesex, *Schipp* 395 (UM, NY).

Certainly very close to or conspecific with the widespread *Miconia serrulata* (DC.) Naud., better known as *M. macrophylla* (D. Don) Triana. Flowers are necessary to determine its status accurately. *M. serrulata* is exceedingly variable in its foliage and flowers. The slight differences in foliage between some of its forms and *M. belizensis* are by no means so great as the variation within the species.

5. *MICONIA DODECANDRA* (Desr.) Cogn. in Mart. Fl. Bras. 14⁴: 243. 1887.

Melastoma dodecandra Desr. in Lam. Encyc. 4: 46. 1796.

Tall shrub or tree up to 10 m. tall, the young stems closely and finely brown-stellate-tomentose; petioles stout, 2 to 4 cm. long, thinly tomentose; leaf-blades firm, elliptic or oblong-ovate, 10 to 20 cm. long, 4 to 10 cm. wide, acuminate, entire, obtuse to rounded at the base, 5-nerved, glabrous above, finely and closely brown-stellate-tomentose beneath; panicle rather narrow, 1 to 2 dm. long, pubescent like the stem, with two superposed branches at each node; bracts obovate, canescent externally, 5 to 8 mm. long, early deciduous; flowers mostly 6-merous; hypanthium narrowly campanulate, about 5 mm. long, canescent-stellate; calyx-tube about 1 mm. long; sepals triangular, short and irregular; petals narrowly obovate, 7 to 9 mm. long; stamens isomorphic; anthers linear-subulate, 6 to 10 mm. long, the thecae convolute; connective very briefly prolonged into 2 short ventral lobes; ovary 4- to 5-celled, mostly superior; style 10 to 12 mm. long.—In forests; southern Mexico and the West Indies to southern Brazil and Bolivia.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Lundell* 6609 (UM, NY), 6685 (UM, NY). Stann Creek District—Stann Creek Railway, *Schipp* 244 (UM, NY); near Middlesex, *Schipp* 473 (UM, NY).

6. *MICONIA HONDURENSIS* Donn. Sm. Bot. Gaz. 40: 3. 1905.

Small tree, up to 10 m. high, with glabrous stem and foliage; petioles 1 to 3 cm. long; leaf-blades firm, elliptic, 10 to 18 cm. long, 4 to 9 cm. wide, abruptly short-acuminate, entire, acute at the base, 3-plex-nerved; panicle pyramidal, long-peduncled, 1 to 2 dm. long, the branches mostly opposite; flowers 5-merous, in terminal glomerules of 3 to 5, on pedicels about 0.5 mm. long; hypanthium tubular-campanulate, 3.5 to 4 mm. long, more or less

stellate-puberulent, decreasingly so with age, the hairs 0.1 mm. wide; sepals nearly obsolete; exterior teeth minute thickenings; petals elliptic, 3.5 to 4 mm. long, concavely truncate, thinly furfuraceous; stamens isomorphic; filaments flat, 3.5 to 4 mm. long, anthers subulate, 4 to 4.5 mm. long; connective very obscurely 4-lobed and minutely glandular at the base; ovary half inferior, with very few ovules; style 9 to 10 mm. long, glabrous; stigma truncate.—In forests; Honduras and British Honduras.

BRITISH HONDURAS: Stann Creek District—Middlesex, *Schipp* 246 (UM, NY); Mullins River road, *Schipp* 186 (UM, NY).

7. *MICONIA PALEACEA* Cogn. Monog. Phan. 7: 757. 1891.

Shrub 2 to 3 m. high, the very stout branches densely bristly with long, deflexed or recurved hairs more or less flattened at the base; petioles stout, 5 to 7 cm. long, bristly like the stem; blades broadly elliptic, 3 to 5 dm. long, 2 to 3 dm. wide, abruptly short-acuminate, entire or more or less repand-denticulate, rounded at the base, 5-nerved, or 3-nerved with a pair of conspicuous marginals, above opaque, glabrous and somewhat glaucous, beneath purple-tinged, glabrous on the surface, bristly on the primary veins; panicles compact, 5 to 15 cm. long, pubescent; bracts subulate, 5 mm. long; flowers sessile, 6-merous; hypanthium narrowly campanulate, 3.4 mm. long, thinly and irregularly tomentulose with appressed hairs; calyx-tube about 0.5 mm. long, truncate or undulate, densely pubescent with long crooked hairs; sepals obsolete; petals pink, obovate, 4 mm. long, stamens isomorphic; filaments 6 mm. long; anthers subulate, 4 mm. long; connective simple; ovary 4-celled, mostly superior; style 9 to 10 mm. long, bent near the apex.—In forests; British Honduras and Costa Rica.

BRITISH HONDURAS: Toledo District—Pueblo Viejo, alt. 550 m., *Schipp* 1253 (UM, NY).

II. SECTION ADENODESMA

Flowers large for the genus, 5-merous; anthers subulate, usually strongly arcuate, more or less dimorphic, the connective expanded at the base and glandular; leaves ample, 3-nerved, sessile or nearly so, stellate-pubescent beneath.

The nine recognized species are chiefly Amazonian; only the two enumerated below enter North America.

Leaves broadest above the middle, broadly clasping at the base 8. *M. amplexans*
 Leaves broadest below the middle, tapering to a narrow base 9. *M. tomentosa*

8. *MICONIA AMPLEXANS* (Crueg.) Cogn. in Mart. Fl. Bras. 14¹: 256. 1887.

Pogonorhynchus amplexans Crueg. Linnaea 20: 107. 1847.

Tall shrub or small tree up to 8 m. high, the younger branches closely brown-stellate-tomentose; leaf-blades firm, sessile or nearly so, obovate, 2 to 4 dm. long, 1 to 2 dm. wide, broadest above the middle, rather abruptly acuminate, narrowed below to a rounded or auriculate clasping base, 3-ply-nerved, the inner pair arising 5 to 10 cm. from the base, stellate above when young, soon glabrescent, thinly stellate beneath; inflorescence narrow, 1 to 2 dm. long, thinly stellate-tomentose; hypanthium narrowly campanulate, 5.5 to 6 mm. long to the torus, densely but finely stellate-tomentose; calyx-tube prolonged 1 to 1.5 mm. to sharp sinuses; sepals 2 mm. long from the torus, the free portion semicircular; petals oblong-obovate, inequilateral, 7 mm. long; stamens slightly dimorphic; filaments stout, 5.5 or 6 mm. long, sparsely glandular-pubescent; anthers slenderly subulate, about 6 or about 8 mm. long; connective prolonged at base, curved into a half-circle, glandular-pubescent; ovary nearly free, glandular-pubescent; style 10 mm. long, glandular-pubescent below; stigma

truncate.—In forests; British Honduras; Panama; Trinidad; abundant in the upper Amazon Valley in Peru and Bolivia, always at low altitudes.

BRITISH HONDURAS: Stann Creek District—Big Creek, *Schipp* 58 (UM, NY).

For a discussion of the relation of this species to *M. tomentosa* see Bull. Torrey Club 59: 367. 1932.

9. *MICONIA TOMENTOSA* (Rich.) D. Don, Mem. Wern. Soc. 4: 316. 1823.

Melastoma tomentosa Rich. Act. Soc. Hist. Nat. Paris 1792: 109. 1792.

Tall shrub or small tree, up to 10 m. high, the stout branches roughly brown-stellate-tomentose; leaves firm but thin, sessile or short-petioled, elliptic-oblong to subrhombic, 2 to 4 dm. long, 1 to 2 dm. wide, broadest below the middle, long-acuminate, cuneate at the base, 3-ply-nerved, the lateral nerves arising 4 to 10 cm. above the base, stellate-tomentose above when young, at maturity opaque and glabrate, brown and loosely stellate-tomentose beneath; inflorescence rather slender, erect, long-peduncled, 1 to 2 dm. long, stellate-tomentose throughout, the rachis strongly angled; flowers sessile, 5-merous; hypanthium campanulate, about 4 mm. long, stellate-tomentulose; calyx-tube slightly flaring, 1.5 to 2 mm. long; sepals triangular-ovate, 1 to 1.5 mm. long; petals oblong-obovate, 7 mm. long, slightly inequilateral and retuse; stamens nearly isomorphic but differing in size; filaments 4.5 to 5 or 6.5 to 7 mm. long, glandular-puberulent; anthers subulate, 5.2 to 5.8 or 6.5 to 7.5 mm. long; connective thickened at base, prolonged ventrally into 2 glandular-pubescent lateral lobes; style 13 to 15 mm. long, sparsely glandular-puberulent.—In forests; British Honduras; Cuba; abundant at low elevations in the rain forests of northern South America as far south as Rio de Janeiro and Bolivia.

BRITISH HONDURAS: Stann Creek District—near Big Creek, *Gentle* 2650 (UM, NY). Toledo District—Jacinto, *Schipp* S-654 (NY).

III. SECTION CHAENANTHERA

Flowers 5-merous (in ours), small; stamens isomorphic; anthers linear or oblong, opening by a longitudinal ventral slit extending in some species to the base of the anther; connective prolonged below the thecae but not appendaged.

About 25 species, mostly Amazonian; the following is the only one of wide distribution.

One species, in our region 10. *M. chrysophylla*

10. *MICONIA CHRYSOPHYLLA* (Rich.) Urban, Symb. Ant. 4: 459. 1910.

Melastoma chrysophylla Rich. Act. Soc. Hist. Nat. Paris 1792: 109. 1792.

Melastoma fulva Rich.; Bonpl. Mélast. 23. pl. 11. 1807.

Miconia fulva DC. Prodr. 3: 180. 1828.

Shrub or tree 3 to 10 m. high; young branches sharply 4-angled, finely brown-lepidote, soon glabrescent; petioles stout, channeled above, lepidote, 5 to 15 mm. long; leaves opposite or in whorls of 3 or 4, the leaf-blades firm, narrowly oblong to oblong-lanceolate, 10 to 20 cm. long, 2 to 4 cm. wide, acuminate, entire or serrulate, tapering gradually below to a narrow but obtuse base, 3-nerved, smooth above with strongly impressed primaries, densely and finely lepidote beneath with reddish-brown scales; inflorescence freely branched, 1 to 2 dm. long, lepidote; flowers sessile, 5-merous; hypanthium broadly campanulate, 1.5 mm. high, densely lepidote; calyx-tube erect, 0.5 mm. wide, the sepals reduced to minute projecting teeth; petals obovate, retuse, 2 mm. long; stamens isomorphic; filaments slender, 2 mm. long; anthers oblong, 1.6 mm. long, opening by elongate clefts; connective not appendaged, prolonged straight back 0.5 mm. from the base of the thecae to the summit of the

filament; style stout, 3 mm. long; stigma truncate.—In forests; Central America, West Indies, and Amazonian South America, at low altitudes.

BRITISH HONDURAS: Stann Creek District—Mullins River road, *Schipp* 27 (UM, NY); Stann Creek Valley, *Gentle* 2646 (UM, NY).

IV. SECTION GLOSSOCENTRUM

Flowers 4- to 6-merous, mostly small; stamens usually dimorphic; anthers linear, often slightly wider toward the tip, opening by a pore as wide as the anther; connective usually prolonged below the thecae and variously lobed.

Nearly 80 species have been described, of which the majority are found in southern Brazil, only a few reaching North America. The fact that the form of the connective is duplicated in section Eumiconia indicates that the section may not be well founded.

One species in our region II. *M. longifolia*

II. *MICONIA LONGIFOLIA* (Aubl.) DC. Prodr. **3**: 184. 1828.

Melastoma longifolia Aubl. Pl. Guian. **1**: 432. pl. 170. 1775.

Shrub or small tree, up to 10 m. high; young branches acutely 4-angled, minutely furfuraceous, soon glabrescent; leaves usually in whorls of 3; petioles slender, 5 to 15 mm. long; leaf-blades oblong-lanceolate to narrowly obovate, 8 to 18 cm. long, 2.5 to 6 cm. wide, short-acuminate, entire, cuneate at base, 3-ply-nerved, glabrous or nearly so; inflorescence 5 to 15 cm. long, widely branched, the principal branches usually 4 or 6 at each node, minutely furfuraceous; flowers 5-merous, sessile or nearly so; hypanthium broadly campanulate, glabrous or nearly so, 2 to 2.5 mm. long; sepals minute, truncate or depressed-triangular; petals broadly obovate, 1.2 mm. long; episepalous anthers 1.5 to 2 mm. long, the connective prolonged below the thecae into a broadly triangular, obtuse, dorsal lobe, its lateral margins curved ventrally around the filament; epipetalous anthers 1.1 mm. long, the connective dilated at base into a broad truncate dorsal lobe; style terete, 3 to 4 mm. long; stigma truncate or punctiform.—In forests and thickets, usually at low elevations; British Honduras to Panama; St. Vincents and Trinidad; in South America southward to Bolivia and southern Brazil.

BRITISH HONDURAS: Belize District—Sibun River, *Gentle* 1391 (UM, NY), 1436 (UM, NY). Stann Creek District—Middlesex, *Schipp* 338 (UM, NY); Stann Creek Valley, *Gentle* 2665 (UM, NY).

V. SECTION AMBLYARRHENA

Flowers 4- to 8-merous, from small to large for the genus; stamens usually isomorphic with short filaments; anthers short, blunt, ovoid or oblong, 4-celled, usually minutely bent extrorsely at the apex, deeply furrowed on the ventral side.

The section is most abundantly represented in Andean South America. Comparatively few of the 120 described species enter Central America.

One species in our region 12. *M. Schlimii*

12. *MICONIA SCHLIMII* Triana, Trans. Linn. Soc. Bot. **28**: 102. 1871.

Small tree, up to 10 m. high; younger stems thinly brown-stellate-tomentose, later glabrescent; petioles slender, about 1 cm. long, tomentose like the stem; leaf-blades lanceolate, up to 17 cm. long and 7 cm. wide, usually considerably smaller, acuminate, remotely (3 to 4 mm.) denticulate and ciliate, acute at the base, 5-ply-nerved, the innermost laterals arising 1 to 3 cm. above the base, glabrous above, thinly stellate beneath; panicles 3 to 7

cm. long, divaricately branched, few-flowered; flowers 6-merous, actually sessile but apparently long-pedicelled; hypanthium broadly campanulate, 3.5 mm. long, thinly stellate; calyx-tube flaring, 2 mm. long, truncate or barely undulate, stellate within and without, the sepals obsolete; exterior teeth minute, conic, divergent; petals 10 mm. long, broadly obovate; stamens isomorphic; filaments 5 to 6 mm. long, flat; anthers oblong, blunt, 4.5 to 5 mm. long, 4-celled, opening by a minute terminal pore; ovary wholly inferior, 5-celled; style stout, glabrous, 14 mm. long; stigma capitate.—In forests; British Honduras and Guatemala to Colombia.

BRITISH HONDURAS: Toledo District—Punta Gorda, *Schipp 1032* (UM, NY).

VI. SECTION HARTIGIA

Flowers 5-merous, crowded and secund in the axils of minute persistent bracts; stamens isomorphic; anthers 2-celled, oblong to linear, all declined in one direction; ovary 3- to 5-celled, almost wholly inferior; style bent horizontally near the apex.

About a dozen species, distributed over the whole generic range. The petioles of most species are somewhat deflexed at the very base.

Calyx truncate or barely undulate.

Leaves green beneath, 2 to 2.5 times as long as wide 13. *M. ciliata*

Leaves red-purple beneath, 3 or 4 times as long as wide 14. *M. oinochrophylla*

Calyx lobed, the sepals semicircular or depressed.

Sepals ciliate, petioles pilose; stems terete or roundly 4-sided.

Cilia of the sepals several, up to 1.7 mm. long; stems, petioles, and inflorescence long-hirsute 15. *M. lacera*

Cilia of the sepals few, up to 0.3 mm. long; stems glabrous or with a few hairs around the nodes 16. *M. Schippii*

Sepals entire; plants wholly glabrous; stems square, sharply 4-angled . . . 17. *M. reducens*

13. MICONIA CILIATA (Rich.) DC. Prodr. 3: 179. 1828.

Melastoma ciliata Rich. Act. Soc. Hist. Nat. Paris 1792: 109. 1792.

Shrub 0.5 to 3 m. tall; younger branches brown, terete or roundly 4-angled, glabrous; petioles slender, 1 to 3 cm. long, usually pilose on the upper side near the apex, or setose throughout; leaf-blades firm, oblong, varying to obovate-oblong or ovate-oblong, 7 to 17 cm. long, 3 to 7 cm. wide, acute or abruptly acuminate, serrulate and conspicuously ciliate, acute, obtuse, or subrotund at base, glabrous on both sides, 3-nerved with an additional pair of marginal nerves, the primaries deeply impressed above; inflorescence pyramidal, 5 to 15 mm. long, its branches divaricately spreading; flowers 5-merous, sessile and secund; hypanthium urceolate-globose, glabrous, 2 to 2.5 mm. long; calyx-tube erect, 1 to 1.5 mm. long, truncate; exterior teeth none; petals obovate-oblong, 3 mm. long; stamens isomorphic; filaments slender, 2 mm. long; anthers stout, oblong, 1.5 mm. long; connective thickened toward the base, neither appendaged nor prolonged; ovary inferior; style 2 mm. long.—In forests, thickets, and clearings; southern Mexico and the West Indies and southward to central Brazil and Peru.

BRITISH HONDURAS: Belize District—Butcher Burn, *Bartlett 11391* (UM, NY); Manatee Pine Ridge, *Gentle 92* (UM), *111* (UM); Cornhouse Creek, *Bartlett 11299* (UM); Big Falls, *Lundell 3847* (UM); Sibun River, *Gentle 1515* (UM, NY). El Cayo District—Mountain Pine Ridge, *Bartlett 11679* (UM), *11596* (UM). Stann Creek District—Stann Creek Railway, *Schipp 182* (NY).

14. MICONIA OINOCHROPHYLLA Donn. Sm. Bot. Gaz. 40: 4. 1905.

Shrub 1 to 3 m. high, glabrous throughout; petioles rather stout, 1 to 3 cm. long, leaf-blades usually red-purple beneath, lanceolate to narrowly oblong, 12 to 22 cm. long, 3 to 7

cm. wide, acuminate, entire, minutely ciliate, acute at the base, 3-nerved with an additional submarginal pair; panicle small, few-branched, up to 10 cm. long, the 5-merous flowers secund and sessile, subtended by persistent broadly triangular bracts about 1 mm. long; hypanthium subglobose, 2 to 2.5 mm. long, minutely glandular within; calyx-tube erect, 0.2 mm. long, the sepals obsolete or nearly so; exterior teeth none; petals oblong-obovate, 2.5 to 3 mm. long, inequilateral; stamens isomorphic; filaments flat, stout, 1.6 mm. long; anthers stoutly linear, all pointing in one direction, 1.7 mm. long, opening by a very minute pore, 2-celled, the connective neither appendaged nor prolonged; ovary almost wholly inferior, 5-celled, its summit minutely glandular; style stout, 2.5 mm. long, bent at right angles distally to a punctiform stigma.—In wet forests; British Honduras, eastern Guatemala, and northern Colombia.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Barlett 11722* (UM, NY), *Lundell 6888* (UM, NY). Stann Creek District—Middlesex, *Schipp 326* (UM, NY).

15. *MICONIA LACERA* (Bonpl.) Naud. Ann. Sci. Nat. III. Bot. **16**: 152. 1851.

Melastoma lacera Bonpl. Mélast. 9. pl. 5. 1807.

Shrub 1 to 2 m. high, the stem, petioles, and inflorescence sparsely hirsute with dark purple hairs up to 10 mm. long; petioles 1 to 3 cm. long; leaf-blades thin, lanceolate to oblong-lanceolate, 7 to 15 cm. long, 3 to 6 cm. wide, acuminate, conspicuously ciliate, rounded or obtuse at the base, sparsely setose above, more or less setose beneath, especially along the veins, 3-nerved, or rarely 5-nerved; panicle usually compact and crowded, 5 to 10 cm. long, the sessile 5-merous flowers secund along the branches; hypanthium cup-shaped, 2 mm. long, glabrous; calyx-tube prolonged nearly 1 mm.; sepals depressed semicircular, 1.5 mm. long from the torus, thin, long-ciliate, the hairs up to 1.7 mm. long; exterior teeth triangular, almost wholly adnate, the free tip somewhat spreading, 0.4 mm. long, bearing a few long cilia; petals oblong-obovate, 4 mm. long, deeply retuse; stamens isomorphic; anthers oblong, 1.3 to 1.5 mm. long, the connective simple; style slender, hooked at the apex, about 3 mm. long.—In forests and thickets; Mexico to Panama; West Indies; Trinidad to Colombia and Peru; reported from Rio de Janeiro.

BRITISH HONDURAS: Stann Creek District—Mullins River road, *Schipp 14* (UM, NY). Toledo District—Toledo, *Peck 923* (NY). GUATEMALA: Dept. Peten, Monte Santa Teresa, *Lundell 2766* (UM, NY).

16. *MICONIA SCHIPPII* Standley, Field Mus. Publ. Bot. **8**: 29. 1930.

Shrub 2 m. high; branches roundly 4-angled and 4-sulcate, glabrous or with a few scattered hairs, especially at the nodes; petioles slender, 15 to 30 mm. long, long-pilose; leaf-blades thin, narrowly oblong-ovate, 11 to 22 cm. long, 4 to 9 cm. wide, acuminate, ciliate, inconspicuously serrulate, broadly rounded at the base, 5-nerved, the outer pair weaker and submarginal, sparsely short-setose above, beneath glabrous on the surface and sparsely hirsute on the nerves; inflorescence pyramidal, compact, 10 to 15 cm. long including the peduncle; flowers sessile, secund, 5-merous; hypanthium 2 to 2.2 mm. long, subglobose, glabrous; calyx-tube prolonged 0.6 mm. to broadly rounded sinuses; sepals semicircular, 1 mm. long from the torus, the free tip 0.4 mm. long, rounded, bearing a few cilia up to 0.3 mm. long; exterior teeth spreading at right angles, conic at base, ending in a slender seta, the whole 1 mm. long; petals, stamens and style as in *M. lacera*.—Endemic.

BRITISH HONDURAS: Stann Creek District—Big Creek, *Schipp 220* (UM, NY).

17. *MICONIA REDUCENS* Triana, Trans. Linn. Soc. Bot. **28**: 106. 1871.

Small tree, up to 10 m. high, glabrous throughout; younger branches square or 4-sulcate, sharply angled; petioles stout, 1.5 to 3.5 cm. long, decurved at the base and connected across the stem by an upwardly curved elevation; leaf-blades firm, somewhat shining, oblong or oblong-elliptic, 12 to 20 cm. long, 4 to 7 cm. wide, abruptly short-acuminate or apiculate, entire, acute or obtuse at the base, weakly 5-ply-nerved; panicle rather narrow, pedunculate, 15 to 20 cm. long, most of its branches opposite, the terminal half-obsolete, producing a secund cyme with sessile 5-merous flowers; hypanthium cylindric, 4 mm. long; calyx-tube prolonged 0.7 mm., slightly flaring; sepals depressed semicircular, 1.4 mm. long from the torus; exterior teeth minute protuberances; petals rose-color, oblong-obovate, 8 mm. long, retuse; stamens isomorphic; anthers oblong, arcuate, 3 mm. long; connective simple; ovary inferior, 3-celled; style thickened below, 6 mm. long, bent distally to the capitate stigma.—In forests; British Honduras and the Pacific coast of Colombia and Ecuador.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Bartlett 13083* (UM, NY). Toledo District—Camp 36, British Honduras—Guatemala boundary survey, *Schipp 1244* (UM, NY).

Previously identified from British Honduras as *M. subnodosa* Triana, a Colombian species with the leaf-blades gradually tapering to a subsessile base and connected across the stem by a straight elevated line.

VII. SECTION EUMICONIA

Flowers 5-merous (in our species), mostly small; anthers linear, straight or slightly curved, 2-celled, opening by a pore usually about half as wide as the anther; connective rarely simple, usually more or less prolonged below the thecae and variously dilated or lobed.

The largest section of the genus, with about 250 described species, distributed over the entire range of the genus but proportionately most abundant in Amazonian South America.

- Connective simple at the base, not prolonged below the thecae 18. *M. oligocephala*
- Connective not dilated at the base, prolonged straight back into a dorsal lobe 19. *M. nervosa*
- Connective of the episepalous stamens dilated at its base to the width of the thecae, decurved around the filament and prolonged below the thecae to a truncate or lobed tip, the dorsal lobe often the largest.
- Leaves pubescent or tomentose beneath.
- Leaves petioled.
- Younger stems strongly flattened and 2-edged 20. *M. argentea*
- Younger stems sharply 4-angled 21. *M. punctata*
- Leaves sessile 22. *M. impetioralis*
- Leaves glabrous on the surface beneath at maturity, usually minutely stellate-furfuraceous along the veins.
- Anthers isomorphic, but differing in size, truncate and obscurely lobed at the base; leaves obtuse to rounded at the base 23. *M. laevigata*
- Anthers dimorphic, those of the epipetalous stamens with one dorsal and two deflexed lateral lobes, those of the episepalous series with a single quadrate truncate lobe; leaves acute or obtuse at the base 24. *M. hyperprasina*
- Connective of the episepalous stamens prolonged below the thecae and dilated into a broad, oblique, cordate structure with the apex of the filament in its sinus.
- Anthers isomorphic or nearly so; leaves cinereous-tomentose beneath 25. *M. albicans*
- Anthers dimorphic, the connective of the epipetalous series prolonged at the base into two lateral lobes; leaves soon glabrescent beneath 26. *M. Chamissois*
- Connective of the episepalous stamens prolonged below the thecae into two deflexed lateral lobes.
- Leaves 3- to 5-ply-nerved.
- Panicles with few branches, subracemose, lateral branches mostly with a single terminal flower; inflorescence glabrous or nearly so 27. *M. ochroleuca*

- Panicles freely branched, the flowers numerous, mostly in terminal glomerules; leaves more or less decurrent on the petiole.
- Sepals triangular; exterior teeth triangular, nearly or quite equaling the sepals.
- Inflorescence and leaves beneath hirsute with simple hairs . . . 28. *M. ibaguensis*
- Inflorescence minutely stellate-tomentulose.
- Stigma capitate, wider than the style 29. *M. obovalis*
- Stigma truncate, no wider than the style 30. *M. prasina*
- Sepals depressed semicircular, the exterior teeth obsolete or minute thickenings only.
- Leaves 5-ply-nerved 31. *M. pteropoda*
- Leaves 3-ply-nerved 32. *M. Schlechtendalii*
- Leaves 3- to 5-nerved.
- Leaves glabrescent beneath, or thinly stellate-furfuraceous on the veins . . . 33. *M. calvescens*
- Leaves pubescent beneath with simple hairs 34. *M. Matthaei*
- Leaves densely and finely stellate-tomentose beneath.
- Ordinary well-grown foliage leaves 2 to 3 dm. long, dull yellowish brown beneath 35. *M. elata*
- Ordinary well-grown foliage leaves 1 to 1.5 dm. long, silvery or canescent beneath 36. *M. stenostachya*

18. *MICONIA OLIGOCEPHALA* Donn. Sm. Bot. Gaz. 46: III. 1908.

Small tree; younger stems much flattened, thinly and closely stellate-tomentulose, soon becoming terete and glabrous; petioles 1 to 2 cm. long, stellate-tomentulose; leaf-blades rather thick, lanceolate, 10 to 20 cm. long, 2.5 to 5 cm. wide, acuminate, minutely but sharply denticulate, gradually narrowed to the base, the two sides meeting over the petiole, 5-ply-nerved, the nerves mostly alternate, the innermost arising 1 to 2 cm. from the base, opaque and glabrous above, beneath gray with a fine, close, stellate tomentum; panicle tomentulose, 5 to 8 cm. long, including the flattened peduncle; flowers sessile, 5-merous; hypanthium cup-shaped, 2.2 mm. long, stellate-tomentulose; calyx-tube prolonged 1 mm.; sepals oblong, stellate, obtuse, 2.3 mm. long from the torus, the exterior teeth adnate almost to the end, the free tip conic, 0.4 mm. long; petals obovate, 4 to 4.5 mm. long; stamens isomorphic; anthers oblong, 3 mm. long; connective simple; style 6 mm. long; stigma truncate.—In forests; Guatemala and British Honduras.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Lundell 6608* (UM, NY), *6770* (UM, NY). Stann Creek District—Middlesex, *Schipp 232* (UM, NY).

19. *MICONIA NERVOSA* (Sm.) Triana, Trans. Linn. Soc. Bot. 28: III, in part. 1871.

Melastoma nervosum Sm. in Rees, Cycl. 23. 1819.

Herbaceous or woody, 1 to 6 m. high, the upper branches slender, densely strigose; petioles stout, strigose, 1 to 2 cm. long; leaf-blades often unequal in each pair, thin, elliptic to ovate-elliptic, acute or acuminate, distinctly cuneate at base, 5- to 7-ply-nerved, the uppermost laterals arising 3 to 8 cm. above the base; upper side sparsely pubescent on the surface, densely strigose on the primary veins; lower side softly pubescent or sericeous on the surface, strigose on the veins; inflorescence strigose throughout, short-peduncled or branching from the base, the branches rarely 2 cm. long and most flowers sessile in lateral glomerules; flowers 5-merous; hypanthium tubular-campanulate, 3.5 to 4 mm. long, densely strigose; calyx-tube prolonged about 0.5 mm.; sepals depressed-triangular, 0.2 mm. long; petals oblong-obovate, 3 to 3.5 mm. long; stamens isomorphic; filaments 2.3 to 2.8 mm. long; anthers linear, straight, 3.5 to 4 mm. long; connective not lobed, prolonged straight back into a dorsal appendage 0.2 to 0.3 mm. long; ovary three-fifths free, finely pubescent; style 6 mm. long; stigma truncate.—In forests at low elevation; abundant throughout the Amazon Valley, extending north in regions of heavy rainfall to Trinidad and southern Mexico.

BRITISH HONDURAS: Stann Creek District—Mullins River road, *Schipp* 56 (UM, NY); Stann Creek Valley, *Gentle* 2656 (UM, NY).

20. *MICONIA ARGENTEA* (Sw.) DC. Prodr. **3**: 182. 1828.

Melastoma argentea Sw. Fl. Ind. Occ. 779. 1800.

Tree or tall shrub up to 15 m. high; younger stems strongly flattened and sharply 2-edged, thinly gray-stellate; petioles stout, 2 to 6 cm. long, stellate; leaf-blades firm, broadly elliptic, 12 to 23 cm. long, 7 to 13 cm. wide, abruptly acuminate, entire to sharply toothed, obtuse to rounded at the base, 5-nerved, glabrous above with deeply impressed veins, nearly white and finally stellate-tomentose beneath; panicles freely-branched, many-flowered, 1 to 2 dm. long; flowers 5-merous, sessile; hypanthium cup-shaped, 1.6 mm. long, stellate-tomentose; sepals minute, triangular; petals obliquely obovate, 2 mm. long; stamens somewhat dimorphic; filaments slender; anthers linear, nearly straight, 2 or 2.3 mm. long, opening by a large terminal pore; connective prolonged 0.8 or 0.5 mm., curved around the filament, truncate or shallowly lobed in the larger anthers, ending in a single dorsal lobe in the smaller ones; ovary half inferior; style 4 to 4.5 mm. long; stigma capitate.—In forests; southern Mexico to Panama.

BRITISH HONDURAS: Belize District—Single Hill Creek, *Bartlett* 11329 (UM, NY); Big Falls, *Lundell* 3853 (UM). El Cayo District—Duck Run, *Bartlett* 11540 (UM); Vaca, *Gentle* 2485 (UM, NY). Stann Creek District—Stann Creek Railway, *Schipp* 41 (UM, NY); Mullins River road, *Gentle* 1890 (UM, NY). GUATEMALA: Dept. Peten, Chiche, *Lundell* 1661 (UM, NY). La Libertad, *Lundell* 2430 (UM, NY), 2536 (UM), 3084 (UM, NY), 3347 (UM, NY); *Aguiar* H. 348 (NY).

21. *MICONIA PUNCTATA* (Desr.) D. Don, Mem. Wern. Soc. **4**: 316. 1823.

Melastoma punctata Desr. in Lam. Encyc. **4**: 50. 1797.

Miconia habrolepis Standley, Field Mus. Publ. Bot. **4**: 319. 1929.

Tree, up to 20 m. high; younger stems sharply 4-angled, thinly brown-lepidote; petioles stout, 1 to 3 cm. long, lepidote; leaf-blades thick, oblong-obovate, 12 to 20 cm. long, 4 to 8 cm. wide, short-acuminate, entire, gradually narrowed to an acute base, 3-nerved with an additional pair of marginal veins, thinly stellate above when young, soon glabrescent, densely but thinly brown-lepidote beneath; panicle pyramidal, divaricately branched, 1.5 to 3 dm. long, lepidote throughout; flowers 5-merous, obscurely secund, sessile; hypanthium cup-shaped, 1.5 mm. long, densely lepidote; calyx-tube erect, 0.4 mm. long; sepals triangular, acute, 0.2 mm. long, separated by broad flat sinuses; petals obovate, about 2.5 mm. long; filaments flat; anthers linear, the thecae 1.2 mm. long, opening by a large terminal pore; connective prolonged straight back 0.4 or 0.8 mm. and irregularly 1- to 3-lobed; style 4 to 4.5 mm. long; stigma truncate.—In forests; British Honduras, Guatemala, and southward to Bolivia; also in Cuba, Hispaniola, and Puerto Rico.

BRITISH HONDURAS: Stann Creek District—Stann Creek Railway, *Schipp* 61 (UM, NY); Big Creek, *Schipp* 40 (UM, NY); Middlesex, *Record* 8772 (NY).

22. *MICONIA IMPETIOLARIS* (Sw.) D. Don, Mem. Wern. Soc. **4**: 316. 1823.

Melastoma impetiolaris Sw. Prodr. 70. 1788.

Tall shrub or small tree, the branches closely brown-stellate-tomentose; leaves sessile, oblong-obovate, often unequal in each pair, 2 to 4 dm. long, 1 to 2 dm. wide, acuminate, entire or remotely denticulate, narrowed to a cordate base, 3-nerved with an additional pair of marginals, at maturity glabrous and opaque above, cinereous and stellate-tomentose be-

neath; panicle ample, freely branched, 1 to 2 dm. long, pubescent like the stem; flowers sessile, more or less glomerate, 5-merous; hypanthium cup-shaped, 1.7 mm. long, densely stellate-tomentose; calyx-tube about 0.3 mm. long; sepals semicircular, 0.6 mm. long from the torus; exterior teeth triangular, wholly adnate, stellate-tomentose, just equaling the sepals; petals oblong-obovate, 2.5 mm. long, slightly retuse; stamens dimorphic; anthers linear, 2 or 2.6 mm. long, the connective prolonged 0.3 or 0.5 mm., its sides decurved around the filament, at the end obscurely 3-lobed or truncate; ovary half inferior, 3-celled; style 4 mm. long; stigma truncate.—In forests; Mexico and the West Indies to Bolivia.

BRITISH HONDURAS: Belize District—Gracie Rock, *Gentle 1557* (UM, NY). El Cayo District—Duck Run, *Bartlett 11543* (UM, NY). Stann Creek District—Stann Creek Railway, *Schipp 203* (UM, NY). GUATEMALA: Dept. Peten, Tikal, *Bartlett 12634* (UM, NY). Uaxactun, *Bartlett 12327* (UM, NY). Chiche, *Lundell 1660* (UM, NY). Santa Teresa, Subin River, *Lundell 2690* (UM, NY).

23. *MICONIA LAEVIGATA* (L.) DC. Prodr. **3**: 188. 1828.

Melastoma laevigata L. Sp. Pl. 559. 1753.

Small tree, the young stems slender, thinly ferruginous-stellate, soon glabrescent; petioles slender, 15 to 40 mm. long; leaf-blades thin, bright green, ovate-lanceolate to oblong, 10 to 20 cm. long, 3 to 8 cm. wide, long-acuminate, entire or obscurely repand-dentate, obtuse to rounded at the base, 3- to 5-nerved, stellate-furfuraceous on both sides when young, soon glabrescent; panicle long-peduncled, many-flowered, 8 to 15 cm. long, ferruginous-stellate; hypanthium campanulate, 1.5 to 2 mm. long to the torus, thin-walled, minutely but continuously gray-stellate; calyx-tube somewhat flaring, 0.4 to 0.5 mm. long; sepals depressed-ovate or semicircular, 0.8 to 1 mm. long from the torus, almost transparent, thinly stellate, the exterior teeth adnate to the middle of the calyx, barely divergent; petals obovate, very thin, 3 to 4 mm. long, 2 to 2.5 mm. wide; stamens nearly isomorphic; filaments 3 to 3.5 or 2.3 to 2.8 mm. long; anthers linear, about 3.5 or 2.7 mm. long, the connective curved around the style below the thecae and prolonged straight back into a truncate or obscurely lobed collar-shaped structure 0.4 to 0.7 mm. long and notably wider in the outer series of stamens; ovary 3-celled, half inferior, the summit glabrous; style slender, 6 to 7 mm. long; stigma truncate or subcapitate.—In forests and clearings; Mexico, Central America, the West Indies, where it is especially abundant, and northern South America.

BRITISH HONDURAS: Orange Walk District—Honey Camp, *Lundell 615* (NY). Belize District—Gracie Rock, Sibun River, *Gentle 1634* (UM, NY); Maskall Pine Ridge, *Gentle 978* (UM, NY). GUATEMALA: Dept. Peten, Uaxactun to San Clemente, *Bartlett 12807* (UM, NY).

24. *MICONIA HYPERPRASINA* Naud. Ann. Sci. Nat. III. Bot. **16**: 186. 1851.

A small tree, up to 8 m. high, the younger stems, petioles, inflorescence, and hypanthia thinly but closely stellate with minute brown hairs; petioles 1 to 2 cm. long; leaf-blades rather firm, narrowly oblong-lanceolate, 12 to 20 cm. long, 3.5 to 6 cm. wide, slenderly acuminate, entire or undulate, acute or somewhat obtuse at the base, 3-nerved, the sub-marginal pair often also conspicuous, glabrous above, somewhat paler beneath with lighter-colored veins; panicle freely branched, short-peduncled, up to 10 cm. long; flowers sessile, crowded in terminal cymules; hypanthium cup-shaped, thin-walled, 1.8 mm. long; calyx-tube slightly flaring, 0.5 mm. long; sepals very thin, semicircular, 0.8 mm. long from the torus; exterior teeth conic, divergent, 0.3 to 0.4 mm. long; petals obovate, 2 to 2.5 mm. long, nearly symmetrical, not retuse; stamens dimorphic; filaments slender, 3 or 2.6 mm.

long; anthers linear, 2.8 to 3 or 2.3 to 2.5 mm. long, with a terminal pore; connective of the larger anthers prolonged about 0.7 mm. into a flat, quadrate, truncate dorsal lobe, that of the smaller anthers prolonged about 0.5 mm. into a slender dorsal lobe and two short lateral lobes deflexed at right angles; ovary half inferior, 3-celled, its rounded summit glabrous; style straight, 5 to 5.5 mm. long; stigma subcapitate.—In forests and thickets; southern Mexico to Guatemala and Honduras.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Lundell 6663* (UM, NY). Stann Creek District—Stann Creek—Mullins River road, *Gentle 1917* (UM, NY); Middlesex, *Schipp 306* (NY); Big Creek, *Schipp 159* (NY). Toledo District—Toledo, *Peck 914* (NY).

25. *MICONIA ALBICANS* (Sw.) Triana, Trans. Linn. Soc. Bot. **28**: 116. 1871.

Melastoma albicans Sw. Prodr. 70. 1788.

A shrub 1 to 3 m. tall; younger branches cinereous-tomentulose, later glabrescent; petioles very stout, tomentulose, 5 to 15 mm. long; leaf-blades subcoriaceous, ovate-oblong, 7 to 15 cm. long, 3 to 6 cm. wide, obtuse to short-acuminate, entire, rounded to an emarginate or subcordate base, 5-nerved, the outer pair often weak or submarginal, arachnoid above when young, soon becoming glabrous, dark green, and shining, closely and finely cinereous-tomentulose beneath; inflorescence freely branched, 1 to 2 dm. long, cinereous or ferruginous-tomentose; flowers 5-merous, sessile and secund; hypanthium urceolate-campanulate, 2 mm. long, densely tomentose; calyx-tube prolonged about 0.5 mm., the sepals triangular, very short; petals obovate, 3 mm. long; stamens nearly isomorphic; filaments 2.5 to 3 mm. long; the anthers linear, 3 mm. long, opening by a rather large pore; connective prolonged 0.2 to 0.3 mm. below the thecae and there dilated into an oblique cordate organ, often with a dorsal spur; ovary half-inferior; style 4 mm. long; stigma capitate.—Forests, thickets, and open places; abundant from southern Mexico to Bolivia, Paraguay, and southern Brazil; also in scattered localities in the West Indies; remarkably constant in structure and habit throughout its range.

BRITISH HONDURAS: Belize District—Cornhouse Creek, *Bartlett 11295* (UM, NY); Manatee Pine Ridge, *Gentle 78* (UM); Gracie Rock Pine Ridge, *Gentle 1543* (UM, NY); Churchyard Pine Ridge, *Lundell 6946* (UM, NY). El Cayo District—Mountain Pine Ridge, *Bartlett 11862* (UM), *13115* (UM, NY); Duck Run, *Bartlett 13121* (UM). Stann Creek District—All Pines, *Schipp 546* (UM, NY). Toledo District—Ycacos Lagoon, *Peck 701* (NY).

26. *MICONIA CHAMISSOIS* Naud. Ann. Sci. Nat. III. Bot. **16**: 179. 1851.

Shrub 1 to 3 m. high; younger branches roundly 4-angled and 4-sulcate, glabrous or nearly so; petioles stout, 5 to 20 mm. long, leaf-blades firm, olive-green above when pressed, broadly oblong-ovate, 10 to 18 cm. long, 5 to 10 cm. wide, acute or short-acuminate, broadly rounded to the base, or at the very base barely cuneate and decurrent on the petiole, 3-pinnerved, minutely stellate when young, soon glabrescent; panicle pyramidal, 1 to 2 dm. long, thinly stellate, its numerous branches opposite, or rarely with 1 or 2 short additional ones from the same node; flowers 5-merous; hypanthium campanulate, 2 mm. long, thinly stellate-tomentulose; calyx-tube nearly erect, the sepals very broadly depressed-triangular, 0.5 mm. long from the torus; exterior teeth minute; petals white, obovate, 3.5 mm. long; stamens dimorphic, the anthers linear, 3.5 or 2.7 mm. long, the connective of the larger prolonged 0.6 mm. below the thecae and dilated into an oblique cordate structure nearly 1 mm. wide, that of the smaller stamens shorter, prolonged into 2 deflexed lateral lobes;

ovary half inferior, 3-celled; style 6.5 mm. long; stigma truncate.—In swamps and wet woods; British Honduras; widely distributed in South America, mostly at low altitudes, as far south as Bolivia and southern Brazil.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Barilett 11657* (UM, NY). Stann Creek District—All Pines, *Schipp 597* (UM, NY).

27. *MICONIA OCHROLEUCA* Standley, Field Mus. Publ. Bot. **11**: 138. 1932.

Small tree, nearly glabrous throughout, the younger stems olivaceous; petioles slender, 7 to 10 mm. long; leaf-blades thin, bright green, elliptic or oblong, 9 to 14 cm. long, 3.5 to 6 cm. wide, acuminate to an obtuse point, entire, acute at the base, 3-plexi-nerved, the lateral veins arising only 2 to 3 mm. above the base; panicles 3 to 5 cm. long, few-branched and subracemose, the lateral branches mostly one-flowered and jointed in the middle, 2 to 3 mm. long; hypanthium cup-shaped, strongly 10-ribbed, very minutely furfuraceous with shining hairs; calyx-tube erect, 0.2 to 0.3 mm. long; sepals triangular, acute, 0.5 mm. long from the torus, with broadly rounded sinuses; exterior teeth none; petals oblong, pale yellow, about 2 mm. long, retuse; stamens nearly isomorphic; filaments 2.6 or 2.1 mm. long; anthers linear, 2.7 or 2.4 mm. long, the connective prolonged nearly straight back into 2 flat, appressed, lateral lobes; ovary half inferior, 2-celled, its summit glabrous; style slender, 5.5 mm. long; stigma truncate.—In forests; endemic.

BRITISH HONDURAS: Stann Creek District—Middlesex, *Schipp 467* (UM, NY).

28. *MICONIA IBAGUENSIS* (Bonpl.) Triana, Trans. Linn. Soc. Bot. **28**: 110. 1871.

Melastoma ibaguense Bonpl. Mélast. 105. pl. 45. 1815.

Shrubby, 1 to 6 m. tall, the younger branches thinly stellate-tomentose and densely hirsute or villous; petioles stout, densely hirsute, 3 to 8 mm. long; leaves firm, oblong to oblong-lanceolate, 8 to 15 cm. long, 3 to 6 cm. wide, acuminate, entire or minutely serrulate, obtuse to rounded at base, 5-plexi-nerved, the veins strongly impressed above, upper surface at first stellate-pubescent, later often glabrous or sparsely setose near the midvein, lower surface sparsely pilose with simple hairs; inflorescence hirsute, divaricately branched, 1 to 2 dm. long; flowers nearly or quite sessile, 5-merous, mostly crowded toward the end of the branches; hypanthium campanulate, 2.5 to 3 mm. long, finely stellate and loosely hirsute; calyx-tube prolonged 0.7 mm.; sepals triangular from broad sinuses, 0.2 mm. long, scarious; exterior teeth triangular, equaling the sepals; petals obovate, 4 mm. long, obscurely retuse; stamens slightly dimorphic; filaments 3 to 4 mm. long; anthers linear, 3.3 or 4.2 mm. long; connective prolonged at base into lateral lobes, ovoid and somewhat deflexed in the small anthers, much broader and curved forward in the larger; ovary half inferior, its rounded summit often setose; style 7 mm. long; stigma capitate.—In forests and thickets; abundant and widely distributed from southern Mexico and Cuba southward to southern Brazil and Bolivia.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Lundell 6586* (UM, NY), 6892 (UM, NY). Stann Creek District—Sittee River, *Schipp S-187* (UM, NY). GUATEMALA: Dept. Peten, Monte Polol, *Lundell 3037* (UM, NY), 3454 (UM, NY).

29. *MICONIA OBOVALIS* Naud. Ann. Sci. Nat. III. Bot. **16**: 183. 1851.

A small tree, up to 10 m. high, the young stems conspicuously flattened and densely brown-furfuraceous; petioles stout, about 1 cm. long; leaf-blades oblong-obovate, 15 to 30 cm. long, 6 to 12 cm. wide, abruptly acuminate, entire or obscurely repand, gradually nar-

rowed to an acute base, decurrent along the petiole nearly to its base, 3-ply-nerved, the submarginal pair often also conspicuous, glabrous above, minutely furfuraceous on the veins beneath; panicle pyramidal, 1 to 2 dm. long, its branches strongly flattened, brown-tomentulose; hypanthium campanulate, 2.5 mm. long to the torus, thinly brown-stellate; calyx-tube nearly erect, about 0.5 mm. long; sepals sharply triangular, nearly 1 mm. long from the torus; exterior teeth completely adnate, slightly shorter than the sepals; petals narrowly obovate, broadly retuse, 3 to 3.5 mm. long; stamens nearly isomorphic; anthers linear, 3 to 3.5 or 2.2 to 2.7 mm. long, opening by a terminal pore, the connective briefly prolonged into two slightly deflexed lateral lobes; ovary half inferior; style slender, 5.5 to 6 mm. long; stigma capitate.—In forests; Central America and the West Indies to Brazil.

BRITISH HONDURAS: Stann Creek District—Big Creek, *Schipp* 43 (UM, NY).

The species is poorly understood.

30. *MICONIA PRASINA* (Sw.) DC. Prodr. **3**: 188. 1828.

Melastoma prasina Sw. Prodr. 69. 1788.

Shrub or small tree, 3 to 10 m. high, the younger branches obtusely 4-angled and minutely stellate-furfuraceous; petioles 5 to 20 mm. long, often winged by the decurrent leaf-base; leaf-blades firm, lanceolate to oblong, 10 to 20 cm. long, 3 to 8 cm. wide, acuminate, entire or repand, acute or acuminate at base, 3- to 5-ply-nerved, sometimes minutely puberulent when young but glabrous at maturity; inflorescence ample, 5 to 15 cm. long, its branches strictly opposite, minutely stellate-furfuraceous; flowers 5-merous, crowded toward the end of the branches, sessile or nearly so; hypanthium narrowly campanulate, 2 to 2.5 mm. long, thinly stellate; calyx-tube prolonged about 0.5 mm. its lobes triangular, 0.2 to 0.4 mm. long, acute to obtuse; petals obovate, 2.5 to 3 mm. long, scarcely inequilateral; stamens weakly dimorphic; anthers somewhat curved ventrally, 3 to 3.5 or 2.5 to 3 mm. long, the connective prolonged below the thecae into two lateral lobes which are deflexed ventrally and often somewhat spreading; ovary half inferior, 3-celled, style 5 to 6 mm. long, slightly dilated upward to the truncate stigma.—Throughout tropical America from southern Mexico and the West Indies to Paraguay and Bolivia; common and variable.

BRITISH HONDURAS: Belize District—Cornhouse Creek, *Bartlett* 11311 (UM, NY); Manatee Lagoon, *Peck* 98 (NY); Big Falls, *Lundell* 3851 (UM, NY). Stann Creek District—Stann Creek Railway, *Schipp* 81 (NY).

31. *MICONIA PTEROPODA* Benth. Hook. Jour. Bot. **2**: 314. 1840.

Shrub 1 to 4 m. high, the younger stems and inflorescence thinly but completely covered with minute chestnut-brown hairs; leaves firm, oblong-elliptic, 10 to 22 cm. long, 3.5 to 7 cm. wide, acuminate to a blunt tip, entire or barely undulate, abruptly cuneate below into a winged petiole 1.5 to 3 cm. long, the wing extending to the base, 5-ply-nerved, with an additional pair of marginal or submarginal veins, glabrous above and on the surface beneath, minutely furfuraceous on the veins beneath, especially toward the base; panicle pyramidal, 1 to 2 dm. long; flowers sessile; hypanthium cup-shaped, 2.5 to 3 mm. long to the torus, thinly but completely brown-stellate; calyx-tube erect, 0.5 to 0.6 mm. long; sepals depressed-semicircular, 0.7 mm. long from the torus; exterior teeth reduced to a thickened ring extending to the level of the rounded sinuses and minutely tuberculate opposite each sepal; petals obovate, 3 mm. long, densely furfuraceous; stamens slightly dimorphic; filaments 3 to 3.5 or 2.2. to 2.6 mm. long; anthers 3.2 to 3.7 or 2.6 to 3 mm. long, linear, with a terminal pore; connective prolonged backward into two lateral lobes, slender and rounded

in the smaller stamens, flat, truncate, and somewhat divergent in the larger; ovary half inferior, 3-celled, with glabrous summit; style 5 to 5.5 mm. long; stigma truncate.—In forests and thickets; Central America and Amazonian South America.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, *Lundell 6790* (NY), *Bartlett 11773* (UM, NY).

32. *MICONIA SCHLECHTENDALII* Cogn. Monog. Phan. **7**: 804. 1891.

A small tree, the younger stems nearly terete and almost glabrous; petioles 10 to 15 mm. long; leaf-blades firm in texture, lanceolate or narrowly oblong, broadest near the middle, 8 to 14 cm. long, 2.5 to 4 cm. wide, acute or subacuminate, entire and often somewhat revolute, cuneate to the base and decurrent as a narrow wing along the petiole almost to its base, 3-plexi-nerve, glabrous above, nearly so beneath; panicle narrow or pyramidal, 1 to 2 dm. long, its branches strictly opposite, glabrous or sparsely and minutely stellate; flowers more or less crowded in terminal cymes, sessile; hypanthium campanulate, 2.5 to 3 mm. long, very thinly stellate-puberulent; calyx-tube erect, about 0.5 mm. long; sepals thin, depressed-semicircular, 0.7 to 0.9 mm. long from the torus; exterior teeth obsolete; petals obovate-oblong, 3 to 3.5 mm. long, nearly symmetrical, not retuse, more or less erose on the covered margin; stamens nearly isomorphic, the anthers linear, nearly straight, about 3.5 and 3 mm. long, opening by a ventro-terminal pore, the connective briefly prolonged into two lateral lobes, which are more abruptly deflexed in the larger stamens than in the smaller; ovary half inferior, 3-celled, glabrous on the summit; style 6 to 8 mm. long, slightly expanded to the truncate stigma.—In forests; British Honduras, Guatemala, and southern Mexico.

BRITISH HONDURAS: Belize District—Maskall Pine Ridge, *Gentle 1354* (UM, NY). El Cayo District—Little Cocquericot, *Lundell 3845* (UM, NY). Stann Creek District—Stann Creek Railway, *Schipp 302* (UM, NY). GUATEMALA: Dept. Peten, La Libertad, *Aguilar H. 295* (UM, NY).

33. *MICONIA CALVESCENS* DC. Prodr. **3**: 185. 1828.

Small tree, the younger branches somewhat flattened, thinly gray-furfuraceous; petioles stout, 3 to 6 cm. long; leaf-blades elliptic to obovate-oblong, 15 to 35 cm. long, by about half as wide, abruptly short-acuminate, entire or undulate, rounded or obtuse at the base, 3-nerve, furfuraceous above when young, soon glabrescent, obscurely furfuraceous on the veins beneath; panicles large, divaricately branched, thinly furfuraceous; flowers aggregated in terminal and lateral glomerules; hypanthium campanulate, 2 mm. long, thinly stellate-tomentulose; calyx-tube prolonged about 0.5 mm.; sepals broadly triangular, about 0.8 mm. long from the torus; petals obovate, 2.5 to 3 mm. long, slightly inequilateral; stamens nearly isomorphic; filaments slender, 2.5 to 3 mm. long; anthers linear, 2 to 2.5 or 3 to 3.5 mm. long; connective briefly prolonged below the thecae into two deflexed lateral lobes; ovary two-thirds inferior, 3-celled, glabrous; style glabrous, 5 to 7 mm. long; stigma capitate.—In wet forests at low elevations; British Honduras; abundant in the upper Amazon valley, extending south to southern Brazil and Bolivia.

BRITISH HONDURAS: Toledo District—Temash River, *Schipp 1338* (NY).

34. *MICONIA MATTHAEI* Naud. Ann. Sci. Nat. III. Bot. **16**: 176. 1851.

Tall shrub or small tree, up to 15 m. high; young stems densely hirsute with curved-ascending hairs; petioles 1 to 2 cm. long, hirsute; leaf-blades thin, lanceolate to narrowly oblong-elliptic, 15 to 25 cm. long, 3 to 7 cm. wide, long-acuminate, entire or barely undulate,

tapering to an acute base, 3-nerved, glabrous above, short-hirsute beneath, especially on the veins; inflorescence pyramidal, 1 to 2 dm. long, many-flowered, densely hirsute; bracts subulate, nearly 1 cm. long; flowers 5-merous, sessile, almost involucred by a rosette of long hairs; hypanthium narrowly campanulate, 2.5 mm. long, thinly stellate-furfuraceous and sparsely hirsute; calyx-tube prolonged 0.5 mm.; sepals triangular, obtuse, 1.2 mm. long from the torus; exterior teeth wholly adnate, bearing at the apex a tuft of long ascending bristles; petals obovate-oblong, 3.5 mm. long; stamens slightly dimorphic; anthers 3.4 or 4.3 mm. long, the connective prolonged 0.3 mm. below the thecae, dilated into 2 truncate lateral lobes, each bearing at its margin 2 (smaller stamens) or 4 or 5 (larger stamens) glands; style 9 mm. long; stigma capitate.—In forests; British Honduras; Trinidad; upper Amazon valley of Amazonas, Peru and Bolivia; remarkably constant in structure in its three disjunct areas.

BRITISH HONDURAS: Stann Creek District—Big Creek, *Schipp* 76 (UM, NY). Toledo District—Rio Grande, *Schipp* 1118 (UM, NY).

35. *MICONIA ELATA* (Sw.) DC. Prodr. **3**: 182. 1828.

Melastoma elata Sw. Prodr. 70. 1788.

Small tree up to 10 m. high; the younger stems sharply 4-angled, thinly brown-tomentose; petioles stout, angular, 3 to 5 cm. long; blades firm, ovate-lanceolate to elliptic, 10 to 30 cm. long, 5 to 15 cm. wide, acuminate, entire or repand, broadly acute to subrotund at the base, 3- to 5-nerved, glabrous above with impressed veins, beneath closely brown-tomentose, the veins very prominent; inflorescence sparingly branched, 10 to 15 cm. long, its branches angled and tomentose like the stem; flowers sessile, 6-merous; hypanthium campanulate, about 2 mm. long, closely and finely stellate-tomentose; calyx-tube erect, prolonged about 0.5 mm., nearly truncate, the sepals nearly obsolete; petals subrotund, 1.5 mm. long; anthers isomorphic, linear, minutely 2-lobed at the base.—In forests; British Honduras, Cuba and Jamaica.

BRITISH HONDURAS: Stann Creek District—Mullins River road, *Schipp* 150 (NY).

36. *MICONIA STENOSTACHYA* DC. Prodr. **3**: 181. 1828.

Shrub or small tree, up to 6 m. tall; the slender branches strongly angled, thinly cinereous-tomentulose; petioles stout, cinereous, 1 to 4 cm. long; leaf-blades thin, oblong to ovate-oblong, 8 to 17 cm. long, 3 to 7 cm. wide, obtuse to short-acuminate, rounded at base, glabrous and somewhat shining above, thinly cinereous beneath, 3- to 5-nerved; inflorescence rather dense, 5 to 15 cm. long, cinereous; flowers 5-merous, sessile and secund; hypanthium campanulate, 3 mm. long, cinereous-tomentulose; calyx-tube very briefly prolonged, the sepals subacute, broadly sinuate-triangular; petals broadly ovate, 3 to 5 mm. long, minutely glandular-ciliate; stamens isomorphic; filaments 4 to 4.5 mm. long; anthers stoutly linear, 3.5 to 4.5 mm. long; connective barely prolonged below the thecae into 2 deflexed lateral lobes and 1 minute dorsal lobe; ovary half inferior; style 7 mm. long; stigma conic or punctiform.—In forests; from southern Mexico and Trinidad south to Bolivia and southern Brazil.

BRITISH HONDURAS: Belize District—Churchyard Pine Ridge, *Lundell* 6947 (UM, NY). El Cayo District—Mountain Pine Ridge, *Bartlett* 11930 (UM, NY). Stann Creek District—All Pines, *Schipp* 519 (UM, NY).

20. MOURIRIA Aubl.

Flowers 4- or 5-merous; hypanthium thick-walled, obconic to pyriform or hypocrateriform; sepals usually coherent in the bud, separating at anthesis nearly or quite to the torus; petals mostly yellow, ovate to lanceolate, acute or acuminate; stamens isomorphic; filaments glabrous, somewhat flattened; anthers stout, blunt, the thecae usually much shorter than the anther, each opening by a lateral longitudinal cleft; connective thickened toward the base, glandular on the back, often prolonged into a short basal or dorsal spur; ovary wholly inferior, mostly small, 2- to 5-celled, or 1-celled by disappearance of the septa; ovules few in each loculus, collateral and ascending from near the base; style slender, elongate; stigma punctiform; fruit baccate. Trees or shrubs, usually glabrous throughout, with sessile or short-petioled, 1-nerved leaves, the secondary veins obscure or obsolete, and small yellow flowers on bracted pedicels in short axillary cymes.

About 65 species have been described, most abundant in Amazonia, extending south to southern Brazil and Bolivia and north through the West Indies, whence many local endemics have been described, and Central America to southern Mexico. The species avoid high elevations. The genus is noteworthy as the sole American representative of the paleotropic tribe Memecyleae. It is probable that the phylogeny of the tribe is distinct from the rest of the family and that the similarities of structure which have led to its classification among the true melastomes are due to convergence.

Petioles 2 to 4 mm. long; leaf-blades 8 to 17 cm. long 1. *M. exilis*
 Petioles none; leaf-blades 3 to 7 cm. long 2. *M. parvifolia*

1. *Mouriria exilis* Gleason, sp. nov.

Arbor glabra; folia breviter petiolata, coriacea, oblonga vel elliptica, saepissime utrinque acuta, venis lateralibus flexuosis obscuris; flores mediocri fasciculati, pedicello pedunculum excedente; sepala quadrato-ovata, 2.5 mm. longa; petala brevissime unguiculata, late ovata; antherae 3.5 mm. longae, connectivo crasso obtuso erecto.

Tree, up to 10 m. high and 25 cm. in diameter, with rather stout grayish twigs; petioles 2 to 4 mm. long; leaf-blades thick, narrowly oblong or elliptic, rarely ovate-lanceolate, 8 to 17 cm. long, 3 to 7 cm. wide, acute, entire, mostly acute, rarely obtuse or subrotund at the base, 1-nerved, the secondary veins crooked, visible but not conspicuous, the obscure collective vein arcuate, 3 to 5 mm. from the margin; flowers in clusters of 3 to 6, the peduncles about 2 mm., the pedicels about 3 mm.; bracts broadly ovate, 1.5 mm. long, soon deciduous; hypanthium obconic, 4.5 to 5 mm. long; sepals broadly quadrate-ovate, about 2.5 mm. long; petals ovate, acute, 5 to 5.5 mm. long and almost as wide; filaments up to 15 mm. long; anthers 3.5 mm. long, the thecae two-thirds as long; spur erect, very stout and blunt, nearly 1 mm. high; ovules few; style up to 16 mm. long; stigma punctiform.

BRITISH HONDURAS: Belize District—Gracie Rock, Sibun River, *Gentle 1604* (UM, NY), 1753 (UM, NY); Churchyard Pine Ridge, *Lundell 6945* (UM, NY); Manatee Pine Ridge, *Gentle 116* (UM). El Cayo District—Mountain Pine Ridge, *Lundell 6772* (UM, NY). Stann Creek District—Stann Creek—Mullins River road, in high ridge, *Gentle 1950* (UM; NY, type); Stann Creek Railway, *Gentle 2126* (UM, NY).

Apparently related to *M. acutiflora* Naud., an Amazonian species with narrow petals and the connective prolonged straight back. It has been confused with the Guatemalan *M. cyphocarpa* Standley, in which the leaves are thin and the lateral veins conspicuous.

2. MOURIRIA PARVIFOLIA Benth. Bot. Voy. Sulphur 97. pl. 36. 1845.

Shrub 2 to 6 m. high, the twigs divaricately branched; leaves sessile, lanceolate, 3 to 7 cm. long, 1 to 3 cm. wide, acute, minutely aristate, entire, rounded or emarginate at the base, 1-nerved, the smaller veins obscure or obsolete; flowers few, the pedicels 2 to 4 mm. long, with a pair of subulate bracts 1 mm. below the summit; hypanthium campanulate, 2.5 to 3 mm. long; sepals triangular, apiculate, equaling the hypanthium; petals ovate, acuminate, 5 to 6 mm. long; filaments increasing with age to 15 mm. long; anthers 2 to 2.5 mm. long, the thecae about half as long, the stout connective prolonged into a curved-ascending spur about 0.5 mm. long; ovules about 8; style 11 to 12 mm. long; stigma punctiform.—In forests; Tepic and Oaxaca, and southward to Bolivia.

BRITISH HONDURAS: Orange Walk District—Honey Camp, *Lundell* 483 (NY). Belize District—Gracie Rock, *Gentle* 1608 (UM, NY); Maskall, *Gentle* 1247 (UM, NY); Belize-Sibun River road, *Gentle* 44 (UM). El Cayo District—Duck Run, *Bartlett* 13132 (UM); near Camp 6, *Gentle* 2591 (UM, NY). Stann Creek District—Mullins River road, *Schipp* 124 (NY); Silk Grass Reserve, *Record* 8790 (NY). GUATEMALA: Dept. Peten, La Libertad, *Aguilar H.* 272 (UM, NY); *Lundell* 2576 (UM), 2976 (UM, NY), 3078 (UM), 3471 (UM).

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XXI

The Bignoniaceae of the Maya Area

INCLUDING YUCATAN, CAMPECHE, QUINTANA ROO, CHIAPAS,
TABASCO, BRITISH HONDURAS, AND GUATEMALA

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With three plates
[Issued June 20, 1940]

THE BIGNONIACEAE OF THE MAYA AREA

INTRODUCTION

The present work is an attempt to bring together those species of Bignoniaceae thus far collected in the Yucatan Peninsula and its surrounding regions which are included in the Maya area. Recent collections from the area have been particularly rich in previously unreported species. Of the 39 recognized genera, one genus is proposed as new; included in the 61 species and three varieties here recognized, two species are apparently new to science, while six new combinations are proposed.¹

It has previously been thought that the Central American and southern Mexican species were, for the most part, distinct from those of northern South America and the West Indies. However, as more material for comparative study has become available and the variability of the lianas, in particular, could be observed, evidence for a more coherent bignoniaceous flora throughout these regions seems to exist, as might be expected of highly efficient, winged-seed-producing genera. A rather large percentage of more recently described species are apparently synonymous with West Indian and South American species. Although material is still inadequate for the complete study of a number of species, recent collectors have made a special effort to obtain much-needed fruiting specimens.

BIGNONIACEAE

Trees, shrubs or climbers, rarely herbs; branchlets terete or angled, occasionally with detachable fibrous ribs; nodes with interpetiolar glandular fields of small impressed plate-shaped glands or interpetiolar ridges, occasionally with both, rarely without either; axillary buds with the outer scales pseudostipular or frequently foliaceous; leaves usually opposite, rarely alternate, exstipulate, simple, 1-foliolate, or variously digitately or pinnately compound, in most of the lianas commonly 3-foliolate with the terminal leaflet often replaced by a 1- to 3-fid tendril; leaflets usually entire, varying greatly in size and texture depending on the age and position on the branches, glabrous, variously simple or stellately pubescent, commonly glandular-lepidote and frequently becoming punctate after the fall of the glandular scales; axiles of the lateral nerves with impressed plate-shaped glands, frequently barbate or with barbate cavities, or glabrous; inflorescence a terminal or axillary raceme, thyrse or dichasium, sometimes reduced to single flowers or a fascicle of pedicels, developing with the leaves, before the leaves or after their fall; bracts and bracteoles present, caducous; calyx gamosepalous, variable in shape and size, usually more or less campanulate or tubular, variously pubescent or glabrous, occasionally with fields of plate-shaped glands, 5-lobed, shortly or irregularly lobed, spathaceously split, or truncate and usually somewhat denticulate; corolla gamopetalous with a conspicuous tube, often narrowly cylindrical toward the base, campanulate or funnel-shaped, more or less hypocrateriform or tubular, variable in length, glabrous, glandular-lepidote or variously pubescent; limb somewhat bilabiate, the

¹ Material studied is located in the Herbarium of the Arnold Arboretum (AA), Field Museum of Natural History (F), Gray Herbarium (G), Herbarium of the University of Michigan (M), Missouri Botanical Garden (MBG), New York Botanical Garden (NY), United States National Herbarium (US), and the Herbarium of Yale University (Y). Most of this work was done while the author was at the Arnold Arboretum.

5 lobes usually imbricate, rarely valvate; fertile stamens 4, rarely 2, didynamous, the anterior pair the longer, usually inserted below the middle of the tube; anthers glabrous or villous, the thecae divergent, divaricate or parallel-sagitate; staminode usually very short and inconspicuous, rarely as long as the stamens; disk pulvinate to cupuliform or nearly patelliform, seldom lacking; ovary bilocular, rarely unilocular; ovules numerous, attached within each loculus to two axile placentas, or parietal in genera with unilocular ovaries; style simple with two usually lamelliform stigmas; fruit capsular, bivalved, either septicidally dehiscent and septifragal or loculicidally dehiscent and occasionally septifragal, or baccate and indehiscent; seeds usually compressed, often transversely oblong with broad membranaceous and hyaline, firm and corky or hairy wings, or thick and wingless, embedded in pulp.

Woody trees, shrubs or lianas.

Fruit gourd-like or berry-like, indehiscent.

Trees or shrubs, never climbing; fruit large, gourd-like; calyx caducous.

Leaves alternate, simple.

Flowers fasciculate on bracteate short-shoots on old wood; fruit ellipsoid or oblong, costate; ovary 2-celled 1. AMPHITECNA

Flowers solitary or few-fasciculate, terminating branchlets or in the axils of leaves on young wood; fruit subglobose or oval, smooth; ovary incompletely 2-celled 2. ENALLAGMA

Leaves fasciculate or opposite, simple or compound.

Calyx irregularly cleft or bilabiate; fruit globose or oval, with a thick, hard pericarp; plants without spines 3. CRESCENTIA

Calyx spathaceous, splitting along one side; fruit elongate, cylindrical, with a fleshy pericarp; plants usually armed with stout spines 4. PARMENTIERA

Climbers by rootlets, at least when young; fruit small, berry-like, more or less immersed in a somewhat accrescent calyx; leaves simple, opposite 5. SCHLEGELIA

Fruit capsular, dehiscent.

Trees or shrubs, without tendrils; loculicidally dehiscent capsules (except *Astianthus*).

Leaves simple; fruit septicidal 6. ASTIANTHUS

Leaves compound.

Leaves bipinnately compound; fruit suborbicular 7. JACARANDA

Leaves palmately or simply pinnately compound; fruit elongate, cylindrical.

Leaves palmately compound.

Fruit smooth, ecostate; calyx large, coriaceous 8. TABEBUIA

Fruit costate.

Anthers glabrous; flowers large, over 4.5 cm. long 9. CYBISTAX

Anthers pilose; flowers small, under 2 cm. long 10. GODMANIA

Leaves simply pinnately compound.

Stamens included; native plants 11. TECOMA

Stamens exerted; introduced, cultivated plants 12. TECOMARIA

Tendrilled lianas; septicidally dehiscent capsules.

Nodes with interpetiolar glandular fields.

Capsules more or less oblong, subterete or oval in cross section, never flatly compressed; valves convex, somewhat woody.

Tendrils trifold; calyx with impressed plate-shaped glands; flowering with mature or nearly mature leaves.

Inflorescence a raceme; anthers villous; axillary buds 3, serially arranged 13. PACHYPTERA

Inflorescence a thyrse; anthers glabrous; axillary buds 1 14. CERATOPHYTUM

Tendrils simple; calyx without impressed plate-shaped glands; flowering in the axils of fallen leaves 15. SALDANHAEA

Capsules elongate-linear, flatly compressed; valves flat, coriaceous.

Capsules smooth, never verrucose.

Tendrils trifold, with claw-like uncate arms; corolla glabrous 16. MACFADYENA

Tendrils trifold or simple, never with uncate arms; corolla pubescent.

Anthers villous 17. LUNDIA

Anthers glabrous.

Tendrils trifold 18. PSEUDOCALYMMA

- Tendrils simple.
 - Inflorescence a large, terminal or axillary, many-flowered thyse or dichasium; calyx small, coriaceous, truncate or denticulate, pubescent 19. ARRABIDAEA
 - Inflorescence a terminal, few-flowered raceme on short, lateral branchlets; calyx thin, tubular, membranaceous, split subspathaceously, glabrous 20. NEOMACFADYA
 - Capsules conspicuously verrucose 21. SCOBINARIA
- Nodes with interpetiolar ridges, never with glandular-fields.
 - Branchlets conspicuously angled.
 - Branchlets 6- to 8-angled; tendrils trifid.
 - Stamens included; capsule ellipsoid or oblong.
 - Calyx lobed and with conspicuous interior lobe-like appendages; capsule smooth 22. AMPHILOPHIUM
 - Calyx truncate, without appendages; capsule echinate 23. PITHECOTENIUM
 - Stamens exerted; capsule compressed, elongate-linear 24. PYROSTEGIA
 - Branchlets more or less 4-angled; tendrils simple.
 - Capsule oblong to subrotund, echinate; corolla pubescent; pseudostipules never foliaceous 25. CLYTOSTOMA
 - Capsule elongate-linear, smooth; corolla glandular-lepidote; pseudostipules often foliaceous.
 - Disk absent; calyx campanulate, never spreading; corolla narrowly funnel-shaped 26. CYDISTA
 - Disk present; calyx very short, spreading shallowly cup-shaped; corolla broadly funnel-shaped 27. MUSSATIA
 - Branchlets terete or subterete, striate.
 - Flowers abnormally small (less than 1.5 cm. long); corolla conspicuously bilabiate; interpetiolar ridges V-shaped; anthers slightly exerted 28. TYNANTHUS
 - Flowers large (more than 2.5 cm. long); corolla not conspicuously bilabiate; interpetiolar ridges usually straight, never V-shaped; anthers included.
 - Calyx very large, inflated campanulate (3 to 4 cm. long), composed of a spongy tissue 29. CALLICHLAMYS
 - Calyx not very large, never inflated-campanulate.
 - Corolla glabrous; tendrils trifid with hooked, claw-like arms.
 - Tendrils with recurved arms; branchlets and petioles with very short spreading gland-tipped hairs; inflorescence a flexuous raceme 30. MARTINELLA
 - Tendrils with thickened hooked arms, not recurved; branchlets and petioles glabrous or pubescent, but without gland-tipped hairs; inflorescence a cyme or thyse, or a cluster of 1 to 3 flowers.
 - Capsule compressed-linear; pseudostipules striate, broadly concave-ovate; calyx irregularly lobed with an expanded or plicate margin 31. DOXANTHA
 - Capsule oblong, thick and woody; pseudostipules subulate; calyx spathaceously split, with a small, recurved apiculus 32. MELLOA
 - Corolla pubescent or glandular-lepidote, at least on the lobes; tendrils simple, 2-, 3- or 4-fid, the arms not hooked or claw-like.
 - Leaflets pellucid glandular-lepidote punctate below 33. STIZOPHYLLUM
 - Leaflets not pellucid-punctate.
 - Corolla pubescent only on the lobes the tube glabrous outside.
 - Calyx thin, membranaceous, loosely and shallowly cup-shaped or patelliform; tendrils simple; pseudostipules falcate-foliaceous; capsule compressed elongate-linear 34. PETASTOMA
 - Calyx campanulate, subcoriaceous, never spreading; tendrils 3- or 4-fid; pseudostipules small, not foliaceous; capsule oblong, not compressed 35. CHODANTHUS

- Corolla entirely pubescent or glandular-lepidote outside.
- Pseudostipules large, foliaceous; corolla glandular-lepidote outside; ovary ellipsoid, attenuate at the base; capsule short, ellipsoid, stipitate 36. ANEMOPAEGMA
- Pseudostipules subulate, not foliaceous; corolla densely tomentose; ovary oblong, not attenuate at the base; capsule linear or oblong, never stipitate.
- Inflorescence a many-flowered terminal dichasium; bracts small, inconspicuous; capsule elongate-linear, somewhat compressed; valves firm, coriaceous 37. PARAGONIA
- Inflorescence a narrow axillary or terminal raceme or thyrs; bracts usually large, conspicuous; capsule oblong, thick, not compressed; valves woody 38. ADENOCALYMMA
- Annual herbaceous vines; fruit an ovoid, densely uncate-spinose septicidally dehiscent capsule 39. TOURRETTIA

1. AMPHITECNA Miers

Small trees or shrubs; branchlets angulate, becoming more or less terete; nodes enlarged, pulviniform; petioles short, much enlarged, pulvinoid; leaves large, alternate, borne in a crowded position at the ends of branchlets, simple, entire and nearly sessile; flowers long-pedicellate, fasciculate on bracteate short-shoots on old wood; calyx closed in bud, splitting bilabiate in anthesis; corolla campanulate-funneliform; stamens nearly exerted; anthers glabrous; disk large, pulvinate; ovary 2-celled, 8-costate, glabrous or somewhat glandular-punctate; fruit baccate, ovoid or ellipsoid, 8-costate, with a coriaceous pericarp; seeds without wings, imbedded in pulp.

AMPHITECNA MACROPHYLLA (Seem.) Miers ex Baill., Rev. Hort. 465. 1882.

Crescentia macrophylla Seem., Hook. Journ. Bot. Kew Misc. 6: 274. 1854.

Neotuerckheimia megalophylla Donn. Sm., Bot. Gaz. 47: 258. fig. 1. 1909.

Leaves large with a conspicuously enlarged midrib, oblanceolate to oblong-oblanceolate, 30 to 80 cm. long, 6 to 16 cm. broad, obtuse to acute or acuminate, long attenuate to the base, papery, glabrous; calyx 1.5 to 2.5 cm. long, splitting bilabiate halfway to the base, somewhat glandular-lepidote; corolla 2 to 5 cm. long, greenish, glabrous; ovary oblong, somewhat punctate-glandular; fruit ellipsoid, short acuminate, with 8 unevenly spaced longitudinal ridges.—Mountainous forests of Veracruz, Tabasco, and central Guatemala; type from Teapa, Tabasco.

GUATEMALA: Dept. Alta Verapaz, Coban, alt. 1350 m., fl. May 1908, *H. von Tuerckheim* II.2278 (US syntype of *Neotuerckheimia megalophylla* Donn. Sm.); Cubilquitz, alt. 350 m., fl. September 1904, *Tuerckheim* 8723 (US syntype of *Neotuerckheimia megalophylla* Donn. Sm.); banks of Chisaxte River, below Secanquim, alt. 250 m., fl. & fr. coll. of 1905, *H. Pittier* 295 (G, NY, US); Sepacuite, fl. May 1904, *O. F. Cook* 120 (US), fl. March 1902, *O. F. Cook* & *R. F. Griggs* 158 (US), April 1902, *Cook* & *Griggs* 575 (US). Dept. Izabal, between Los Amates & Izabal, Sierra del Mico, alt. 600 m., fl. February 1908, *W. A. Kellerman* 7168 (NY).

The genus *Amphitecna* is very closely related to *Enallagma*, but apparently may be distinguished by having a definitely 2-celled ovary, flowering on peculiar bracteate short-shoots on the trunk and older branches and having its leaves clustered at the ends of the branchlets.

Further study of living material, particularly of the ovary and fruit may prove the two genera to be synonymous. According to H. Pittier, the fruits of *A. macrophylla* are "like Cacao pods of the Crillo variety" (Pittier 295).

2. ENALLAGMA Baill.

Small trees or shrubs; leaves alternate, simple, entire, very short-petiolate; flowers usually large, terminal or axillary on young wood, long pedicellate, usually solitary, occasionally in fascicles of 2 or 3; calyx closed in bud, splitting bilabiate in anthesis; corolla broadly tubular-campanulate; stamens nearly exserted; anthers glabrous; disk large, annular; ovary 1-celled or incompletely 2-celled; fruit gourd-like, smooth, subglobose or oval, indehiscent with a thick coriaceous, somewhat woody pericarp; seeds numerous, slightly compressed, without wings, embedded in pulp.

- Leaves thick, coriaceous, elliptic or obovate; calyx with scattered, impressed plate-shaped glands 1. *E. latifolia*
 Leaves thin, papery, oblanceolate; calyx without glands.
 Calyx large with a broadly rounded base, to 2 cm. in diameter, split halfway to the base 2. *E. sessilifolia*
 Calyx small, narrow, obtuse to the base, to 0.6 cm. in diameter, split to the base 3. *E. Donnell-Smithii*

1. ENALLAGMA LATIFOLIA (Mill.) Small, Fl. Miami 171. 1913.

Crescentia latifolia Mill., Gard. Dict. ed. 8. 306. 1768.

Crescentia cucurbitina L., Mant. 2: 250. 1771.

Enallagma cucurbitina (L.) Baill., Hist. Pl. 10: 24. 1888; ex K. Schum., E. & P. Nat. Pflanzenf. 4, 3b: 247. 1895.

Tree to about 15 m., 30 cm. in diameter; branchlets angulate, becoming subterete and shallowly fissured; nodes enlarged, pulviniform at the attachment of the leaves; petioles very short, pulvinoid; leaves coriaceous, elliptic or obovate, abruptly acute, cuneate to the base, 7 to 20 cm. long, 4 to 12 cm. broad, sparsely glandular-lepidote beneath; flowers greenish or somewhat purplish; calyx 1.8 to 4 cm. long, bilabiate, split nearly to the base, with a few scattered, impressed, plate-shaped glands on the upper half; corolla 3 to 6 cm. long, glandular-lepidote; ovary glandular-lepidote; fruit subglobose, 6 to 8 cm. in diameter.—Riverbanks, edges of tidal swamps and wet, low forest; southern Mexico to Venezuela and the West Indies.

TABASCO: Chiltepec, fl. February 1890, *J. N. Rovirosa* 728 (US). BRITISH HONDURAS: Belize District—Lower reach of Sibun River, on riverbank, fr. April 1935, *P. H. Gentle* 1606 (AA, M, MBG, NY); Gracie Rock, Sibun River, on riverbank, fl. December 1935, *Gentle* 1785 (AA, M, MBG, NY). El Cayo District—Mountain Pine Ridge, fl. February 1931, *H. H. Bartlett* 11767 (F, M); Mountain Pine Ridge, San Agustin, Rio Frio, on forested bank of river, fl. July-August 1936, *C. L. Lundell* 6618 (F, M, NY); Vaca, on rock in middle of the river, fr. May 1938, *Gentle* 2605 (M). Stann Creek District—All Pines, along edge of swamps, fl. March 1931, *W. A. Schipp* 734 (AA, F, G, M, MBG, NY); Melinda Pine Ridge, in pinelands, fl. & fr. January 1937, *Gentle* 1864 (AA, M, NY); Sittee River, fr. September 1930, *Schipp* 645 (AA, F, G, M, MBG, NY); S. C. Railway, open forest, swampy places, fl. November, *Schipp* S-67 (F). Toledo District—Cornejo Creek, Temash River, in swamp, st. February 1932, *J. B. Kinloch* 39 (F, Y); Temax River, st. April 1933, *N. S. Stevenson* 156 (F). Without definite locality, fl. February 1930, *S. J. Record* 8 (F, Y).

VERNACULAR NAMES: "Calabash" (*Schipp* 734); "Huiro de montaña" (*Rovirosa* 728);

"River Calabash" (*Schipp* 645); "Wild calabash" (*Gentle* 1606, 1785, *Record* 8, *Stevenson* 156).

Enallagma latifolia is characterized by having thick, leathery leaves which are conspicuously articulate to the stems. There is a great deal of variation shown both in size and shape of leaves and in the size of the flowers; however, the species apparently blooms and fruits more or less continuously throughout the year so that one might expect variation of this sort depending on the season.

2. *ENALLAGMA SESSILIFOLIA* (Donn. Sm.) Standl., *Field Mus. Bot.* **18**: 1120. 1938.

Tabebuia sessilifolia Donn. Sm., *Bot. Gaz.* **25**: 156. 1898.

Neotuerckheimia gonoclada Donn. Sm., *Bot. Gaz.* **47**: 259. 1909.

Tree up to 8 m. with a short, thick trunk; leaves papery, almost sessile, oblanceolate to oblong-oblanceolate, short acuminate, long attenuate to the very short, thickened petiole, 15 to 30 cm. long, 3.5 to 7 cm. broad, glandular-lepidote above and below; flowers whitish or yellowish green; calyx 2 to 4 cm. long, bilabiate, split about halfway to the base, glabrous; corolla 3 to 6.5 cm. long, sparsely glandular-lepidote; ovary glandular-lepidote; fruit ellipsoid or oval, about 15 cm. long and 10 cm. in diameter.—Mountain forests of Chiapas, central Guatemala, and central Costa Rica.

CHIAPAS: Mt. Ovando, fl. April 1937, *E. Matuda* 1818 (M). GUATEMALA: Dept. Alta Verapaz, Quebradas Secas, alt. 770 m., in jungle, fl. October 1920, *H. Johnson* 867 (US).

From *E. latifolia*, this species may be easily distinguished by its oblanceolate leaves of papery texture, by the calyx which splits only halfway to the base, and by its apparently restricted mountain habitat. The type specimens of *Neotuerckheimia gonoclada* Donn. Sm. (*Tonduz* 7384) and *Tabebuia sessilifolia* Donn. Sm. (*Tonduz* 7937), both collected in Costa Rica, have been borrowed from the U. S. National Herbarium. Although the specimens are in poor condition, they apparently agree with the Chiapas and Guatemalan material at hand. Characters of the calyx, leaves, and the apparently incomplete 2-celled ovary indicate a close affinity to *Amphitecna macrophylla* and may possibly, upon further detailed study of adequate material, prove the present plant to be a linking species between *Amphitecna* and *Enallagma*.

3. *ENALLAGMA DONNELL-SMITHII* (Sprague) Standl., *Field Mus. Bot.* **12**: 361. 1936.

Crescentia Donnell-Smithii Sprague, *Bull. Herb. Boiss. ser. 2.* **6**: 376. 1906.

Small tree with very slender branches; nodes not enlarged; leaves papery, oblanceolate, acute-acuminate, attenuate to the base, 7 to 16 cm. long, 1.5 to 4 cm. broad, sparsely glandular-lepidote above and below; flowers solitary, usually axillary, calyx split nearly to the base, narrow, bilabiate, one lobe being minutely 3-dentate, the other 2-dentate, 1.2 to 1.7 cm. long, glabrous; corolla 2.5 to 3 cm. long, tube very narrow, short and expanding to the base, the limb spreading, sparsely glandular-lepidote; disk annular to about 1 mm. high; ovary densely glandular-lepidote.—Known only from the type locality of central Guatemala.

GUATEMALA: Dept. Alta Verapaz, Cubilquitz, alt. 350 m., fl. March 1901, *H. von Tuerckheim* 7953 (US cotype of *Crescentia Donnell-Smithii* Sprague).

Specimens of *E. latifolia* which have rather narrow leaves and small flowers have been frequently associated with *E. Donnell-Smithii*; however, the habit of the plant, the texture and shape of the leaves, the small calyx and differently shaped corolla of this plant seem to set it off as distinct from any material of the variable *E. latifolia* which I have seen.

3. CRESCENTIA L.

Small or medium-sized trees; branchlets angled when young, becoming somewhat terete; nodes prominent, appearing much enlarged with age; leaves simple or trifoliolate, spirally arranged, usually produced in fascicles on short-shoots in the axils of fallen leaves; inflorescence of 1 to 3 pedunculate flowers from the nodes on the old wood; calyx large, subcoriaceous, deeply split or variously lobed; corolla broadly campanulate, the tube very broad, transversely plicate below the middle on one side, lepidote or glandular-lepidote outside; lobes broadly deltoid-triangular, somewhat acuminate; stamens somewhat exserted; anthers glabrous; disk very large, hemispherical-pulvinate; ovary 1-celled, ovoid-ellipsoid, densely glandular-lepidote; fruit large, gourd-like, globose or ovoid with a hard, corky pericarp, pulpy within; seeds somewhat flattened, without wings, embedded in the pulp.

Leaves simple 1. *C. Cujete*
 Leaves trifoliolate 2. *C. alata*

1. CRESCENTIA CUJETE L., Sp. Pl. 626, 1753.

Small tree to about 7 m.; leaves simple, cuneate-oblanccolate or spatulate, rounded to shortly acuminate or cuspidate, attenuate to the base, variable in size; petioles very short, grading into the leaf; minutely glandular-lepidote below and sparsely so above; main veins more or less pilose below; calyx 1.5 to 2.5 cm. long, deeply split, somewhat glandular-lepidote and with some scattered, small impressed glands; corolla yellowish white, usually with a greenish tinge and dark purplish veins, 4.5 to 7.5 cm. long, glandular-lepidote; fruit variable in size, up to 25 cm. in diameter, punctate.—Tropical America; widely cultivated both in the American and Old World tropics.

YUCATAN: Izamal, fl. coll. of 1917, cultivated, *G. F. Gaumer & Sons 23804* (F, US). Merida, fl. June 1865, *A. Schott 521, 521a* (F). Progreso, fl. April 1901, *E. A. Goldman 672* (US). Silan, fl. April 1895, *Gaumer 437* (AA, F, G, MBG, NY, US). Hoco, fl. April 1917, *Gaumer & Sons 23773* (F, US). Without definite locality, st. coll. of 1937, *Morris Steggerda 19c* (F); st. coll. of 1938, *Steggerda 56* (F). CAMPECHE: Champoton, st. January 1901, *Goldman 542* (US). CHIAPAS: Cheala, st. December 1906, *G. N. Collins & C. B. Doyle 109* (US). BRITISH HONDURAS: Belize District—Pine Ridge, Belize, st. January 1931, *H. H. Bartlett 11212* (M, US). Corozal District—without specific locality, fl. coll. of 1931-32, *P. H. Gentile 618* (M). Orange Walk District—near Honey Camp, st. coll. of 1930, *Wm. C. Meyer 23* (F). El Cayo District—Little Mountain Pine Ridge, fl. May 1931, *Bartlett 13103* (M, US); San Antonio, fl. May 1931, *Bartlett 13048* (M). GUATEMALA: Dept. Alta Verapaz, Cubilquitz, alt. 350 m., fl. August 1904, *H. von Tuerckheim 8724* (US). Dept. Amatitlan, Finca Santa Emilia near Pacaya, alt. 970 m., st. March 1931, *J. Bequaert 32* (G). Dept. Escuintla, Managua, alt. 120 m., fl. April 1890, *J. D. Smith 2096* (G). Dept. Peten, La Libertad, in clearing, fl. April 1933, *C. L. Lundell 2325* (AA, M); La Libertad, fl. May 1933, *Lundell 3279* (AA, M). Dept. Quiche, El Rabinal, fl. June 1904, *O. F. Cook s.n.* (US).

VERNACULAR NAMES: "Calabash" (*Meyer 23*); "Calabash tree" (*Gentile 618*); "Guïro" (*Gaumer 437*); "Huas" (*Gaumer 437, Schott 521*); "Huaz" (*Steggerda 19c*); "Huiros" (*Meyer 23*); "Jicara" (*Gaumer & Sons 23804*); "Luch" (*Steggerda 56*).

ECONOMIC USES: The shells of the fruits may be seen almost universally throughout Mexico and Central America used for numerous kinds of kitchen utensils, particularly cups, bowls, and bottles, many of which are ornamented with shallowly carved designs. The wood is reported to be tough and strong, but not durable. Pulp of the fruit is used in various ways for domestic medicine and is reported to have laxative, emollient, astringent, and

expectorant properties. The sap, which almost immediately blackens the blade of a machete, is said to be a black dye for silk.

Crescentia Cujete, as all species of plants which have been cultivated from time immemorial, presents a great deal of variation. The leaves are variable in size; the corollas, particularly the corolla lobes, are not uniformly shaped or crispate; while the fruits show the greatest amount of variation in shape and present an amazing spectacle when seen growing together on the same tree.

2. *CRESCENTIA ALATA* H. B. K., Nov. Gen. & Sp. **3**: 123. 1819.

Crescentia trifolia Blanco, Fl. Filip. ed. 1. 489. 1837.

Parmentiera alata (H. B. K.) Miers, Trans. Linn. Soc. Bot. **26**: 166. 1868.

Tree 3 to 12 m., leaves trifoliolate, rarely simple or forked in transitional stages; petioles long, broadly winged, resembling a leaflet; leaflets sessile, linear or narrowly obovate, 2 to 9 cm. long, obtuse to rounded, base cuneate, coriaceous, somewhat lepidote beneath; calyx bilabiate, deeply cleft, 1.5 to 2 cm. long, glabrous; corolla 6 to 7 cm. long, greenish and purplish brown or reddish; fruit about 5 to 12 cm. in diameter.—Low mountainous regions; from Baja California and Sonora to Guatemala and El Salvador.

CHIAPAS: Near Acala, st. December 1906, *G. N. Collins & C. B. Doyle 107* (US). GUATEMALA: Dept. Alta Verapaz, hills between Cajval and Cahabon, alt. 400 m., fl. May 1905, *H. Pittier 212* (NY, US); Cahabon, st. April 1904, *O. F. Cook 95* (US). Dept. Jalapa, El Rancho, alt. 300 m., fl. January 1908, *W. A. Kellerman 7050* (F, NY). Fiscal, alt. 700 m., on top of mountains, fl. May 1909, *C. C. Deam 6065* (F, G, MBG, NY, US).

VERNACULAR NAME: "*Morro*" (*Collins & Doyle 107, Deam 6065*).

Fascicled trifoliolate leaves with broadly winged, leaf-like petioles facilitate the recognition of this species.

4. *PARMENTIERA* DC.

Trees or shrubs; branchlets subterete, usually armed with a spine at each node subtending the leaves; nodes ampliate into the spines; leaves opposite or subopposite, alternate on young branchlets, trifoliolate, frequently simple on young branchlets, usually a fascicle of 3 in the axils of the spines; petioles usually narrowly winged, at least near the apex; flowers large, greenish, solitary or fasciculate from the nodes on old wood, or terminating branchlets; calyx spathaceous, closed in bud, splitting on one side in anthesis and soon falling, minutely glandular-lepidote; corolla dilated, campanulate, somewhat curved; limb subbilabiate; stamens somewhat exerted; anthers glabrous; disk large, pulvinate; ovary oblong, glandular-lepidote; fruit elongate, subcylindrical, indehiscent with a fleshy pericarp, smooth or costate, greatly shrinking with drying; seeds small, numerous, not winged, embedded in pulp.

Fruit short, thick and costate; leaflets mostly acute and entire, about 5 to 7 cm. long . . . 1. *P. edulis*
Fruit long, slender and nearly smooth; leaflets usually rounded, toothed, 1.5 to 3 cm. long . . . 2. *P. aculeata*

1. *PARMENTIERA EDULIS* DC., Prod. **9**: 244. 1845.

Small tree; branchlets with stout, incurved spines at the nodes; leaves minutely lepidote, with long, narrowly winged petioles; leaflets entire, elliptic to obovate, acute, base cuneate, 4 to 8 cm. long; axils of the lateral nerves with a conspicuous barbellate cavity on the lower surface; flowering in fascicles at the nodes of old wood, or axillary at or near the ends of branchlets; calyx 2.5 to 3.5 cm. long; corolla 5 to 6.5 cm. long; fruit 11 to 17 cm. long, 2 to 3 cm. in diameter, much larger when not dried, broad at the base, gradually narrowing to the apex, conspicuously curved, conspicuously costate.—Growing up to about 1350 m. above

sea level; a native of lower Mexico and northern Central America; frequently cultivated.

YUCATAN: Izamal, fl. & fr. October 1916, *G. F. Gaumer & Sons 23440* (F, MBG, NY, US). Merida, Quinta del Obispo, cult.?, fl. & fr. March 1865, *A. Schott 242* (F). Mugeret Isl., street in Dolores, cult.?, st. coll. of 1895, *C. F. Millspaugh 30* (F). CAMPECHE: Apazote, fl. & fr. December 1900, *E. A. Goldman 575* (US). TABASCO: Laguna de la Polvora, fl. May 1888, *J. N. Rovirosa 171* (US). BRITISH HONDURAS: El Cayo District—Roaring Creek, st. August 1929, *C. L. Lundell 340* (F); Cocquericot, fr. March 1931, *H. H. Bartlett 12037* (F, M, NY); Water Hole near Vaca, fl. & fr. April 1938, *P. H. Gentle 2433* (M). Toledo District—Rio Grande, along riverbank, alt. 75 m., fr. March 1933, *W. A. Schipp 1146* (AA, F, M, MBG, NY). Without definite locality, fl. coll. of 1926, *H. W. Winzerling III.9* (US, Y). GUATEMALA: Dept. Alta Verapaz, Cajabon, fl. December 1904, *G. P. Goll 148* (US); road from Cajabon, fl. April 1902, *O. F. Cook & R. F. Griggs 681* (US); Panzos, alt. 50 m., fl. & fr. May 1905, *H. Pittier 353* (US). Dept. Chiquimula, San Jose de la Orada, near Chiquimula, fl. January 1907, *Pittier 1860* (US). Dept. Guatemala, Chinautla, alt. 1212 m., fl. & fr. May 1892, *J. D. Smith 2691* (G, US); Jardin Botanico, Guatemala City, cult., st. March 1938, *M. F. Barrett s.n.* (NY); Pinula, near Guatemala, fl. July 1860, *S. Hayes s.n.* (G). Dept. Peten, Yaxha-Remate road, fl. & fr. March 1933, *C. L. Lundell 2079* (F, M). Dept. Santa Rosa, Santa Rosa, alt. 910 m., fl. & fr. May 1892, *Heyde & Lux 3109* (G, US).

VERNACULAR NAMES: "*Cow okra*" (*Winzerling III.9*); "*Cruceillo*" (*Rovirosa 171*); "*Cuajilote*" (*Pittier 353*); "*Cuijilote*" (*Heyde & Lux 3109*); "*Juajilote*" (*Goll 148*); "*Cat*" (*Gaumer & Sons 23440, Schott 242*); "*Pepina*" (*Millspaugh 30*).

ECONOMIC USES: The tree is cultivated for both its fruit and shade. The fruit is edible either raw or cooked and is frequently used as food for livestock. It is reported to be used as a remedy for colds.

2. *PARMENTIERA ACULEATA* (H. B. K.) Seem., Bot. Voy. Herald 183. 1854.

Crescentia aculeata H. B. K., Nov. Gen. & Sp. 3: 123. 1819.

Shrubs or small trees, 2 to 6 m.; branchlets with stout spines at the nodes; leaves whitish glandular-lepidote and short pubescent above and below, with naked or narrowly winged petioles; leaflets small, irregularly dentate, broadly orbicular-spathulate, apex rounded, 1.5 to rarely 5 cm. long; inflorescence of rarely more than one flower and flowering usually at the ends of the branchlets; calyx to 2.5 cm. long; corolla 4 to 4.5 cm. long; fruit about 18 to 30 cm. long, 1 to 1.5 cm. in diameter, long acute to the apex, cuneate to the base, smooth or inconspicuously ribbed when dry.—Apparently limited in distribution to the forests of Yucatan and Campeche.

YUCATAN: Merida, fl. & fr. August 1865, *A. Schott 382, 382a* (F). Izamal, fl. & fr. coll. of 1895-96, *G. F. Gaumer 338* (AA, F, MBG, NY, US). Suitan, forests, fr. May 1916, *Gaumer & Sons 23289* (F, G, MBG, NY, US). Suitan, in woods, fl. & fr. October 1916, *Gaumer & Sons 23439* (F, MBG, NY, US). Without definite locality, fl. *Gaumer 1613* (F); st. *Schott s.n.* (F, US). CAMPECHE: Chan Laguna, fr. December 1931, *C. L. Lundell 1021* (F, M, MBG, NY, US).

VERNACULAR NAMES: "*Catcuuc*" (*Gaumer & Sons 23289*); "*Catcuuc el silvestre*" (*Gaumer & Sons 23439*); "*Xcat-cunc*" (*Gaumer 338, Schott 382*).

This species has been confused with *P. cereifera* Seem., a spineless species from Panama, which bears its flowers and fruit in clusters on the trunk and large branches. *P. aculeata* on the other hand bears its flowers and fruit, usually singly, at the terminal ends of branchlets. It seems to be distinct from but closely related to *P. edulis*, apparently differing in its longer and more slender, ecostate fruit and the irregularly dentate, smaller leaflets. The wood is reported to be very hard and heavy.

5. SCHLEGELIA Miq.

Erect or scandent shrubs, usually epiphytic, climbing by rootlets when young; branchlets subterete; leaves simple, opposite, coriaceous and shining; pseudostipules small, in subulate pairs; inflorescence a terminal thyrs or axillary raceme; calyx tubular-campanulate or campanulate, truncate, irregularly lobed or subulate-dentate; corolla hypocrateriform, tubular or campanulate, large or small, thick and fleshy with a glabrous tube; limb minutely papillose or nearly glabrous outside; stamens included; anthers glabrous; disk none or adnate; ovary bilocular, ovoid, divided near the middle by a horizontal ridge; fruit baccate, subglobose, small with a crustaceous pericarp, partially immersed in the accrescent calyx; seeds small, wingless, surrounded by pulp.

Branchlets glabrous; calyx truncate or shallowly lobed 1. *S. nicaraguensis*
 Branchlets setose; calyx with 5 long, subuliform teeth 2. *S. cornuta*

1. SCHLEGELIA NICARAGUENSIS Standl., Trop. Woods 16: 44. 1928.

A large scandent shrubby liana; branchlets glabrous; leaves oblong-elliptic to slightly obovate, abruptly, usually short acuminate, base obtuse to acute, 8 to 18 cm. long, 3 to 8 cm. broad, subcoriaceous, minutely glandular-lepidote becoming punctate with age; petioles short and conspicuously enlarged; inflorescence axillary, of very much condensed racemes or thyrses in the axiles of fallen leaves on older wood; calyx 10 to 12 cm. long, nearly as wide, truncate and minutely denticulate to shallowly lobate, puberulent below, sparsely so above; corolla about 4.5 cm. long, glabrous, yellowish and shading to lavender above; ovary ovoid, glabrous, smooth above and below the horizontal ridge.—Forested mountains of southwestern Guatemala and northwestern Nicaragua.

GUATEMALA: Dept. Suchitepequez, Finca Moca, in forest, alt. 1230 m., fl. January 1935, *A. F. Skutch* 2083 (AA); Finca Moca, alt. 1140 m., fl. January 1935, *Skutch* 2116 (AA, F).

VERNACULAR NAME: "*Coralmeca*" [*Englesing* 99 (F) type from Nicaragua].

The type specimen, located at Field Museum, has been seen and apparently agrees very well with the Guatemalan material. None of the specimens seen is in fruit.

2. SCHLEGELIA CORNUTA Donn. Sm., Bot. Gaz. 18: 6. 1893.

Epiphytic, somewhat procumbent climber by rootlets; branchlets pilose and covered with numerous small setose tubercules; leaves obovate, obtuse to rounded, base cuneate into a short petiole, 6 to 10 cm. long, 3 to 4 cm. broad, thick, coriaceous; inflorescence axillary and terminal, few flowered; calyx to 1.2 cm. long including the subulate teeth, 0.7 cm. long; corolla evenly cylindrical, 3.5 to 4 cm. long, slightly pilose; fruit about 1 cm. long with the same diameter, glabrous.—Known only from the type locality in the mountains of western Guatemala.

GUATEMALA: Dept. Quiche, San Miguel Uspatan, alt. 2424 m., fl. & fr. April 1892, *Heyde & Lux* 3044 (G, US type).

6. ASTIANTHUS D. Don

Trees; stems terete; leaves simple, ternately whorled, linear; pseudostipules small, subulate; inflorescence terminal, composed of loose paniced cymes and thyrses; calyx campanulate, triangulate-dentate, with plate-shaped glands on the upper half, nearly glabrous; corolla funnel-shaped, pubescent on the upper one-third, otherwise glabrous; anthers glabrous, sagittate; disk cupular; ovary constricted at the base, oblong; fruit small, a linear, slightly oblong, cylindrically, septicidally dehiscent capsule; valves coriaceous, without a median longitudinal nerve; seeds small, transversely suboblong with broad whitish-hyaline wings.

ASTIANTHUS VIMINALIS (H. B. K.) Baill., Hist. Pl. **10**: 44. 1888.

Bignonia viminalis H. B. K., Nov. Gen. & Sp. **3**: 103. 1819.

Astianthus longifolius D. Don, Edinb. Phil. Journ. **9**: 262. 1823.

Tecoma viminalis (H. B. K.) Hemsl., Biol. Cent. Am. Bot. **2**: 497. 1882.

Tree, reported up to 15 m.; bark grayish white, fissured; stems terete, glabrous; leaves attenuate to each end, 13 to 28 cm. long, densely brownish glandular-lepidote, becoming punctate above and below; pseudostipules to 3 mm. long; inflorescence bracts very narrow, linear, to 8 mm. long; flowers yellow; calyx breaking away from below the disk after the corolla falls, about 0.8 cm. long, minutely and sparsely pubescent, with pallid plate-shaped glands on the upper half; corolla 4 to 5 cm. long, tomentellous on the upper one-third outside, otherwise glabrous; anthers glabrous, sagittate; disk cupular; ovary glabrous; capsule 6 to 9 cm. long, 8 to 9 mm. broad, glabrous; seeds 2 mm. long, 6 mm. broad, with white hyaline wings.—On sand bars along rivers; Colima to Oaxaca, Puebla, Veracruz, and southern Guatemala.

GUATEMALA: Dept. Santa Rosa, Agua Caliente, fl. December 1908, *W. A. Kellerman 7006* (NY). Dept. Zacapa, Gualan, on rocky sand bars of Motagua River, alt. 185 m., fl. & fr. June 1909, *C. C. Deam 6265* (AA, F, G, M, MBG, NY, US).

7. JACARANDA Juss.

Trees; branchlets subterete; leaves impari- or pari-bipinnate; pseudostipules not evident; inflorescence a terminal or axillary thyrse; calyx tubular-campanulate, nearly truncate, or shallowly cup-shaped with acute, deltoid teeth; corolla funnel-shaped or campanulate-funnel-shaped, the tube conspicuously contracted towards the base, densely pubescent to nearly glabrous outside; stamens short, with the staminode very long and far exceeding the stamens, variously glandular-tipped pubescent, often densely and long-tufted; anther thecae very unequal, the anterior one extremely reduced, the posterior one polliniferous, glabrous; disk pulvinate or stoutly stipitiform; ovary ovoid or ovoid-ellipsoid, usually glabrous; fruit a shortly and broadly oblong, woody, compressed, smooth, loculicidally dehiscent capsule; septum very narrow; seeds broadly transversely elliptic or suborbicular, with broad membranaceous hyaline wings.

JACARANDA COPAIA (Aubl.) D. Don, Edinb. Phil. Journ. **9**: 267. 1823.

Bignonia Copaia Aubl., Pl. Guian. **2**: 650. *pl.* 265 & *pl.* 261, *fig.* 1. 1775.

Medium-sized tree, about 30 m.; branchlets usually conspicuously smooth, drying purplish black, glabrescent; nodes somewhat flattened, expanding and enlarged with a conspicuous articulation at the attachment of the leaves; rachis angular; rachis of the pinnae not winged; leaflets 3 to 25 on each pinna, elliptic, ovate-elliptic or oblong, obtuse to shortly acuminate, base cuneate, usually conspicuously unequal-sided, 2.5 to 7 cm. long, 1.5 to 3.5 cm. broad, usually drying brownish purple, conspicuously punctate above and below, usually sparsely and minutely pubescent on the midrib below; inflorescence of very large thyrses, borne among the leaves; flowers light blue; calyx 4 to 6 mm. long, truncate with obscure, broadly obtuse, very short lobes, densely short pubescent and glandular-lepidote; corolla 3 to 4.5 cm. long; limb shortly stellately pubescent; tube glabrous; disk small, shortly pulvinate; ovary shiny, glabrous; capsule rounded at the apex when mature, 8 to 14 cm. long, 5 to 8 cm. broad, glabrous; seeds nearly suborbicular, to 2.5 cm. long, 4 cm. broad; wings interrupted by a distinct sinus at the point of attachment, hyaline except for membranaceous veins which extend out from the body.—Wet forests of British Honduras, Nicaragua, Costa Rica, Panama and northern South America.

BRITISH HONDURAS: Toledo District—Rio Grande, in forest, alt. 75 m., February 1933, fl. *W. A. Schipp 1133*, fr. 1152 (AA, F, M, MBG, NY). Without definite locality, st. *James Heyden s.n.* (Y).

VERNACULAR NAME: "*Samarapa*" (*Heyden s.n.*).

ECONOMIC USES: A light, soft but firm wood with a straight, medium grain, suitable for boxes and light interior construction.

This tree is one of the most beautiful in Central America. Blooming in February or March, usually before the leaves appear, it becomes a mass of blue flowers. The large leaves attain a length of nearly 1.5 m.

8. TABEBUIA Gomes ex DC.

Usually deciduous trees; leaves simple or unifoliolate, or palmately 3- to 5- and occasionally 7-foliolate, glabrous, pubescent, glandular-lepidote or pubescent and glandular-lepidote; leaflets petiolulate, entire or dentate, the lateral ones being somewhat smaller; inflorescence terminal or axillary, varying from loose panicles to dense heads, or reduced to one flower, having rather small, more or less caducous bracts; calyx campanulate or tubular, unequally 5-lobed to bilabiate, glabrous to glandular-lepidote or pubescent, or both; corolla straight or partly incurved, the limb spreading, slightly bilabiate, glabrous, glandular-lepidote, punctate, or occasionally variously pubescent on the outer surface; stamens included; anthers glabrous with divergent locules; disk annular-pulvinate or cupuliform, occasionally slightly lobed; ovary linear to linear-oblong, glabrous to glandular-lepidote, pubescent or both; fruit an elongate-linear or somewhat oblong-linear, subterete, ecostate, pendant and septicidally dehiscent capsule; seeds broadly winged with hyaline or nearly opaque wings.

Calyx and leaves densely whitish glandular-lepidote, never with hairy pubescence . . . 1. *T. pentaphylla*
Calyx pubescent; leaves pubescent, at least in the axiles of the lateral nerves.

Flowers reddish or lavender; calyx mealy-pubescent; corolla tube pubescent . . . 2. *T. Palmeri*

Flowers yellow; calyx stellately pubescent; corolla tube glabrous.

Young branchlets glandular-lepidote; inflorescence open; flowers all blooming together; calyx sparingly short stellately pubescent . . . 3. *T. Guayacan*

Young branchlets stellately pubescent; inflorescence congested; flowers not all blooming together; calyx densely pubescent with barbate hairs and some stellate hairs . . . 4. *T. chrysantha*

1. TABEBUIA PENTAPHYLLA (L.) Hemsl., Biol. Cent. Am. Bot. 2: 495. 1882.

Bignonia pentaphylla L., Sp. Pl. ed. 2. 870. 1763.

Tecoma rosea Bertol., Fl. Guat. 25. 1840.

Tecoma pentaphylla (L.) Juss. ex DC., Prod. 9: 217. 1845.

Tabebuia rosea (Bertol.) DC., Prod. 9: 215. 1845.

Couralia rosea (Bertol.) Donn. Sm., Bot. Gaz. 20: 9. 1895.

Tecoma evenia Donn. Sm., Bot. Gaz. 20: 8. 1895, partim.

Large tree to 25 m.; branchlets glandular-lepidote; leaves 5- rarely 3-foliolate; petioles nearly as long as the longest leaflets; petiolules articulated to the blade; leaflets subcoriaceous, variable in size, 10 to 25 cm. long, elliptic-oblong to elliptic-ovate, or somewhat elliptic-obovate, acute to acuminate, base rounded or acute, densely whitish or tannish glandular-lepidote above and below; axils of the basal lateral nerves with plate-shaped glands, never barbate; inflorescence large, open, glandular-lepidote; flowers purplish pink or nearly white; calyx bilabiate, 1.5 to 2 cm. long, closed in bud, splitting in anthesis, densely glandular-lepidote; corolla 6 to 8.5 cm. long, glabrous, the margins of the lobes ciliate; ovary conspicuously and densely tannish glandular-lepidote; fruit acuminate-attenuate to each end, about 30 cm. long and 1.2 cm. in diameter, densely glandular-lepidote, with the calyx more

or less persistent throughout the development of the capsule.—In clearings, open forests, swamps and low hills; Mexico to Venezuela and the West Indies.

CAMPECHE: Tuxpeña, fl. February 1932, *C. L. Lundell 1317* (F, G, M, MBG, NY, US). TABASCO: San Juan Bautista, fl. March 1888, *J. N. Rovirosa 131* (US). CHIAPAS: Escuintla, fl. February 1936, *E. Matuda 1087* (AA, NY). San Pedro, fr. April 1930, *C. D. Mell 648* (US). BRITISH HONDURAS: Belize District—Belize—Sibun road, fr. coll. of 1931–32, *P. H. Gentle 58* (F, M); Belize, occupied clearing, fl. May 1933, *C. L. Lundell 4210* (F, M); lower Belize River, fl. February 1926, *S. J. Record BH46* (US, Y); Maskall, fl. April 1934, *Gentle 1189* (AA, F, M, MBG, NY). Stann Creek District—Stann Creek, in open forest, fl. May 1931, *W. A. Schipp 730* (AA, F, G, M, MBG, NY). Toledo District—Toledo, in forest, fl. May 1907, *M. E. Peck 917* (G, NY). GUATEMALA: Dept. Baja Verapaz, San Jeronimo, alt. 290 m., fl. May 1924, *G. Salas 496* (US). Dept. Guatemala, Guatemala, alt. 1480 m., fl. May 1923, *M. Ruano 425* (US). Dept. Izabal, Morales, fl. March 1907, *W. A. Kellerman 6638* (F); vic. Quirigua, in swamps and pastures, alt. 75–225 m., st. May 1922, *P. C. Standley 24147, 24609* (G, NY, US). Dept. Peten, Uaxactun, fl. March 1931, *H. H. Bartlett 12340* (AA, F, M, NY); La Libertad, occupied clearing, fl. & fr. May 1933, *Lundell 3282* (F, M). Dept. Santa Rosa, Santa Rosa, alt. 750 m., fl. March 1892, *Heyde & Lux 3110* (G, MBG, US type of *Tecoma evenia* Donn. Sm.); Teocinte, alt. 750 m., fl. March 1892, *Heyde & Lux 3111* (G, US); Agua Caliente, fl. January 1908, *Kellerman 7717, 7722* (F). Dept. Solola, near Patalul, fl. February 1906, *Kellerman 5784* (US). Dept. Zacapa, Los Limones, 2 mi. east of Gualan, fl. January 1927, *S. J. Record & H. Kuylen G.127* (US, Y); Entre Rios, fl. March 1926, *H. Kuylen G.57* (F, NY, US, Y); Santa Inez, fr. May 1927, *C. Galusser 15* (US, Y). Without definite locality, fl. coll. of 1892, *E. T. Heyde 260a* (US).

VERNACULAR NAMES: “Maculiz” (*Rovirosa 131*); “Madera de ebanisteria” (*Salas 496*); “Maquelis” (*Kuylen G57*); “Matilisquate” (*Galusser 15, Ruano 425, Salas 496*); “May bush” (*Schipp 730*); “May flower” (*Gentle 58, 1189, Record B.H.46*); “Roble cinero” (*Mell 649*).

ECONOMIC USES: An important commercial timber tree in parts of Mexico and Central America. The wood is brownish with a fine dark brown striping, strong, durable, easy to work and saw, holds its place well after being manufactured and is of the same hardness as mahogany. Seventy-five per cent of the tree can be utilized. The lumber is used for furniture and cabinet work in general, house building, interior trim, piers, boats, paddles and many other purposes.

Being one of the best known and most useful trees in Central America, *T. pentaphylla* presents an unrivaled beauty in the spring months when the trees are covered with their pale pinkish purple to almost white flowers. The description of *Tecoma rosea* Bertol. indicates that the species is synonymous with *Tabebuia pentaphylla*, but the fruit is described as being “tomentose.” Donnell Smith, in his new combination *Couralia rosea*, cites a Heyde & Lux specimen, no. 3111, which I have seen, and in which the ovary is densely glandular-lepidote, which is typical for *T. pentaphylla*. It is quite possible that the dense tannish glandular-lepidote condition of the fruit was mistakenly called “tomentose.”

The type specimens of *Tecoma evenia* Donn. Sm., *Heyde & Lux 3110*, are represented by flowering specimens and unattached leaves. The leaves seem unquestionably those of *T. pentaphylla* and do not belong to the flowering specimens, which are *T. chrysantha*, which blooms without leaves. Indications are that the leaves were picked from the ground and happened to represent *T. pentaphylla*, most likely growing near by. This possibility of mistake is apparently further evidenced by the fact that the next collection number of Heyde & Lux, no. 3111, is the specimen of *Tabebuia* previously discussed under *Couralia rosea*.

2. *TABEBUIA PALMERI* Rose, Contr. U. S. Nat. Herb. **1**: 109. *pl. 11*. 1891.

Tabebuia nicaraguensis Blake, Contr. Gray Herb. no. **52**: 95. 1917.

Large tree; branchlets glabrous, but mealy-pubescent at the terminus; leaves usually 5-foliolate; petiolules conspicuously articulated to the blade; leaflets oval-oblong to oval-lanceolate or slightly obovate-lanceolate, acutely acuminate, base cuneate to cuneate-rotund, glandular-lepidote above and below and somewhat puberulus below, especially along the veins and in the axiles of the lateral nerves, apparently becoming more pubescent as the leaves become older; inflorescence densely farinose-tomentulose; flowers appearing before the leaves, light mauve at the base, with white and yellow patches; calyx 5 to 8 mm. long, abundantly mealy-pubescent or farinose-tomentulose; corolla 5 to 7 cm. long, shortly puberulus; disk pulvinate, slightly lobate; ovary glabrous; fruit to 37 cm. long and 2.2 cm. in diameter, with the calyx soon falling, glabrous; seeds about 1.7 cm. long and 5 cm. broad; wings hyaline.—In open woods, preferring mountains and drouth; Sonora to Nicaragua.

CHIAPAS: San Pedro, fr. April 1930, *C. D. Mell 649* (US). GUATEMALA: Dept. Zacapa, Gualan, fl. January 1927, *S. J. Record & H. Kuylen G. 117* (US, Y).

VERNACULAR NAMES: "*Cortez colorado*" (*Record & Kuylen G. 117*); "*Roble cinero*" (*Mell 649*).

ECONOMIC USES: The wood is reputed to be resistant, rather hard, durable when exposed to moisture, and takes a good polish. It is used for building and cabinet purposes.

This species is easily recognized when in flower by the conspicuous mealy pubescence on the calyx and inflorescence and by its pubescent corolla. The leaves have a varying amount of pubescence on the under surface and are somewhat glandular-lepidote above and below, but not nearly so densely so as *T. pentaphylla*. The axiles of the lateral nerves are always puberulous, while the rest of the under surface apparently becomes more puberulous as the leaves age.

3. *TABEBUIA GUAYACAN* (Seem.) Hemsl., Biol. Cent. Am. Bot. **2**: 495. 1882.

Tecoma Guayacan Seem., Bot. Voy. Herald 180. 1854.

Large tree to 30 m.; branchlets minutely glandular-lepidote; leaves normally 5-foliolate, the lowermost lateral leaflets frequently partially and unequally divided in two; petiolules articulate to the blade; leaflets ovate, acutely acuminate, base broadly rounded to nearly truncate, minutely glandular-lepidote, especially below; axiles of lateral nerves minutely stellately pubescent; inflorescence open, somewhat stellately-rufescent; flowers all blooming at the same time, golden-yellow with conspicuous darker veins, occurring before the leaves; calyx 1 to 1.5 cm. long, with longitudinal ribs terminating at the apex of each lobe, usually punctured near the base by hummingbirds (?), somewhat minutely brownish stellately pubescent and rufescent; corolla 7 to 9.5 cm. long, glabrous except for a conspicuous stellate pubescence in the sinus of each lobe; disk cupuliform; ovary glabrous.—Low altitude forests; Tabasco to Panama.

TABASCO: San Juan Bautista, fl. May 1889, *J. N. Rovirosa 481* (US). BRITISH HONDURAS: El Cayo District—Vaca, on hilltop, fl. April 1930, *P. H. Gentle 2532* (M). Toledo District—Jacinto Creek, alt. 15 m., fl. May 1933, *W. A. Schipp 1173* (AA, F, M, MBG). GUATEMALA: Dept. Alta Verapaz, Cubilquitz, alt. 105 m., fl. March 1901, *H. von Tuerckheim 7932* (G, US). Dept. Izabal, Quebradas, in sandy loam, st. May 1919, *H. N. Whitford & L. R. Stadtmiller 44* (US, Y). Dept. Peten, La Libertad, fl. May 1933, *C. L. Lundell 3407* (F, G, M, NY, US).

VERNACULAR NAMES: "*Cortez*" (*Gentle 2532, Tuerckheim 7932, Whitford & Stadtmiller*

44); "*False lignum-vitae*" (Whitford & Stadtmiller 44); "*Guayacan*" (Rovirosa 481, Tuerckheim 7932); "*Yellow mayflower*" (Gentle 2532).

ECONOMIC USES: The species has a dense, very hard reddish brown wood which takes a high polish and is durable when exposed to weather. It is used for tool handles and wherever great strength and durability are required.

A very beautiful tree, blooming before the leaves at the end of the dry season, most often confused with *T. chrysantha*, from which it may be distinguished by its minutely and sparsely glandular-lepidote leaflets, pubescent only in the axils of the lateral nerves. The leaflets are ovate with a broadly rounded, or more often nearly truncate base, whereas the lowermost lateral leaflets are frequently partially and unequally divided in two. The open inflorescence, composed of several conspicuous 3-flowered cymes, and the conspicuous dark-colored veins in the corolla along with the large stellate pubescence in the sinus of each lobe are outstanding characters. An unusual phenomenon exists in the calyx in that it is usually punctured near the base. The cause is unknown, although hummingbirds might be considered as a possibility.

4. *TABEBUIA CHRYSANTHA* (Jacq.) Nichols., Dict. Gard. **4**: 1. 1889.

Bignonia chrysantha Jacq., Hort. Schoenb. **2**: 45. pl. 211. 1797.

Tecoma chrysantha (Jacq.) DC., Prod. **9**: 221. 1845.

Tecoma evenia Donn. Sm., Bot. Gaz. **20**: 8. 1895, partim.

Tecoma Palmeri Kraenzl., Fedde Rep. Sp. Nov. **17**: 220. 1921.

Large or small tree; young branchlets, petioles and petiolules densely short stellately tomentose; petiolules articulated to the blade; leaves 5-foliolate; leaflets broadly lanceolate or somewhat obovate to elliptic-oblong, about 10 to 18 cm. long, rather abruptly acuminate, broadly obtuse at the base, somewhat rugose, usually entire, occasionally dentate, abundantly stellately pubescent to somewhat glabrate below, less pubescent above, sparsely glandular-lepidote above and below; inflorescence congested; flowers in dense terminal head-like clusters, never all blooming at the same time; calyx 0.8 to 1.4 cm. long, 5-dentate with as many longitudinal ribs, terminating at the apex of the lobes, abundantly pubescent, varying in density and length, composed of long, short-barbate hairs and some intermixed long stellate hairs; corolla bright yellow, 5.5 to 7 cm. long, very sparsely stellately pubescent on the lobes, with some large flat, simple hairs in the sinus of each lobe; ovary with a few stellate hairs; capsules 20 to 30 cm. long, about 1.3 cm. in diameter; valves thick, becoming somewhat rugose in drying, stellately tomentose.—Low mountain forests; Mexico to Venezuela.

YUCATAN: Buena Vista Xbac, rare in forests, fl. coll. of 1895-96, *G. F. Gaumer 1048* (F, MBG). Progreso, st. coll. of 1934, *R. S. Flores s.n.*, coll. of 1936, *Flores s.n.* (F). Southeast Kancabdzonot, fl. March 1917, *Gaumer & Sons 23607* (F, US), fl. May 1917, *Gaumer & Sons 23890* (AA, F, US). Without definite locality, fl., *Gaumer 24186* (F, US), *24421* (F). **CHIAPAS:** San Vicente, fl. April 1904, *E. A. Goldman 890* (US). **BRITISH HONDURAS:** Orange Walk District—Hillbank, st. July 1928, *C. S. Brown 15* (F, Y). **GUATEMALA:** Dept. Izabal, vic. Quirigua, alt. 75-225 m., open slope, st. May 1922, *P. C. Standley 23951* (US). Dept. Santa Rosa, Santa Rosa, alt. 750 m., fl. March 1892, *Heyde & Lux 3110* (G, MBG, US type of *Tecoma evenia* Donn. Sm.).

VERNACULAR NAMES: "*Ahan-Che*" (*Flores s.n. colls. of 1934 & 1936*); "*Cortez*" (*Brown 15*); "*Xha-hua-che*" (*Gaumer 1084*).

ECONOMIC USES: The wood is brown, hard, heavy, strong, and durable, and finishes smoothly. It is used for tool handles and where strength and durability are required.

A conspicuous and brilliant bloomer, flowering before the leaves, frequently confused with *T. Guayacan*, from which it may be distinguished by its head-like inflorescence in which the flowers do not all bloom simultaneously. The conspicuous barbate hairs on the calyx furnishes a good criterion, as well as do the stellately pubescent leaves.

Examination of the type of *Tecoma evenia* Donn. Sm. (*Heyde & Lux 3110*) seems to indicate that the flowers are those of *T. chrysantha*. The unattached leaves belong to *T. pentaphylla*.

9. CYBISTAX Mart.

Small or large trees; leaves opposite or somewhat alternate, digitately 5- to 9-, mostly 7-foliolate; petioles long and striate; leaflets petiolulate; inflorescence terminal, contracted or in large open panicles or thyrses and dichasiums; flowers yellow; calyx membranaceous, campanulate, bilabiate to conspicuously 5-lobed, the lobes triangular-cuspidate or obtuse; corolla tubular-campanulate, pubescent; stamens included; anthers glabrous; disk patelliform, somewhat lobed; ovary cylindrical, stipitate or sessile, somewhat glandular-lepidote and striate; capsule linear-oblong, occasionally somewhat stipitate, conspicuously longitudinally-costate with 10 to 16 raised costae, loculicidally dehiscent, with coriaceous valves; seeds broadly heart-shaped, with a large, surrounding, ovate, thinly hyaline wing.

Cybistax Donnell-Smithii (Rose) Seibert, comb. nov.

Tabebuia Donnell-Smithii Rose, Bot. Gaz. 17: 418. pl. 26. 1892.

Large tree up to 30 m.; young stems minutely and sparingly pubescent with a somewhat stellate pubescence; leaves deciduous, mostly somewhat alternate, 5- to mostly 7-foliolate; petioles and petiolules conspicuously striate, becoming glabrate, covered with a dense, short, white stellate pubescence when young; leaflets oblong to ovate, acuminate, rounded or subcordate at the base, occasionally irregular serrate, 5 to 25 cm. long, 2 to 14 cm. broad, pubescent above and below along the nerves, becoming more or less glabrate; inflorescence a large open panicle, somewhat thyrsoid, quite densely pubescent with capitate hairs; bracts 8 mm. long, 2 mm. broad, acuminate; calyx conspicuously membranaceous and bilabiate, deeply lobed, 1.2 to 1.5 cm. long, covered with very short capitate hairs; corolla yellow, 4.5 to 6 cm. long, also pubescent with capitate hairs; disk conspicuously patelliform and somewhat lobed; ovary densely glandular-lepidote, striate, the striations continuing halfway up the style; capsule 30 to 45 cm. long, 2 to 3 cm. broad, oblong-linear, oblong in cross section, each valve with 5 or 6 costae, sparsely pubescent with very short white hairs; seeds with very thin hyaline wings.—Wet forests of southern Mexico and Central America, from Colima to Honduras.

CHIAPAS: San Pedro, fr. April 1930, *C. D. Mell 651* (US). GUATEMALA: Dept. Escuintla, Cuyuta, alt. 61 m., fl. & fr. April 1890, *J. D. Smith 2070* (US type of *Tabebuia Donnell-Smithii* Rose).

VERNACULAR NAMES: "*Copal*" (*Smith 2070*); "*Palo blanco*" (*Mell 651*); known as "*Primavera*" in the U. S. timber trade.

ECONOMIC USES: Widely employed for veneering, furniture, interior trim, and flooring.

A large timber tree, well known for its importance in the lumber industry as well as for its beauty. It appears advisable, however, to transfer it from *Tabebuia* to *Cybistax*, a genus heretofore unknown in North America. From the genus *Tabebuia* it may be distinguished by the striate ovary, the conspicuously costate fruit, and the membranaceous calyx, the texture of which is almost identical with that of the corolla. The leaves are mostly 7-foliolate.

The type of pubescence on the inflorescence, composed of capitate hairs, is rarely met with in other members of the Bignoniaceae.

10. GODMANIA Hemsl.

Medium-sized trees; leaves opposite, long petiolate, digitately 5- mostly 7-foliolate, the leaflets petiolulate, entire; flowers small, numerous in dense corymbs; calyx small, broadly campanulate, short obtusely 5-dentate; corolla campanulate-ventricose, barbate within; limb subbilabiate, the lobes broad and rounded, unequal, spreading or recurved; stamens included; anthers pilose, the locules oblong, divergent; filaments shortly pilose; staminodium capitate; disk annular; fruit a long cylindrical, costate, loculicidally dehiscent capsule with coriaceous valves; seeds with a long hyaline wing on either side.

GODMANIA AESCULIFOLIA (H. B. K.) Standl., Standl. & Calderón, *Lista Prelim. Pl. El Salvador* 200. 1925; *Contr. U. S. Nat. Herb.* **23**: 1319. 1926.

Bignonia aesculifolia H. B. K., *Nov. Gen. & Sp.* **3**: 109. 1819.

Tecoma fuscata DC., *Prod.* **9**: 218. 1845.

Tecoma (?) *aesculifolia* (H. B. K.) DC., *Prod.* **9**: 221. 1845.

Tabebuia aesculifolia (H. B. K.) Hemsl., *Biol. Cent.-Am. Bot.* **2**: 494. 1882.

Tabebuia fuscata (DC.) Hemsl., *Biol. Cent.-Am. Bot.* **2**: 494. 1882.

Godmania macrocarpa Hemsl., *Diag. Pl. Mex.* 35. 1879.

Tree, 4 to 10 m.; young stems puberulent; leaflets ovate to ovate-oblong, 5 to 17 cm. long, acute to acuminate, cuneate or attenuate to the base, shortly pilose on both surfaces, sometimes glabrate, glandular-lepidote beneath; calyx very small, 0.1 cm. long, with short pubescence; corolla 1 to 1.3 cm. long, puberulent outside; capsule about 70 cm. long, 1.5 cm. in diameter, with 16 rather small, evenly spaced costae.—Mountainous regions from Mexico to Chiapas and Campeche, Central America and Venezuela.

CAMPECHE: Camino de China, fr. coll. of 1932, *R. S. Flores s.n.* (F). CHIAPAS: Chiapa, fl. May 1904, *E. A. Goldman 1002* (US). Escuintla, fl. July 1937, *E. Matuda 1798* (AA, M, NY, US). Near Ocala, fr. December 1906, *G. N. Collins & C. B. Doyle 106* (US). GUATEMALA: Dept. Peten, Campo Zizha near La Libertad, fl. May 1934, *M. Aguilar 279* (M, NY). Dept. Santa Rosa, Rio Casillas, alt. 1300 m., fl. May 1893, *Heyde & Lux 4561* (G, US). Dept. Solola, Atitlan, fl. February 1894, *Heyde & Lux 6425* (G, US). Fiscal, alt. 1120 m., fl. June 1909, *C. C. Deam 6077* (G, US), *6090* (F, G, M, MBG, NY, US). Without definite locality, fr. January 1927, *S. J. Record & H. Kuylén G.129* (US, Y).

VERNACULAR NAMES: "*Cacho de Toro*" (*Collins & Doyle 106*); "*Ceñorita*" (*Deam 6077*); "*Hoco*," "*Joco*" (*Flores s.n.*); "*Palo blanco*" (*Record & Kuylén G.129*).

This species is frequently mistaken for a *Vitex* because of its small flowers.

11. TECOMA Juss.

Shrubs or small trees; branchlets with indistinct interpetiolar ridges at the nodes; leaves imparipinnate, occasionally simple near the base of the lateral branchlets, rarely all simple; leaflets serrate; pseudostipules small, not foliaceous; inflorescence a terminal raceme or panicle; calyx campanulate, with deltoid-triangular, often apiculate lobes; corolla campanulate-funnel-shaped or narrowly tubular-funnel-shaped; usually glabrous except for the white ciliate margins of the lobes, occasionally minutely glandular-lepidote in bud; stamens included (in Maya species); anthers pilose (in Maya species); disk shallowly cupuliform;

ovary oblong, glandular-lepidote; fruit a linear, slightly compressed, smooth, loculicidally dehiscent capsule; valves subcoriaceous; seeds oblong with broad, membranaceous, whitish wings.

TECOMA STANS (L.) H. B. K., Nov. Gen. & Sp. **3**: 112. 1819.

Bignonia stans L., Sp. Pl. ed. 2. 871. 1763.

Stenolobium stans (L.) Seem., Journ. Bot. **1**: 88. 1863.

Gelsemium stans (L.) O. Ktze., Rev. Gen. **2**: 479. 1891.

Shrub or small tree, 1.5 to 9 m. tall; trunk to 25 cm. in diameter; branchlets terete, striate, raised lenticellate, somewhat whitish glandular-lepidote when young; nodes with indistinct interpetiolar ridges; leaves imparipinnate, with 1 or 2, usually 3, pairs of leaflets; basal pair of leaves on lateral branchlets frequently simple; rachis striate, canaliculate, glandular-lepidote; leaflets lanceolate to ovate-lanceolate, sharply attenuate, acuminate, base cuneate, sharply serrate, 4 to 10 cm. long, 1 to 4 cm. broad, papery, glabrous, punctate below, slightly pilose along the veins; axiles of the lateral nerves with small, somewhat barbellate cavities; inflorescence a terminal raceme or panicle with yellow flowers; calyx 4 to 7 cm. long, with deltoid-triangular, usually apiculate or acute lobes up to 1.5 mm. long, slightly glandular-lepidote, minutely ciliate along the lobes, with some slightly impressed plate-shaped glands on the upper half; corolla funnel-shaped, 3.5 to 5 cm. long, minutely and sparingly glandular-lepidote in bud; lobes white ciliate along the edge; anthers pilose; ovary oblong, glandular-lepidote; capsule long attenuate to each end, drying brownish, 10 to 20 cm. long, slightly glandular-lepidote, shiny and yellowish lenticellate.—Widely distributed throughout tropical America; often cultivated.

YUCATAN: Chichankanab, fl. coll. of 1897-98, *G. F. Gaumer 1667* (F, MBG). Chichen Itza, fl. June 1929, *J. Bequaert 25* (AA); fl. & fr. January-February 1901, *E. A. Goldman 563* (F, US); fl. coll. of 1895, *C. F. Millsbaugh 124* (F, G); in forest, fl. & fr. June 1932, *W. C. Steere 1062* (F, M); fr. June 1932, *Steere 1340* (M). Near Piste, in forest, fl. June 1932, *Steere 1420* (M). Izamal, in brushlands, fl. & fr. coll. of 1895, *Gaumer 332* (AA, F, G, MBG, NY, US); fl. coll. of 1888, *Gaumer s.n.* (F); fl. & fr. February 1906, *J. M. Greenman 372* (F, G); fl. & fr. January 1895, *Millsbaugh 55* (F, G). Merida, alt. 0-15 m., fl. & fr. January 1913, *G. N. Collins 30* (US); fl. & fr. January 1866, *A. Schott 799* (F); fl. & fr. coll. of 1896, *P. Valdez 39* (F, G, M, MBG, NY, US). San Anselmo, fl. coll. of 1897-98, *Gaumer 1604* (F, G). CHIAPAS: near Ceopisco, fl. & fr. December 1906, *G. N. Collins & C. B. Doyle 122* (US). Tuxtla Gutierrez, fr. March 1904, *Goldman 740* (US). GUATEMALA: Dept. Amatitlan, Amatitlan, alt. 1200 m., fl. & fr. October 1904, *H. von Tuerckheim 8722* (US); near Amatitlan, fl. July 1860, *S. Hayes s.n.* (G); Laguna Amatitlan, alt. 1180 m., fl. & fr. February 1890, *J. D. Smith 1918* (G, US); Palin, alt. 1075 m., fl. & fr. February 1892, *Smith 2687* (US); San Vicente Panga, fl. April 1921, *Tonduz 485* (US). Dept. Chiquimula, Chiquimula, fl. January 1887, *Ed Selser 3391* (G, US). Dept. Guatemala, Sanarate, fl. & fr. February 1916, *E. W. D. Holway 496* (US); alt. 1480 m., fl. January 1927, *J. Morales 629* (US). Dept. El Progreso, Barranquilla, alt. 545 m., fl. March 1920, *W. Popenoe 955* (US). Dept. Santa Rosa, Naranjo, alt. 1061 m., fl. December 1892, *Heyde & Lux 4360* (G, US). Dept. Zacapa, Gualan, alt. 126 m., fl. January 1905, *C. C. Deam 383* (AA, F, G, MBG, NY, US); Gualan, alt. 122 m., fl. January 1905, *W. A. Kellerman s.n.* (F); Gualan, along railroad, transition from desert to wet lands, fl. & fr. January 1927, *S. J. Record & H. Kuylen G.110* (US, Y); vic. of Zacapa, alt. 200-400 m., fl. December 1906, *H. Pittier 1729* (US). Dept. Sacatepequez, Embaulada, alt. 1625 m., fl. & fr. December 1889, *Heyde & Lux 4551* (US). Without definite locality, fl. July 1925, *G. Bosse 8147* (F); fl. coll. of 1892, *E. T. Heyde 615* (US); fr. October 1927, *Morales 758* (US).

VERNACULAR NAMES: "*Chante*" (*Record & Kuylen G.110*); "*Flor amarillo*" (*Millspaugh 55, 124, Popenoe 955*); "*Kan lo*" (*Collins 30*); "*Kanlol-che*" (*Steere 1340*); "*Timboque*" (*Morales 629, 758*); "*Xkanlol*" (*Gaumer 332, Millspaugh 55, 124, Valdez 39*).

The present species is used to a considerable extent for hedges and is cultivated as an ornamental shrub or small tree throughout Central America. The wood is apparently of little economic value.

TECOMA STANS var. *VELUTINA* DC., *Prod.* **9**: 224. 1845.

Tecoma mollis H. B. K., *Nov. Gen. & Sp.* **3**: 112. 1819.

Stenolobium molle (H. B. K.) Seem., *Journ. Bot.* **1**: 90. 1863.

Gelsemium molle (H. B. K.) O. Ktze., *Rev. Gen.* **2**: 480. 1891.

Usually a shrub, 2 to 5 m.; branchlets when young more or less densely pubescent; leaflets broadly lanceolate to ovate, whitish tomentose beneath, with the midvein and lateral veins slightly short-pubescent, seeming glabrous in comparison with the under surface.—High mountain slopes are apparently the most frequent habitat; Mexico to Bolivia.

CHIAPAS: Comitán, fl. & fr. April 1904, *E. A. Goldman 908* (US). GUATEMALA: Dept. Guatemala, Agua Caliente, fl. & fr. March 1922, *J. M. Greenman & M. T. Greenman 5963* (G). Dept. Huehuetenango, Chacula, fl. September 1896, *Ed. Seler 3215* (G, US); hedgerow, alt. 2060 m., fl. September 1934, *A. F. Skutch 1153* (AA, F); San Miguel Actán, on bushy mountain side, alt. 1880 m., fl. August 1934, *Skutch 1010* (AA, F). Dept. Quetzaltenango, near Zumil, alt. 1800-2100 m., fl. February 1905, *Wm. R. Maxon & R. Hay 3600* (US). Dept. Quiché, San Miguel Uspantán, alt. 1818 m., fl. April 1892, *Heyde & Lux 3050* (G, US). Dept. Sacatepequez, Antigua, fl. January 1915, *E. W. D. Holway 75* (US); Volcan Acatenango, alt. 2121 m., fl. August 1892, *W. C. Shannon 3601* (US). Without definite locality—fl. coll. of 1892, *E. T. Heyde 279* (US); alt. 1480 m., fl. May 1923, *M. Ruano 409* (US); alt. 1480 m., fl. & fr. July 1923, *G. Salas 513* (US).

VERNACULAR NAMES: "*La Aurora*," "*Timboc*" (*Salas 513*).

The species is a very variable one with nearly every possible gradation from a glabrous to densely tomentose condition. *T. mollis* has usually been considered as a distinct species but in a few cases, on the other hand, has been placed in synonymy with *T. stans*. The densely tomentose underleaf surfaces unquestionably give the plant a different aspect from the glabrous, typical *T. stans*; however, it does not seem to merit specific rank, and the acceptance of DeCandolle's varietal name for the conspicuously pubescent specimens appears advisable.

12. *TECOMARIA* Spach.

Erect or scandent shrubs; leaves imparipinnate; leaflets serrate; inflorescence terminal, racemose or thyrsoid with the lateral flowers of each cyme somewhat reduced or aborted; calyx campanulate, 5-dentate; corolla somewhat curved, with a long and narrow tube, tapering to the base; stamens exserted; anthers glabrous; disk annular-cupuliform; ovary glabrous; fruit a somewhat oblong, linear capsule, dehiscent loculicidally; valves thin, coriaceous, with a conspicuous median longitudinal rib; seeds transversely oblong with hyaline wings.

TECOMARIA CAPENSIS (Thunb.) Spach, *Hist. Veg. Phan.* **9**: 137. 1840.

Bignonia capensis Thunb., *Prod. Pl. Cap.* 105. 1800.

Tecoma capensis (Thunb.) Lindl., *Bot. Reg.* **13**: pl. 1117. 1828.

A rather large drooping shrub; leaflets 7 to 9, ovate to broadly elliptic, 1.5 to 3 cm. long, acute to shortly acuminate, serrate, slightly pubescent above and below; veins pilose, the

axiles of the lateral nerves densely tomentose; calyx minutely pubescent; corolla orange-red, 4 to 5 cm. long, glabrous outside; capsule linear, to about 11 cm. long, 0.8 cm. in diameter, attenuate-acuminate to each end, with a persistent calyx.—A native of South Africa; cultivated in the higher altitudes of tropical America, where it occasionally has become naturalized.

GUATEMALA: Without definite locality, alt. 1480 m., fl. February 1927, *J. Morales* 637 (US).

VERNACULAR NAME: "*Julia*" (*Morales* 637).

13. PACHYPTERA DC.

Tendrilled lianas; branchlets tetragonal or subtetragonal; ribbed and striate; nodes with conspicuous interpetiolar glandular fields, the fields also being very evident at the nodes on the inflorescence and at the apex of each petiole; leaves 2- or 3-foliolate, the terminal leaflets often replaced by a trifid tendril; axillary buds usually 3, arranged serially, producing a conspicuous row of superposed, subulate, tan-colored pseudostipules, the upper pair being the longest; inflorescence an axillary or terminal raceme; calyx narrowly campanulate-truncate, lobed or denticulate, densely short puberulus, with large plate-shaped glands on the upper half; corolla narrowly funnel-shaped, thin, short-puberulus outside; lobes with rows of glands outside; stamens included; anthers densely villous; staminode villous-tipped; disk pulvinate; ovary elliptic-oblong or oblong-linear, 4-angled, pubescent; fruit an oblong or somewhat oblong-linear, attenuate or apiculate, thick, subcylindrical, loculicidally dehiscing capsule; valves smooth, with or without a distinct median, longitudinal nerve, puberulous and dotted with immersed plate-shaped glands; seeds transversely oblong; wings somewhat corky, of the same color as the body, with a narrow hyaline margin.

PACHYPTERA KERERE (Aubl. emend. Splitg.) Sandw., Recueil Trav. Bot. Neerland. **34**: 219. 1937.

Bignonia Kerere Aubl., Hist. Pl. Guiane **2**: 644. t.260. 1775; emend. Splitg., Tijdschr. Nat. Geschied. en Phys. **9**: 8. 1842.

Pachyptera foveolata DC., Prod. **9**: 175. 1845.

Adenocalymna (?) *brachybotrys* DC., Prod. **9**: 202. 1845.

Adenocalymma foveolatum (DC.) Baill., Hist. Pl. **10**: 7. ff. 9-16. 1888.

Adenocalymma foveolatum (DC.) K. Schum., Engl. & Prantl, Nat. Pflanzenf. **4**, 3b: 214. fig. 89, F-G. 1894.

Adenocalymma Kerere (Aubl.) Bur. & K. Schum., Mart. Fl. Bras. **8**, 2: 119. 1896, partim.

Adenocalymna symmetrica Rusby, Descr. Three Hundred New Sp. Am. Pl. 122. 1920.

Tanaecium Zetekii Standl., Contr. Arnold Arb. **5**: 140. pl. 19. 1933.

Tendrilled lianas; branchlets somewhat puberulous when young, becoming glabrous, with the outer cortex peeling off; nodes with glandular fields and a straight interpetiolar ridge above the glands; leaves 2- or 3-foliolate; petioled with glandular-fields at their apex; petiolules conspicuously articulated to the blade; leaflets ovate to ovate-lanceolate, usually acuminate, base rounded, but always slightly cordate, 9 to 18 cm. long, 3 to 11 cm. broad, papery, minutely and slightly glandular-lepidote below, otherwise glabrous, except for the minutely puberulous veins; pseudostipules sharp-pointed, subulate, serially arranged in 3 pairs, to 7 mm. long; inflorescence short and scarred, about 5 cm. long, with glandular fields at the nodes; internodes very much condensed; flowers white or creamy white, long and narrow; calyx 7 to 11 cm. long, densely short puberulous, with large plate-shaped glands in longitudinal rows on the upper half; corolla 5.5 to 8 cm. long, minutely, rather densely puberulous outside; lobes with two irregular rows of conspicuous glands near the base,

extending down slightly on the tube; anthers densely white-villous; disk pulvinate, 1 mm. long; ovary elliptic, 4-angled, minutely and densely pubescent; capsule 10 to 25 cm. long, 2 to 3.8 cm. broad, minutely dense brownish pubescent with scattered immersed glands.—Rain forests from British Honduras to Amazonian Brazil.

BRITISH HONDURAS: Toledo District—Jacinto Creek, Machaca, on creek bank, alt. 15 m., fl. May 1933, *W. A. Schipp* 5561 (F). GUATEMALA: Dept. Izabal, vic. Quirigua, alt. 75-225 m., fl. May 1922, *P. C. Standley* 24003 (G, US).

14. CERATOPHYTUM Pittier

Tendrilled lianas; branchlets terete, striate; nodes with distinct interpetiolar glandular fields; leaves trifoliolate or bifoliolate with a trifid tendril; pseudostipules indistinct; inflorescence a terminal subcorymbose thyrses; calyx coriaceous, campanulate, truncate, occasionally minutely denticulate, densely glandular-lepidote, with sunken glands on the upper half; corolla funnel-shaped, tomentellous outside, white or somewhat yellowish; stamens included; anthers glabrous; disk pulvinate; ovary oblong-linear, densely lepidote; fruit a smooth, thick, oblong-linear, horn-shaped, septically-dehiscing capsule, with a gibbously thickened base and tapering to the apex; seeds transversely oblong with broad membranaceous, translucent wings having a hyaline margin.

CERATOPHYTUM TOBAGENSE (Urb.) Sprague & Sandw., Kew Bull. 322. 1933.

Anemopaegma tobagense Urb., Fedde Rep. Sp. Nov. 14: 311. 1916.

Ceratophytum brachycarpum Pittier, Journ. Wash. Acad. Sci. 18: 65. 1928.

Adenocalymna heterophyllum Standl., Field Mus. Bot. 8: 49. 1930; non Kraenzl., 1915.

Adenocalymna Standleyanum Lundell, Carnegie Inst. Wash. Publ. 478: 221. 1937.

Branchlets glandular-lepidote, having greatly enlarged leaf scars where the leaves have fallen; leaves 3-foliolate except when the terminal leaflet is replaced by a recurved-trifid tendril; petioles about 3 or 4 times as long as the petiolules; leaflets ovate to usually ovate-elliptic, occasionally slightly obovate, obtusely to acutely short-acuminate, base cuneate to rounded, or subcordate, 6 to 15 cm. long, 4 to 8 cm. broad, thinly coriaceous, becoming coriaceous with age, somewhat glandular-lepidote, otherwise glabrous; axils of the lateral veins with conspicuous, somewhat barbellate cavities; flowers white, occasionally with a yellowish throat; calyx 0.9 to 1.2 cm. long, coriaceous, densely glandular-lepidote, with fields of somewhat sunken glands on the upper half; corolla 6.5 to 8 cm. long, tomentellous outside; disk pulvinate, 0.5 mm. high; style densely glandular-lepidote near the base; ovary linear-oblong, somewhat longitudinally ridged when dry, glandular-lepidote; capsule up to 28 cm. long and 3.5 cm. broad, tan to pale cinnamon-colored with a median longitudinal rib or shallow furrow, dotted with immersed plate-shaped glands; seeds 1.5 cm. long and about 4 cm. broad.—Forested regions of Yucatan, Tabasco, Campeche, British Honduras, Venezuela, British Guiana, Trinidad, and Tobago.

YUCATAN: Buena Vista Xbac, in forests, fl. April, *G. F. Gaumer* 1098 (F, G, US). Southeast Kancabdzonot, fl. May 1917, *Gaumer & Sons* 23889 (F type of *Adenocalymna heterophyllum* Standl., MBG, US). Without definite locality, in the mountains, fr. April 1934, *Roman S. Flores s.n.* (F). CAMPECHE: Tuxpeña, infrequent, fl. February 1932, *C. L. Lundell* 1323 (F). TABASCO: San Juan Bautista, fl. June 1889, *J. N. Roviroso* 512 (US). BRITISH HONDURAS: Belize District—Maskall, fl. May 1934, *P. H. Gentle* 1258 (F, NY). COROZAL District—fr. coll. of 1931-32, *Gentle* 397 (F, M); San Andres, fr. July 1933, *Gentle* 4819, 4990 (M).

VERNACULAR NAMES: "Aguijon" (Flores); "Duppy beans" (Gentle 397).

15. *SALDANHAEA* Bur.

Tendrilled lianas; branchlets subterete, with interpetiolar glandular fields at the nodes; leaves 3- to 5-foliolate, or 2-foliolate and terminated by a simple tendril; inflorescence of dense thyrses borne in the axils of fallen leaves; bracts subulate, caducous; calyx campanulate, somewhat turbinate, truncate or subulate-dentate, velutinous; corolla membranaceous, campanulate-funnel-shaped, minutely stellately pubescent; tube straight; stamens included; anthers glabrous, divaricate-recurved; disk annular-pulvinate, somewhat lobed; ovary tetragonous, glandular-lepidote; style cylindrical or tetragonous; fruit an elongate or oblong, somewhat compressed, thick, rugose, septicidally dehiscent capsule; valves woody; seeds transversely and broadly oblong; wings hyaline.

SALDANHAEA SEEMANNIANA O. Ktze., Rev. Gen. **2**: 480. 1891.

Distictis Rovirosana Donn. Sm., Bot. Gaz. **20**: 7. 1895.

Adenocalymna cocleense Pittier, Contr. U. S. Nat. Herb. **18**: 255. 1917.

A deciduous, somewhat shrubby liana, seldom with tendrils; branchlets somewhat tetragonous when young but soon becoming subterete, densely tomentose becoming glabrescent; leaves 3-foliolate except when tendrilled, then 2-foliolate, usually appearing with or very soon after the flowers; petioles and petiolules densely furfuraceous-tomentellous; leaflets oblong-ovate to obovate or oval, caudate-acuminate, base obtuse to rounded or very shallowly cordate, papery, densely stellate-canescens when young, becoming somewhat glabrate except along the veins; pseudostipules triangular, to 3 mm. long; bracts and bractlets linear, boat-shaped, tomentellous outside, glabrous inside, to 7 mm. long; flowers pink, whitish toward the base; calyx 5 to 7.5 cm. long, truncate, 5-costate, the costae extending beyond, forming mucronulate teeth, somewhat tomentellous, margin ciliate; corolla 4.5 to 5.5 cm. long, shortly stellately pubescent; disk 1 mm. high; style tetragonous; ovary ovoid, slightly pubescent near the base, glandular-lepidote above; fruit oblong, smooth, becoming somewhat rugose when dry, 9 to 12 cm. long, to 5 cm. broad; seeds 2.5 cm. long and 4.5 cm. broad, body shortly pubescent; wings hyaline.—Along riverbanks and light forest; Tabasco and British Honduras to Venezuela, Colombia and Trinidad.

TABASCO: Near Atasta, fl. & fr. May 1889, *J. N. Rovirosa* 488 (US type of *Distictis Rovirosiana* Donn. Sm.). BRITISH HONDURAS: El Cayo District—Water Hole, near Vaca, on hillside, fl. April 1938, *P. H. Gentle* 2444 (M, MBG); Vaca, on riverbank, fl. May 1938, *Gentle* 2594 (M, MBG). GUATEMALA: Dept. Escuintla, Obero, alt. 61 m., fl. March 1892, *J. D. Smith* 2689 (G, US); Hda. Las Fianzas, alt. 80 m., fl. March 1923, *G. Salas* 372 (US partim.). Dept. Peten, Chimah, fl. May 1933, *C. L. Lundell* 3436 (F, G, M, US); El Paso, fl. April 1932, *Lundell* 1554 (M).

VERNACULAR NAMES: "*Pie de Gallo*" (*Rovirosa* 488); "*Pink bell*" (*Gentle* 2594).

The fruit of this species, unattached in the type specimen of *Distictis Rovirosana* Donn. Sm. (*Rovirosa* 488), has never been described for *Saldanhaea Seemanniana* and does not exactly fit the description of the few fruits of other species of *Saldanhaea* that have been made. However, I have seen specimens of *S. Seemanniana* growing in Panama that were in fruit and agree well with (*Rovirosa* 488). The only variation, however, seems to be in the shape of the fruit, that of *S. Seemanniana* being more or less oblong, while those of other species are described as elongate, the texture of the valves and the seeds in general being the same. There seems to be no important difference in the habit, flowers, method of flowering, calyx or inflorescence and there is little doubt in my mind that this is the correct placement of the species.

16. MACFADYENA A. DC.

Tendrilled lianas; branchlets slender, subterete with conspicuous interpetiolar glandular fields at the nodes; leaves bifoliolate, terminated by a trifid tendril which may be caducous, the arms being conspicuously claw-like; pseudostipules small, subulate-lanceolate; inflorescence an axillary, contracted, few-flowered thyrses, cyme or raceme, or flowers solitary; calyx spathaceous, split to about the middle or somewhat bilabiate, the midrib of the posterior sepal produced into a short incurved hook or apiculus; corolla funnel-shaped, glabrous, with the tube expanding at the base; stamens included; anthers glabrous; disk flattened, pulvinate or cupuliform; ovary oblong to linear, glandular-lepidote; fruit a compressed, oblong-linear to linear, smooth, septically dehiscent capsule; valves with a slightly elevated thin longitudinal median nerve, thinly coriaceous; seeds with truncate base and curved upper margin; wings firm, dark-colored and opaque as the body.

- Leaflets punctate below; inflorescence a contracted thyrses or cyme, or a single flower in the axils of the leaves on the main branchlets 1. *M. uncata*
- Leaflets pubescent below; inflorescence of short axillary racemes terminating short lateral branchlets 2. *M. mollis*

1. MACFADYENA UNCATA (Andr.) Sprague & Sandw., Recueil Trav. Bot. Neerland. **34**: 215. 1937.

Bignonia uncata Andr., Bot. Rep. **8**: pl. 530. 1808.
Bignonia uncinata G. F. W. Mey., Prim. Fl. Esseq. 210. 1818.
Spathodea uncata (Andr.) Spreng., Syst. Veg. **2**: 835. 1825.
Spathodea uncinata (G. F. W. Mey.) Spreng., Syst. Veg. **2**: 835. 1825.
Macfadyena uncinata (G. F. W. Mey.) DC., Prod. **9**: 180. 1845.

Branchlets finely striate, minutely pubescent or lepidote, glabrescent; leaves bifoliolate terminated by a trifid uncate tendril or a rudimentary one; petioles and petiolules minutely puberulous when young; leaflets elliptic, acutely acuminate, cuspidate, obtusely subcuneate to the base, whitish punctate glandular-lepidote above and below, with a few impressed plate-shaped glands below on either side of the midvein; inflorescence few-flowered in the axils of the leaves on the main branchlets; calyx 1 to 2 cm. long, subspathaceous, split to about the middle, terminated by a short incurved apiculus, glabrous, with a few scattered plate-shaped glands; corolla yellow, 5 to 7 cm. long, glabrous; ovary minutely glandular-lepidote; capsule gradually narrowed at both ends, to 25 cm. long and 2 cm. broad, drying blackish, glabrous; seeds 1.4 cm. long, 2.5 cm. broad with black firm wings.—In wet forests and along riverbanks; Mexico to Brazil.

YUCATAN: Merida, st. May 1865, *A. Schott 399a* (F). TABASCO: San Juan Bautista, fl. May 1888, *J. N. Rovirosa 167* (US). BRITISH HONDURAS: Stann Creek District—Sittee River, on riverbank, fl. & fr. September, *W. A. Schipp S-94* (F). Toledo District—Jacinto Creek, Machaca, along creek bank, fl. May 1933, *Schipp S-562* (F).

VERNACULAR NAMES: "Bejuco verde," "Bejuco blanco" (*Rovirosa 167*).

Frequently confused with *Doxantha unguis-cati* (L.) Rehder, from which it may be distinguished by the glandular fields at the nodes between the petioles, by the short incurved apiculus on the calyx, by the blackish opaque wings of the seeds, and by the subulate-lanceolate pseudostipules, which in *D. unguis-cati* are of a very characteristic striate, concave-ovate form which is found only in that genus.

2. *MACFADYENA MOLLIS* (Sond.) Seem., Journ. Bot. **1**: 227. 1863.

Spathodea mollis Sond., Linnaea **22**: 561. 1849.

Macfadyena guatemalensis Blake, Contr. U. S. Nat. Herb. **24**: 24. 1922.

Shrubby lianas; branchlets subterete, striate, puberulous, occasionally with capitate-glandular hairs intermixed; leaves bifoliolate with terminal scars of tendrils which usually fall early; petioles and petiolules densely puberulous with spreading hairs, conspicuously articulated to the blade in old leaves; leaflets oval to broadly ovate, 9 to 14 cm. long, 3.5 to 6.5 cm. broad, acutely acuminate, mucronate, base cuneate or rounded, glandular-lepidote punctate above, densely puberulous below and somewhat glandular-lepidote; inflorescence of 1 or 2 short racemes or contracted thyrses terminating short lateral branchlets; calyx membranaceous, 1.5 to 2.5 cm. long, subspathaceous, usually somewhat lobate, each lobe terminated by a short apiculus, sparsely and minutely pubescent and with scattered plate-shaped glands near the base; corolla drying blackish, 5.5 to 9 cm. long; disk thick, pulvinate or somewhat cupuliform, 2 mm. high; ovary densely glandular-lepidote.—Apparently rare along riverbanks; Guatemala, Colombia and Brazil.

GUATEMALA: Dept. Izabal, banks of Rio Izabal, fl. June 1919, *S. F. Blake* 7845 (US type of *M. guatemalensis* Blake).

Examination of the type of *M. guatemalensis* and comparison with an excellent series of collections of *M. mollis* from Colombia (*A. Dugand* 1237, 1238; 1239, 1240), which show the range in variation of the leaves and inflorescence, indicate the Guatemalan material to be synonymous with *M. mollis*.

17. *LUNDIA* P. DC.

Tendrilled lianas; branchlets subterete with somewhat ampliate and complanate nodes having large interpetiolar glandular fields; leaves bifoliolate, more rarely trifoliolate, terminated by a simple tendril (in Yucatan species); pseudostipules small, not foliaceous; inflorescence an axillary or terminal thyrse; calyx closed in bud, variously ruptured in anthesis, campanulate, thin, truncate or bilabiate, the upper conical-shaped portion frequently removed by the expansion of the bud; corolla campanulate-funnel-shaped, densely pubescent outside; stamens included; anthers densely villous; disk absent; ovary oblong, densely pubescent, with a ring of villous hairs at the base; style and stigma somewhat pubescent; fruit a compressed linear, smooth, septically dehiscing capsule with a distinctly raised median longitudinal nerve on each valve; seeds narrowly transversely oblong, with membranaceous hyaline wings.

LUNDIA DICHEILOCALYX Blake, Contr. Gray Herb. No. **52**: 94. 1917.

Branchlets tomentellous, drying blackish with numerous pale lenticels; leaves bifoliolate drying brownish black; leaflets ovate, abruptly acuminate, base cordate, usually slightly oblique, ciliolate along the margin and slightly emarginate, minutely glandular-lepidote and sparsely pubescent below, white ciliolate above with a few minute impressed glands; veins short ciliate above and below, the axils of the lateral nerves barbellate; pseudostipules very small, triangular-dentate, 1 mm. long; flowers pinkish rose; calyx bilabiate, lobes to 2 mm. long, closed in bud and splitting bilabiate, ciliate, 4 to 6.5 mm. long, falling easily after anthesis; corolla 4 to 4.5 cm. long, tomentellous; style and stigma both pubescent; fruit unknown.—In forests and on hillsides; known only from southern British Honduras and the adjoining region of eastern Guatemala.

BRITISH HONDURAS: Toledo District—Temash River, in secondary forest, alt. 30 m., fl. August 1935, *W. A. Schipp* S-896 (F); Toledo, in forest, fl. September 1906, *M. E. Peck*

495 (G type). Westmoreland, in forest on hillside, alt. 75 m., fl. December 1932, *Schipp S-404* (AA, F, M, MBG, NY). GUATEMALA: Dept. Izabal, Vic. Quirigua, alt. 75-225 m., on brushy slopes, st. May 1922, *P. C. Standley 24693* (US).

Lundia corymbifera (Vahl) Sandw., a South American species extending north to Costa Rica, has a truncate calyx with a somewhat hyaline margin and white flowers with a yellowish throat, by which it may be distinguished from *L. dicheilocalyx*, which has a bilabiate calyx and pinkish rose flowers.

18. **PSEUDOCALYMMMA** Samp. & Kuhlm.

Tendrilled lianas, often emitting a garlic odor; branchlets subterete, frequently becoming angulate, with conspicuous interpetiolar glandular fields at the nodes; leaves bifoliate, terminated by a trifid tendril which frequently falls very early; petioles commonly with glandular fields at the apex; leaflets usually more or less three-nerved at or near the base; pseudostipules small, subulate; inflorescence an axillary or terminal raceme or thyrse, often short, or longer with a flattened rachis; calyx campanulate, truncate, usually minutely denticulate, without plate-shaped glands; corolla showy, funnel-shaped with a glabrous or minutely glandular-lepidote tube and a densely short pubescent limb outside; stamens included; anthers glabrous; disk annular or pulvinate; ovary oblong, lepidote or glandular-lepidote; fruit an elongate-linear, compressed, smooth, septicidally dehiscent capsule; valves thin with a sharply raised median longitudinal nerve; seeds transversely oblong with broad, thinly membranaceous, more or less hyaline wings.

- Leaflets elliptic, acutely cuneate to the base; stems becoming angulate; inflorescence an axillary thyrse 1. *P. laevigatum*
- Leaflets ovate to subrotund, base obtuse to shallowly cordate; stems usually not becoming angulate; inflorescence of terminal and axillary thyrses which terminate lateral branchlets 2. *P. macrocarpum*

1. **PSEUDOCALYMMMA LAEVIGATUM** (Bur. & K. Schum.) Samp. & Kuhlm., Bol. Mus. Nac. Rio de Janeiro **10**: 101. fig. 1934.

Adenocalymma laevigatum Bur. & K. Schum., Mart. Fl. Bras. **8**²: 113. 1896.

Adenocalymma macrocarpum Donn. Sm., Bot. Gaz. **40**: 9. 1905, partim.

Branchlets becoming distinctly angulate in age with about 8 small ribs; petioles with minute glandular fields at the apex, conspicuously enlarged where the petiolules join; petiolules with a conspicuously enlarged articulation to the blade; leaflets elliptic to slightly ovate-elliptic, acute to acuminate, mucronulate, acutely cuneate to the base, 8 to 15 cm. long, 3.5 to 8 cm. broad, conspicuously punctate below with numerous sunken plate-shaped glands in the axils of the two basal lateral nerves; pseudostipules subulate, to 5 mm. long; inflorescence of axillary thyrses; flowers lavender; calyx 7 to 9 mm. long, minutely glandular-lepidote, margin ciliate; corolla 5.5 to 7.5 cm. long; ovary densely glandular-lepidote; capsule 32 to 51 cm. long, about 1.5 cm. broad; seeds about 1.2 cm. long, 6 to 6.5 cm. broad; wings thinly membranaceous, becoming hyaline towards the margins.—Near riverbanks; Campeche, Guatemala and Brazil.

CAMPECHE: Canasayal, above Champoton on river, fl. December 1900, *E. A. Goldman 460* (US). Tuxpeña, fl. December 1931, *C. L. Lundell 1029* (AA, F, G, M, MBG, NY, US). GUATEMALA: Dept. Alta Verapaz, Cubilquitz, fl. & fr. coll. of 1900, *H. von Tuerckheim 7759* (AA, G, NY, US syntype of *Adenocalymma macrocarpum* Donn. Sm.).

Examination of a photograph of the type specimen of *Adenocalymma laevigatum* Bur. & K. Schum. (*Glaziou 9529*) from Brazil indicates that Donnell Smith, in his description of

A. macrocarpum, cited two specimens of two different species as syntypes, of which *Tuerckheim* 7759 seems to be synonymous with *Pseudocalymma laevigatum* (Bur. & K. Schum.) Samp. & Kuhlm., since it has the typical elliptic leaflets which are cuneate at the base and the distinctly axillary inflorescence, rather than the broadly ovate or subrotund leaves with a more or less shallowly cordate base and the inflorescence which terminates lateral branchlets as is apparently typical in *P. macrocarpum*.

2. *PSEUDOCALYMMA MACROCARPUM* (Donn. Sm.) Sandw., Recueil Trav. Bot. Neerland. **34**: 210. 1937.

Adenocalymna macrocarpum Donn. Sm., Bot. Gaz. **40**: 9. 1905, partim.

Adenocalymna ciliolatum Blake, Contr. Gray Herb. **52**: 90. 1917.

Adenocalymna hosmeca Pittier, Contr. U. S. Nat. Herb. **18**: 256. 1917.

Petastoma Langlasseanum Kraenzl., Fedde Rep. Sp. Nov. **17**: 56. 1921.

Petastoma Tonduzianum Kraenzl., Fedde Rep. Sp. Nov. **17**: 56. 1921.

Adenocalymma alboviolaceum Loesn., Verh. Bot. Ver. Brand. **65**: 100. 1923.

Pseudocalymma Langlasseanum (Kraenzl.) Sandw., Recueil Trav. Bot. Neerland. **34**: 210. 1937.

Young branchlets with a light-colored cortex which peels off, becoming shallowly furrowed, but not distinctly angulate; petioles with inconspicuous glandular fields at the apex, or with a very few submerged glands, enlarged where the petiolules join; petiolules articulate to the blade; leaflets ovate to broadly ovate or subrotund, abruptly short obtusely acuminate, occasionally acute to obtuse, base rounded to truncate or very shallowly cordate, 6 to 9 cm. long, 4 to 8 cm. broad, punctate below with a few sunken plate-shaped glands in the axiles of the two basal lateral nerves; pseudostipules small, inconspicuous; inflorescence a terminal thyrse, frequently with two axillary small thyrses, terminating lateral branchlets; flowers lavender to rose; calyx 5 to 8 mm. long, minutely pulverulent-puberulus to nearly glabrous, margin ciliolate; corolla 5 to 6.5 cm. long; ovary lepidote; capsule 25 to 35 cm. long, 1.5 to 2 cm. broad, conspicuously punctate; seeds 1.2 to 1.8 cm. long, 6 to 7 cm. broad; wings membranaceous with a narrow, more or less hyaline margin.—Thickets; Sinaloa, San Luis Potosi, Guerrero, Oaxaca, and Chiapas to Costa Rica.

CHIAPAS: Tapachula, fl. coll. of 1896, *E. W. Nelson* 3847 (US). GUATEMALA: Dept. Escuintla, Hda. las Fianzas, alt. 80 m., fr. March 1933, *G. Salas* 372 (US partim.). Dept. Zacapa, Gualan, fl. February 1912, *W. P. Cockerell* 41 (US); Gualan, alt. 122 m., fl. January 1905, *W. A. Kellerman* 4507 (F, US).

VERNACULAR NAME: "Bejuco de ajo" (*Salas* 372).

Closely related to *P. laevigatum* but apparently distinguishable on the basis of its subrotund or broadly ovate leaflets with truncate or subcordate bases, the inflorescence which terminates lateral branchlets and the shorter and usually broader capsule.

19. *ARRABIDAEA* DC.

Tendrilled lianas; stems more or less terete, striate and with conspicuous interpetiolar glandular fields at the nodes; leaves usually ternately divided, biternate or triternate in *A. inaequalis*; terminal leaflet often replaced by a simple tendril; pseudostipules very small and inconspicuous; inflorescence usually a large, many-flowered terminal or axillary thyrse or dichasium; flowers comparatively small, pale pink to purple in color; calyx campanulate, truncate, denticulate or somewhat lobed, pubescent; corolla campanulate, infundibuliform with 5 nearly equal lobes, densely pubescent outside; stamens included; anthers glabrous; disk annular, pulvinate; ovary oblong, minutely glandular-lepidote or tomentellous; fruit a

compressed, smooth, linear, septicidally dehiscent capsule; valves coriaceous with a raised longitudinal median nerve; seeds transversely oblong; wings hyaline.

Leaves glabrous or glabrate on both surfaces.

Leaves simply ternate.

Axils of the lateral nerves white-tufted on the lower surface of the leaflets; corolla 1.5 to 2 cm. long 1. *A. floribunda*

Axils of the lateral nerves not tufted; corolla 2.6 to 3 cm. long 2. *A. Chica*

Leaves 2- or 3-ternate 3. *A. inaequalis*

Leaves with a persistent pubescence below.

Inflorescence a large dichasium; branchlets with only one type of pubescence.

Leaflets with a dense, fine, conspicuously white tomentum beneath; calyx tomentose.

Midvein and lateral veins on the under surface of the leaflets densely tomentellous as the rest of the surface; petioles about the same length as the petiolules 4. *A. Blanchetii*

Midvein and lateral veins conspicuous by their apparent glabrous condition against the tomentellous surface; petioles twice as long as the petiolules 5. *A. candicans*

Leaflets with a tan tomentum beneath; calyx glandular-lepidote 6. *A. litoralis*

Inflorescence of long, narrow thyrses; branchlets with 2 types of pubescence, shortly tomentellous and longer capitate pilose 7. *A. mollissima*

I. *ARRABIDAEA FLORIBUNDA* (H. B. K.) Loes., Fedde Rep. Sp. Nov. **16**: 209. 1919.

Bignonia floribunda H. B. K., Nov. Gen. & Sp. **3**: 104. 1819.

Branchlets subterete, striate, with small raised lenticels, shortly white-pubescent when young, glabrate; leaves 2- or 3-foliolate, usually drying somewhat reddish; the first pair of leaves to appear on the lateral branchlets remain quite small and are occasionally simple; petioles with conspicuous enlarged articulation where the petiolules join, both white-pubescent; leaflets ovate to ovate-oblong, obtusely acuminate, rounded to obtuse at the base, 3.5 to 9 cm. long, 1.5 to 4.5 cm. broad, papery, glandular-lepidote above and below becoming somewhat punctate, glabrate; axils of the lateral nerves white-tufted on the lower surface; veins sparsely white-pubescent; inflorescence terminal, occasionally axillary, a large dichasium; flowers lavender to purple, throat usually paler; calyx campanulate, truncate, denticulate, 2 to 3 mm. long, short purplish tomentellous; corolla 1.5 to 2 cm. long, densely short reddish-pubescent; tube very slender and curved; lobes deeply cut; capsule usually somewhat curved, 9 to 18 cm. long, 7 to 9 mm. broad, very shiny, glandular-lepidote, with some submerged glands.—Apparently confined to southern Mexico; usually found in clearings, thickets and scrub forest.

YUCATAN: Chichen Itza, in forest, fl. June 1932, *W. C. Steere 1092, 1110* (F, M), *1116* (M), *1336* (F, M, MBG); in low thicket along the Kaua road, fl. June–July 1938, *C. L. Lundell & Amelia A. Lundell 7583* (M); near Piste, in second growth, fl. June–July 1938, *Lundell & Lundell 7362* (M, MBG). Piste–Yokdzonoot road, in second growth, fl. May–August 1938, *Lundell & Lundell 7867* (M, MBG). Izamal, in forest, fl. June 1895–96, *G. F. Gaumer 739* (AA, M, MBG, F, NY, US). Kanan, fl. July 1916, *Gaumer & Sons 23397* (F, MBG, NY). Labana, fl. June 1911, *Ed. Scler 5578* (G). Merida, fr. August 1865, *A. Schott 887* (F). Peto, in forest, fl. July 1932, *Steere 2248* (F, M). Progreso, in low scrub forest, fl. August 1932, *Steere 3006* (M). Ticul, fl. June 1917, *Gaumer & Sons 23820* (F, US). Uxmal, in old clearing, fl. July 1932, *Steere 2069* (M), in forest *2077* (F, M). Without definite locality, st. coll. of 1935, *R. S. Flores s.n.* (F); fl. coll. of 1917–21, *Gaumer 24041* (F, MBG, NY, US), *24211* (F, US); fl. coll. of 1899, *Gaumer s.n.* (F); fl., *A. Schott 399* (F). CAMPECHE: Champoton, on hillside clearing, fl. July 1932, *Steere 1908* (F, M). Tuxpeña, fr. October 1931, *Lundell 889* (F, M, MBG, NY, US). BRITISH HONDURAS: Orange Walk District—Honey Camp, coastal region, st. November 1929, *Lundell 674* (F, G, MBG, NY, US).

VERNACULAR NAMES: "*Cafe ak*" (*Flores s.n.*); "*Sac ak*" (*Gaumer 739, Lundell & Lundell 7362, Schott 887*); "*Sebaque ak*" (*Seler 5578*).

ECONOMIC USES: Used locally for binding in the construction of thatched roofs.

2. ARRABIDAEA CHICA (H. & B.) Verl., Rev. Hort. 1868: 154. 1868.

Bignonia Chica H. & B. Pl. Aequin. 1: 107. pl. 31. 1808.

Lundia Chica (H. & B.) Seem. Bot. Voy. Herald 180. 1854.

Branchlets terete, drying reddish brown to nearly black, glabrescent, young stems with a short, very white, sparse pubescence; nodes somewhat flattened and dilated, conspicuously enlarged at the attachment of the petiole; leaves 2- or 3-foliolate, usually drying reddish; first pair of leaves to appear on lateral branchlets are very small; leaflets ovate to oval, acute-acuminate, base rotund to obtuse, 7 to 9 cm. long, 3 to 5 cm. broad, subcoriaceous, glabrous above and below except for a very few scattered short hairs and a glandular-lepidote condition; midvein and lateral veins with a sparse white pubescence; axils of lateral nerves not tufted; inflorescence a large, axillary or terminal, loose pyramidal thyrse; flowers reddish mauve; calyx campanulate, truncate, denticulate, 3 to 4.5 mm. long, densely tomentellous, taking on the same reddish purple color as the leaflets; corolla 2.6 to 3 cm. long, densely reddish purple pubescent outside; capsule drying reddish purple, 25 cm. long, 1 to 1.2 cm. broad, glabrous except for scattered submerged glands, the surface very shiny as if shellacked.—Open forests and swamps; British Honduras to Brazil.

BRITISH HONDURAS: Stann Creek District—All Pines, in secondary forest near the coast, fr. August 1930, *W. A. Schipp 593* (AA, F, G, M, MBG, NY); All Pines, in open forest, alt. 2 m., fl. May 1930, *Schipp 710* (AA, F, G, MBG, NY). GUATEMALA: Dept. Izabal, Puerto Barrios, fl. May 1909, *C. C. Deam 6014* (F, G, M, MBG, NY, US); vic. Puerto Barrios, in swamp near sea level, fl. June 1922, *P. C. Standley 24730* (US).

ECONOMIC USES: The purplish coloring matter in the leaves is used locally for dyeing purposes.

3. ARRABIDAEA INAEQUALIS (DC. ex Splitg.) K. Schum., Engl. & Prantl, Nat. Pflanzenf. 4^{3b}: 214. 1894.

Bignonia inaequalis DC. ex Splitg., Tijdschr. Nat. Geschied. en Phys. 9: 9. 1842.

Branchlets terete, finely striate, drying blackish, usually conspicuously marked with pale whitish lenticels, minutely glandular-lepidote; leaves biternate or triternate, rarely simply ternate; petioles and petiolules drying blackish and minutely glandular-lepidote as the branchlets; leaflets ovate-oblong to obovate-oblong, acuminate and cuspidate at the apex, cuneate to rounded, occasionally oblique at the base, 5 to 10 cm. long, 2 to 5 cm. broad, thin, papery, often drying brownish or purplish brown, glabrous; veins sparsely glandular-lepidote, the axils of the lateral nerves slightly barbellate; inflorescence a long, showy, more or less pyramidal thyrse, the lateral branches and pedicels conspicuously brownish tomentellous as compared to the central axis; flowers pinkish purple; calyx campanulate, truncate, denticulate, 4 to 6 mm. long, finely brownish tomentellous; corolla 3 to 3.5 cm. long, densely short pubescent; ovary densely glandular-lepidote.—In forest; British Honduras, Trinidad, Venezuela, Guiana, and Amazonian Brazil.

BRITISH HONDURAS: Toledo District—Machaca, in forest shade, alt. 15 m., fl. August 1933, *W. A. Schipp S-580* (F).

Previously unreported from Central America, *A. inaequalis* is easily recognized by its biternate or triternately compound leaves and the conspicuously tomentellous pedicels and lateral branches of the inflorescence, the central axis being nearly glabrous.

4. *ARRABIDAEA BLANCHETII* DC., Prod. **9**: 186. 1845.

Arrabidaea Lundellii Standl., Field Mus. Bot. **8**: 48. 1930.

Branchlets subterete or somewhat angulate, striate, pallid with dark-colored lenticels, rather densely tomentellous; nodes with a slightly raised ridge extending from each side of the glandular field to the petiole; leaves 2-foliolate, drying pale green; petioles 1 to 1.5 cm. long, canaliculate, minutely tomentellous as the leaflets, with a conspicuously enlarged articulation where the petiolules join; petiolules 1 to 1.5 cm. long, canaliculate, tomentellous; leaflets elliptic-ovate, 6 to 10 cm. long, 3.5 to 5 cm. broad, obtuse to shortly obtuse-acuminate, occasionally mucronulate, base obtuse to rounded, densely and minutely tomentellous above and below, somewhat whitish below, becoming less dense above, with an intermixed glandular-lepidote condition; veins densely tomentellous as the rest of the leaflet; tendrils tomentellous; inflorescence terminal or axillary, a very large, expanded thyrse; flowers pink to pinkish rose; calyx campanulate, truncate, denticulate, 3.5 to 4.5 mm. long, densely tomentose and somewhat scattered glandular-lepidote; corolla 2.5 to 3.5 cm. long, densely short pubescent, becoming sparsely so with age; ovary glandular-lepidote; fruit with a conspicuous raised median nerve and margins, 18 to 30 cm. long, 1 cm. broad, minutely glandular-lepidote with numerous submerged glands.—In forests; Yucatan to northern Guatemala and Brazil.

YUCATAN: Dzitas, fl. September 1935, *E. C. Stewart* 219 (G). CAMPECHE: Tuxpeña, fr. October 1931, *C. L. Lundell* 831 (AA, F, G, M, MBG, NY, US). QUINTANA ROO: Cozumel Isl., San Miguel, in low forest, fl. August 1932, *W. C. Steere* 2946 (M). TABASCO or CHIAPAS: in forest, fl. October 1889, *J. N. Rovirosa* 621 (US). BRITISH HONDURAS: Corozal District—in high ridge, fl. coll. of 1931-32, *P. H. Gentle* 428 (F, M, US). Orange Walk District—Honey Camp, fl. October 1928, *Lundell* 56 (F type of *A. Lundellii* Standl., US). El Cayo District—El Cayo & vic., fr. March-June 1933, *M. Chanek* 59 (F, M). Toledo District—in forest shade, Eldorado, alt. 61 m., fr. December 1932, *W. A. Schipp* 1064 (AA, F, M, MBG, NY). GUATEMALA: Dept. Peten, La Libertad and vic., fl. August 1934, *M. Aguilar* 267 (AA, F, M, MBG, NY).

VERNACULAR NAMES: “*Tie-tie vine*” (*Lundell* 56); “*Tu ak*” (*Stewart* 219).

I am unable to distinguish between *A. Blanchetii* and *A. Lundellii* but feel that the latter should be placed in synonymy with a certain degree of doubt since the present known range jumps from Brazil to northern Central America.

5. *ARRABIDAEA CANDICANS* (L. C. Rich.) DC., Prod. **9**: 185. 1845.

Bignonia candicans L. C. Rich., Act. Soc. Hist. Nat. Paris 110. 1792.

Arrabidaea pachycalyx Sprague, Bull. Herb. Boiss. ser. 2. **6**: 373. 1906.

Branchlets subterete or subtetragonous, striate, pallid, with raised, light-colored lenticels; minutely pubescent, becoming glabrate; leaves 2- or 3-foliolate, usually turning somewhat reddish in drying, first leaves to appear on lateral branchlets being more or less persistent and remaining small; petioles 2 to 4.5 cm. long, deeply canaliculate, with a greatly enlarged articulation at the junction of the petiolules, pubescent as the branchlets; petiolules 1 to 2 cm. long, canaliculate, pubescent as the branchlets; leaflets oblong-ovate to broadly ovate, shortly obtuse-acuminate, mucronulate, base cuneate to rotund or cordate, 4 to 14 cm. long, 2.5 to 8 cm. broad, densely and minutely white-tomentellous beneath with some sunken plate-shaped glands towards the base on either side of the midvein, above somewhat shortly pubescent and minutely glandular-lepidote, shiny, subcoriaceous; veins somewhat tomentellous under a lens, but standing out conspicuously by their glabrous condition on the lower surface; inflorescence a long, terminal, showy, pyramidal thyrse; flowers reddish mauve or

purplish; calyx campanulate, truncate, minutely denticulate, 3.5 to 5 mm. long, finely tomentellous; corolla 2 to 3 cm. long, densely furfuraceous-pubescent outside; ovary densely glandular-lepidote.—Along rivers in high forest; British Honduras, Costa Rica, Panama, and Colombia to Amazonian Brazil.

BRITISH HONDURAS: El Cayo District—Mountain Pine Ridge, San Agustin, in high forest, alluvial river bed, fl. July-August 1936, *C. L. Lundell 6771* (F, M, NY).

A conspicuous species because of the very white, shortly tomentellous lower leaf surfaces. It has been known in recent years from northern South America and southern Central America as *A. pachycalyx*, apparently a synonymous species. The species has previously been unreported north of Costa Rica.

6. *ARRABIDAEA LITORALIS* (H. B. K.) Standl., Contr. U. S. Nat. Herb. **23**: 1318. 1926.

Bignonia litoralis H. B. K., Nov. Gen. & Sp. **3**: 108. 1819.

Bignonia Andrieuxii DC., Prod. **9**: 156. 1845.

Arrabidaea Chica var. *viscida* Donn. Sm., Bot. Gaz. **20**: 7. 1895.

Branchlets terete, striate, lenticellate, densely tomentellous, becoming sparsely so or glabrescent; nodes with small interpetiolar glandular fields; leaves 2- or 3-foliolate; petioles and petiolules rather densely tomentellous; leaflets ovate to subrotund, acuminate, base obtuse to rounded or cordate, drying brownish, 8 to 10 cm. long, 3 to 7 cm. broad, tomentellous below, above sparsely pubescent and glandular-lepidote; veins tomentellous as the rest of the leaflet below; inflorescence a large axillary or terminal, showy, more or less ovate dichasium; calyx campanulate, truncate, rarely denticulate, 4 to 6 mm. long, densely glandular-lepidote with a few short capitate hairs; corolla in bud densely tomentellous, but in anthesis becoming sparsely tomentellous and glandular-lepidote, 3.5 to 4 cm. long; ovary densely glandular-lepidote.—Apparently quite rare; Guerrero to Guatemala.

GUATEMALA: Dept. Santa Rosa, Casillas, alt. 1212 m., fl. May 1893, *Heyde & Lux 4550* (G, US type of *Arrabidaea Chica* var. *viscida* Donn. Sm.). Without definite locality, *Skinner s.n.* (NY).

Examination of a photograph of the type of *Bignonia Andrieuxii* DC. (*Andrieux 223* from Oaxaca) leaves little doubt of its being synonymous with *A. litoralis*, since it has the dichasial inflorescence which serves as an excellent criterion for distinguishing this species from *A. mollissima*, its closest congener which has long, slender thyrses.

7. *ARRABIDAEA MOLLISSIMA* (H. B. K.) Bur. & K. Schum., Mart. Fl. Bras. **8**²: 46. 1896.

Bignonia mollissima H. B. K., Nov. Gen. & Sp. **3**: 103. 1819.

Panterpa mollissima (H. B. K.) Miers, Proc. Roy. Hort. Soc. Lond. **3**: 196. 1863.

Arrabidaea mollicoma Blake, Contr. Gray Herb. **52**: 92. 1917.

Arrabidaea Seleriana Loes., Verh. Bot. Ver. Brand. **65**: 99. 1923.

Branchlets terete, striate, with two types of pubescence, short and densely tomentellous and longer, less dense, capitate-glandular pilose; nodes with large glandular fields; petiole scars large and conspicuous; leaves 2- to mostly 3-foliolate; petioles and petiolules pubescent as the branchlets; leaflets ovate to rotund, short acuminate, base usually shallowly cordate or truncate, 4 to 7 cm. long, 2.5 to 5 cm. broad, densely pubescent above and below, hairs rarely capitate, of equal length, sparsely glandular-lepidote; tendrils very long in comparison to the leaflets, pubescent as the stems and petioles; pseudostipules acicular-subulate, 6 mm. long; inflorescence a terminal or axillary, long, narrow thyrse or dichasium; flowers pink to rose; calyx campanulate, truncate, obscurely denticulate, 4 to 6 mm. long, puberulous, the hairs of various lengths; corolla 4 to 5 cm. long, densely short pubescent; ovary densely and very minutely glandular-lepidote but soon becoming densely puberulous shortly after

anthesis; capsule with an inconspicuously raised median longitudinal nerve, 22 to 25 cm. long, 1.3 to 1.5 cm. broad, densely light brownish-tomentellous.—Comparatively dry hill-sides; Guerrero and Guatemala to Venezuela and Colombia.

GUATEMALA: Dept. Chimaltenango, Morazan, fl. December 1937, *J. R. Johnston 1134* (F). Dept. Chiquimula, Chiquimula, fl. January 1897, *Ed. Seler 3348* (G syntype of *A. Seleriana* Loes.). Dept. Guatemala, near Trapiche Grande, dry slopes, fl. & fr. January 1905, *W. R. Maxon & R. Hay 3422* (US). Dept. Jalapa, El Rancho, alt. 303 m., fl. January 1906, *W. A. Kellerman 5593, 5817*, fl. & fr. 5819, 5920 (US); fl. December 1907, *Kellerman 7836* (F, NY). Dept. Zacapa, Gualan, alt. 128 m., fl. January 1905. *C. C. Deam 349* (G), 313 (G, M, NY, US).

20. NEOMACFADYA Baill.

Tendrilled lianas; branchlets subterete striate, with very small interpetiolar glandular fields at some of the nodes; leaves opposite or nearly so, 1- or 2-foliolate with an occasional simple tendril found only on bifoliolate leaves; pseudostipules inconspicuous; inflorescence a terminal, few-flowered raceme on short lateral branchlets; calyx thin, membranaceous, split on one side, subspathaceous; corolla campanulate, subbilabiate, tube elongating and expanding from a very narrow base, minutely and sparsely mixed pubescent and glandular-lepidote; stamens included; anthers glabrous; disk annular; ovary densely glandular-lepidote; fruit a linear, compressed, smooth, septically dehiscent capsule; valves with a slightly raised longitudinal median nerve; seeds transversely oblong with translucent membranaceous wings.

NEOMACFADYA PODOPOGON (DC.) Baill., *Hist. Pl.* **10**: 26. 1888.

Spathodea podopogon DC., *Prod.* **9**: 205. 1845.

Macfadyena podopogon (DC.) Griseb., *Cat. Pl. Cub.* 195. 1866.

Neomacfadyena podopogon (Griseb.) Baill. ex K. Schum., *Engl. & Prantl, Nat. Pflanzenf.* **4**^{2b}: 227. 1894.

Phryganocydia brevicalyx Standl., *Field Mus. Bot.* **4**: 261. 1929.

Branchlets raised lenticellate; leaves somewhat alternate on young branchlets, becoming opposite when mature; petioles and petiolules barbellate and canaliculate on the upper side; leaflets ovate-oblong to elliptic-oblong, obtuse to short acuminate, base rounded to cuneate, often narrowly subcordate when fully mature, glandular-lepidote above and especially below, becoming punctate; axiles of lateral nerves barbellate; flowers pinkish lavender; calyx closed in bud, spathaceously split halfway down on one side in anthesis, 1.6 to 1.8 cm. long; corolla 4 to 5 cm. long; capsule about 11 cm. long, 1.3 cm. broad, somewhat S-shaped (always?), scattered tannish glandular-lepidote.—Northern and western coast of Cuba, and the dry deciduous forest region of Yucatan, Quintana Roo, and northern British Honduras.

YUCATAN: Chichen Itza-Kaua road, in advanced deciduous forest, fl. & fr. June-July, 1938, *C. L. Lundell & Amelia A. Lundell 7479* (M, MBG); near San Francisco, in forest, fl. June 1932, *W. C. Steere 1597* (M); in forest, fl. June 1932, *Steere 1552* (M). QUINTANA ROO: Coba, west end of Lake Coba, in second growth, fl. June-July 1938, *Lundell & Lundell 7681* (M); east of ruins, in relic forest, fl. June-July 1938, *Lundell & Lundell 7715* (M). BRITISH HONDURAS: Orange Walk District—vicinity of Tower Hill, fl. coll. of 1928, *J. S. Karling 39* (F type of *Phryganocydia brevicalyx* Standl., US).

Previously this monotypic genus has been known to exist only on the north and west coasts of Cuba. The specimens from the Yucatan Peninsula are identical with those examined from Cuba and do not suggest even varietal difference. *Neomacfadya podopogon* is

easily recognized by its somewhat spathaceous, thin calyx, by the unusual number of unifoliate leaves and by the short, axillary branchlets which bear the few-flowered terminal racemes. The species is unusual in not having glandular fields consistently at every node, but frequently has an indistinct interpetiolar ridge where these fields are lacking.

Apparently no native name or economic use for this plant is as yet known.

21. **SCOBINARIA** Seibert, gen. nov.

Frutex scandens. Rami subteretes, striati, tenues, lenticellati, ad nodos ampliati et complanati, consociibus glandularum multarum parvarum inter petiolos sitis. Folia bifoliolata, cirrho caduco terminata; phylla stipulas simulantia parva subulata. Inflorescentia axillaris terminalisque, thyrsoida; calyx anguste tubulato-campanulatus, glabratus, membranaceus, breviter bilabiatus vel crebre et breviter lobulato-serratus; corolla purpurea, infundibularis, extus pilosa; stamina inclusa, antherarum thecae glabrae divaricatae lineares; discus annularis; ovarium tetragonum oblongum. Capsula matura compressa elongato-linearis dense tuberculata; valvae planae maturitate scobinariae; semina suboblonga; alae latae membranaceae, marginibus hyalinis.

Scobinaria verrucosa (Standl.) Seibert, comb. nov.

PL. 5.

Adenocalymna verrucosum Standl., Field Mus. Bot. 4: 323. 1929.

Arrabidaea belizensis Standl., Field Mus. Bot. 8: 48. 1930.

Martinella verrucosa (Standl.) Standl., Contr. Arnold Arb. 5: 138. 1933.

Tendrilled lianas; branchlets subterete, striate, elevated lenticellate; nodes conspicuously dilated and compressed with large interpetiolar fields of small glands; leaves 2-foliolate with a terminal scar of a caducous tendril; petioles and petiolules 1.5 to 3 cm. long, becoming elevated lenticellate in age, minutely and sparsely pubescent; leaflets elliptic to oblong-elliptic, 5 to 12 cm. long and 2.5 to 7 cm. broad, acute to abruptly acuminate, base obtuse to rounded, subcoriaceous, becoming conspicuously articulated to the petiolule, minutely glandular-lepidote above and below, barbellate in the axils of the lateral nerves below; inflorescence an axillary or terminal, comparatively few-flowered thyrs; flowers purple or lilac, white-tipped; calyx thin, 1.5 to 3 cm. long, tubular-campanulate, gradually expanding to a diameter of about 1.4 cm. above, bilabiate or irregularly lobed, of the same color as the corolla, glabrous, but copiously spotted with minutely raised, light-colored protuberances; corolla 5 to 7 cm. long, somewhat short pilose; disk annular; ovary 4-angled, linear, slightly pubescent near the top, otherwise appearing rather sandy under the lens; capsule compressed-linear, without a median longitudinal nerve, 30 to 40 cm. long and 1.5 to 2 cm. broad, densely short tuberculate, appearing much like a flat wood-rasp; seeds suboblong, broadly winged, 1.4 cm. long and about 4.5 cm. broad; wings translucent, of the same color as the body, with a narrow, conspicuously transparent margin.—In wet secondary forest and along stream banks; British Honduras, Lancetilla Valley of Honduras and the Canal Zone.

BRITISH HONDURAS: Stann Creek District—Middlesex, in secondary forest, alt. 61 m., fl. July 1929, *W. A. Schipp* 284 (AA, F, G, M, MBG, NY, US); Stann Creek Valley, Silk Grass Creek Reserve road, in broken ridge, fl. September 1938, *P. H. Gentle* 2628 (M, MBG). Toledo District—Temash River, riverbank in open places, alt. 30 m., fl. March 1935, *Schipp* S-904 (F). Without definite locality, fr. coll. of 1905-07, *M. E. Peck* 796 (G).

EXTRALIMITAL MATERIAL EXAMINED: HONDURAS: Dept. Atlantida, Lancetilla Valley, Lancetilla, fl. June-July, *A. M. Chickering* 157 (F); Lancetilla Valley, near Tela, in wet forest, fr. December-March 1928-29, *P. C. Standley* 53666 (AA), 54891 (AA, F type of *Adeno-*

calymna verrucosum Standl.) PANAMA: Canal Zone, Barro Colorado Island, fr. February 1932, R. H. Woodworth & P. A. Vestal 324 (AA).

The genus is proposed as new primarily on the basis of its verrucose-tuberculate, compressed-linear capsule, a type of capsule which, so far as is known, does not occur in any other genus of Bignoniaceae. The capsules of other genera which are compressed-linear are quite smooth, from which the rasp-like capsule of *Scobinaria* is very distinct. The nodes have large fields of small glands between the petioles, which immediately serve to distinguish it from *Adenocalymma* and *Martinella*, two genera without interpetiolar glandular fields, but in which the species in question has been placed. The most closely allied genus, in which the plant has been described as *Arrabidaea belizensis* Standl., is *Arrabidaea*, which has smooth capsules and a short-pubescent, more or less coriaceous calyx, as compared with the long, tubular, glabrous, membranaceous calyx of *Scobinaria*. The tendrils are apparently caducous when very young, since there is a distinct terminal scar on the leaves.

Flowering material of *Arrabidaea lenticellosa* Bur. & K. Schum., a Brazilian species, is apparently very closely allied to *Scobinaria*; unfortunately the decisive feature, the fruit, has apparently never been collected.

22. AMPHILOPHIUM Kunth

Tendrilled lianas; branchlets hexagonal with distinct removable ribs; nodes with interpetiolar ridges; leaves opposite, 2- or 3-foliolate with a trifid tendril often replacing the terminal leaflet; pubescence variable, glandular-lepidote and often with various amounts of stellate or simple hairs; pseudostipules small, foliaceous; inflorescence a terminal thyrse; calyx broadly campanulate to subglobose, the limb spreading, undulate and somewhat lobed with interior, lobe-like appendages; corolla subcoriaceous, glabrous or shortly pubescent at least on the lobes; tube cylindrical; limb bilabiate with valvate lobes; stamens included; anthers glabrous, oblong-oval; disk large, annular and somewhat pulvinate; ovary ovate, short pubescent; fruit an oblong-elliptical, somewhat compressed, woody, slightly rugose, septicidally dehiscent capsule with a somewhat raised median longitudinal nerve along which each valve splits in two after maturity; seeds transversely oblong with membranaceous wings.

AMPHILOPHIUM PANICULATUM (L.) H. B. K., Nov. Gen. & Sp. **3**: 116. 1819.

Bignonia paniculata L., Sp. Pl. 623. 1753.

Amphilophium purpureum T. S. Brandegee, Zoe **5**: 220. 1905.

Branchlets glandular-lepidote, the ribs usually shortly and sparsely ciliate; nodes with a pubescent interpetiolar ridge; leaves bifoliolate, pellucid-punctate; petioles and petiolules angulate, pubescent as the branchlets; leaflets ovate to broadly ovate or subrotund, short obtusely acuminate, base obtuse to rotund when young, cordate at maturity, densely tannish glandular-lepidote above and below with a few cup-shaped glands in the axils of the lateral nerves; veins minutely pubescent and barbellate in the axils of the lateral nerves; pseudostipules foliaceous to 5 mm. long, sickle-shaped with numerous glands; thyrses narrow and long with 1 or 2 of the flowers on many of the cymes aborted; bracts linear-lanceolate, 5 to 8 mm. long; flowers reddish or purplish, turning white before falling; calyx to 1.3 cm. long, densely glandular-lepidote with interior lobe-like appendages 3 to 5 mm. long, obtuse; corolla 3 to 4 cm. long, the limb very short puberulous to glabrous with puberulous lobes; ovary whitish pubescent; capsule about 8 cm. long and 3.5 cm. broad,

minutely pubescent or furfuraceous, obtuse at each end.—Usually in thickets and second growth; widely distributed throughout tropical America.

YUCATAN: Chichen Itza, along Kaua road, in second growth, fl. June-July 1938, *C. L. Lundell & Amelia A. Lundell* 7908 (M). Chichen Itza, in forest, fl. June 1932, *W. C. Steere* 1094 (F, M); in low forest, *Steere* 1325 (M). Near Xocenpich, in young legume thicket, May-August 1938, *Lundell & Lundell* 7884 (M). Serrania, near Sath-Caba, September 1865, *A. Schott* 886 (F). CHIAPAS: Santa Lucia, between Conala & Cuntalapa, fr. December 1906, *G. N. Collins & C. B. Doyle* 81 (US). BRITISH HONDURAS: Belize District—forest near Manatee Lagoon, fl. January 1906, *M. E. Peck* 275 (G, N). Stann' Creek District—Middlesex, along riverbank, fl. November 1929, *W. A. Schipp* 5-61 (F, NY). GUATEMALA: Dept. Izabal, Jocolo, Rio Pedernales, fl. January 1921, *Harry Johnson* 1092 (F). Dept. Huehuetenango, near Nenton, alt. 900-1200 m., fl. December 1895, *E. W. Nelson* 3538 (F, US).

VERNACULAR NAMES: "*Bejuco de caratilla*" (*Collins & Doyle* 81); "*Sak-ak*" (*Steere* 1094).

AMPHILOPHIUM PANICULATUM var. MOLLE (Schlecht. & Cham.) Standl., Field Mus. Bot. **18**: 1114. 1938.

Amphilophium molle Schlecht. & Cham., Linnaea **5**: 120. 1830.

Branchlets, petioles, petiolules, inflorescence, axis and peduncles short grayish, tawny to olivaceous, stellately pubescent, extremely variant in density; leaves occasionally 3-foliolate, mostly 2-foliolate; leaflets glandular-lepidote above and below, minutely stellate puberulent above, almost glabrous, densely short stellate tomentulose beneath, variant in density; capsule to 9.5 cm. long and 4 cm. broad, rounded at each end, sparsely and shortly tawny pubescent; seeds to 2 cm. long and 6.5 cm. broad; wings thinly membranaceous, obtuse.—Thickets and scrub forest in the drier regions; Mexico to Costa Rica.

YUCATAN: Chichen Itza, along Kaua road, in advanced deciduous forest, fl. June-July 1938, *C. L. Lundell & Amelia A. Lundell* 7911 (M). Tizimin, July 1932, *J. R. Swallen* 2583 (M, US). Peto, in forest, fl. July 1932, *W. C. Steere* 2193 (F, M). QUINTANA ROO: Cozumel Island, San Miguel, in lower scrub forest, fl. August 1932, *Steere* 2964 (F, M). BRITISH HONDURAS: Corozal District—San Juquin, fl. October 1933, *Percy H. Gentle* 812 (F, M). GUATEMALA: Dept. Alta Verapaz, Cubilquitz, alt. 350 m., fl. December 1900, *H. von Tuerckheim* 7649 (AA, G, US). Dept. Chiquimula, San Juan, fl. January 1897, *Ed. Seler* 3379 (G). Dept. Guatemala, Guatemala City, st. February 1916, *E. D. W. Holway* 492 (US); La Corona, Guatemala, alt. 1450 m., fr. February 1892, *J. D. Smith* 2686 (G, US); Las Vacas, near Guatemala, fl. July 1860, *S. Hayes s.n.* (G). Dept. Jutiapa, Rio Paz, alt. 450 m., fl. October 1892, *W. C. Shannon* 3603 (US). Dept. Peten, Uaxactun, fr. April 1931, *H. H. Bartlett* 12440 (AA, F, M, NY, US). Dept. Quiche, Cotzal, Finca San Francisco, alt. 1090 m., in thicket, fl. December 1934, *A. F. Skutch* 1862 (AA); San Siguan, alt. 1760 m., fl. April 1892, *Heyde & Lux* 3107 (G, US). Without definite locality, fl. July 1860, *Hayes s.n.* (G). La Aurora, alt. 1480 m., st. October 1927, *Morales R.* 744 (US).

VERNACULAR NAME: "*Bejuco de cuchampera*" (*Morales* 744).

It is perhaps advisable to consider the densely stellately tomentose forms as a variety rather than a distinct species, since the pubescence density is extremely variable and the glandular-lepidote forms grade into glandular-lepidote and stellately pubescent forms with apparently no other evident differences.

23. *PITHECOCTENIUM* Mart. ex DC.

Tendrilled lianas; branchlets angular with 6 to 8 detachable fibrous ribs; nodes with interpetiolar ridges; leaves 2- or 3-foliolate, the terminal leaflet often replaced by a trifid or twice trifid tendril; pseudostipules often evident, oblong to spatulate; inflorescence a terminal raceme or thyrse; calyx coriaceous, campanulate, truncate or often denticulate; corolla thick, campanulate-funnel-shaped, densely tomentose or stellately furfuraceous, except near the base of the tube; stamens included; anthers glabrous; disk conspicuous, pulvinate; ovary ellipsoid, constricted above the disk, densely and softly spinulose; fruit a thick, woody, flattened ellipsoidal, densely echinate, septically dehiscing capsule with a conspicuous oblong, closely echinate appendage at the apex of the replum; seeds transversely oblong with a broad, thin body and very broad, membranaceous, hyaline wings.

PITHECOCTENIUM ECHINATUM (Jacq.) K. Schum., Engl. & Prantl, Nat. Pflanzenf. 4^{3b}: 218. 1894.

Bignonia echinata Jacq., Enum. Pl. Carib. 25. 1760.

Pithecoctenium muricatum Moc. ex DC., Prod. 9: 194. 1845.

Pithecoctenium hexagonum DC., Prod. 9: 195. 1845.

Branchlets hexagonal when young, becoming octagonal in age with fibrous, detachable ribs, somewhat pubescent with simple hairs and whitish glandular-lepidote; leaves mostly 3-foliolate, except when the terminal leaflet is replaced by a trifid or twice trifid tendril; petioles usually conspicuously tetragonal, constricted where they join the stem; petiolules constricted where they join the petiole; leaflets ovate to suborbicular, acuminate and somewhat cuspidate, base rounded to usually cordate, 5 to 14 cm. long and 4 to 10 cm. broad, papery, conspicuously whitish and somewhat pellucid glandular-lepidote above and below, sparingly pubescent or glabrescent above, usually more densely pubescent below, or at least along the nerves, with 4 main lateral nerves arising at or near the base; pseudostipules oblong-linear, usually spatulate, 7 to 9 mm. long; inflorescence usually a long and narrow raceme; bracts narrowly lanceolate-spathulate to 1 cm. long; flowers white or creamy, usually turning yellowish with age; calyx 7 to 10 mm. long, densely tomentellous outside with glandular fields on the upper half; corolla 4 to 6 cm. long, densely tomentose, except the basal one-fourth which is conspicuously glabrous; ovary constricted above the disk, ellipsoid, densely soft adpressed spinulose; capsule 16 cm. long or more, about 6 cm. broad, prickles deltoid-subulate from a broad base, 3 to 4 mm. long; seeds to 3 cm. long and 8 cm. broad; wings whitish hyaline with numerous pale tan membranaceous nerves extending out from the body.—Widespread, usually in thickets; Mexico to Brazil.

YUCATAN: Chichen Itza, in forest, fl. June 1932, *W. C. Steere 1018* (F, M). Chichen Itza, fr. February 1899, *C. F. Millsbaugh 1638* (F, US). Chichen Itza, on the edge of Thompson's Cenote, fl. June-July 1938, *C. L. Lundell & Amelia A. Lundell 7336* (M, MBG). Izamal, in forests, fl. *G. F. Gaumer 702* (F, MBG). Piste, in old thicket, fl. May-August 1938, *Lundell & Lundell 7554* (M, MBG). Suitun, forests, fl. June 1916, *Gaumer & Sons 23364* (AA, F, G, MBG, NY, US). GUATEMALA: Dept. Escuintla, San Jose, sea level, fl. April 1892, *J. D. Smith 2690* (G, US). Dept. Guatemala, Sanarate, alt. 1465 m., fr. January 1906, *W. A. Kellerman 5029* (US). Dept. Huehuetenango, Nenton, alt. 1200 m., in light forest, fl. June 1896, *Ed. Seler 3170* (G). Dept. Izabal, vic. Quirigua, alt. 75-225 m., fr. May 1922, *P. C. Standley 24212* (US). Dept. Santa Rosa, Santa Rosa, alt. 910 m., fl. June 1892, *Heyde & Lux 3108* (US), June 1893, *Heyde & Lux 4552* (G, US).

VERNACULAR NAMES: "*Chili-ak*" (*Steere 1018*); "*Xnetoloc*" (*Gaumer 702, Gaumer & Sons 23364*); "*Xachetabay*" (*Gaumer & Sons 23364*).

ECONOMIC USES: The spiny valves of the capsule are used as combs. The slender, long branches are very strong and are used for tying braces, etc. in the construction of huts. It is reported that the Maya use the seeds as a remedy for headache by moistening and applying them to the forehead or temples.

24. PYROSTEGIA Presl

Tendrilled lianas; branchlets angulate with 6 to 8 small ribs, striate, with interpetiolar ridges at the nodes; leaves 2- or 3-foliolate, the terminal leaflet frequently replaced by a trifid tendril; leaflets somewhat pellucid-punctate; pseudostipules somewhat conical, small, caducous; inflorescence a terminal or axillary thyse, frequently on short axillary branchlets; flowers orange or reddish; calyx campanulate, truncate, denticulate, glandular-lepidote, ciliate along the edge; corolla long and narrowly tubular, gradually expanding from the base, the lobes narrow and nearly valvate, tomentellous outside, otherwise nearly glabrous; stamens exserted, attached about halfway up the tube; anthers glabrous; disk annular, slightly cupular; ovary 4-angled, linear, glandular-lepidote; fruit a smooth, compressed, linear, loculicidally dehiscent capsule with a somewhat attenuate, acute apex; valves subcoriaceous with a very indistinct median, longitudinal nerve; seeds transversely oblong; wings opaque, thin, with hyaline margins.

PYROSTEGIA VENUSTA (Ker) Miers, Proc. Roy. Hort. Soc. **3**: 188. 1863.

Bignonia venusta Ker, Bot. Reg. **3**: pl. 249. 1818.

Bignonia ignea Vell., Fl. Flum. 244. 1825; **6**: t. 15. 1827.

Pyrostegia ignea (Vell.) Presl, Bot. Bemerk. 93. 1843.

Bignonia tecomaeflora Rusby, Mem. Torr. Bot. Club **6**: 101. 1896.

Branchlets somewhat glandular-lepidote and punctate, slightly pubescent at the nodes; nodes with interpetiolar ridges which are somewhat pubescent; leaves 2- or mostly 3-foliolate, somewhat pellucid-punctate, the terminal leaflet frequently replaced by a trifid tendril; petioles and petiolules striate, canaliculate, somewhat pubescent; leaflets ovate, acuminate and apiculate, base truncate or shallowly cordate, often slightly oblique, 4 to 8 cm. long, 2 to 4.8 cm. broad, densely punctate beneath and with scattered plate-shaped glands which become quite dense in the axiles of the lateral nerves; pseudostipules conical, slightly short-pubescent, to 3 mm. long, caducous, leaving a conspicuous scar; flowers orange; calyx somewhat spreading, pubescent-denticulate, sparsely glandular-lepidote, ciliate along the edge; corolla 5.5 to 7.5 cm. long, slightly glandular-lepidote, becoming tomentellous on the upper half of the lobes; lobes nearly valvate with white tomentellous edges, particularly conspicuous when in bud; capsule about 25 cm. long and 1 to 1.5 cm. broad or larger, attenuate at the apex, slightly glandular-lepidote with scattered, impressed glands; seeds about 1 cm. long and 3.5 cm. broad; wings dark brown except for the hyaline margin.—A native of Brazil and Paraguay, commonly cultivated in the higher altitudes throughout tropical America.

GUATEMALA: Dept. Alta Verapaz, Coban, alt. 1350 m., fl. December 1912, *H. von Tuerckheim* 4012 (US). Dept. Santa Rosa, Cerro Redondo, alt. 1360 m., fl. September 1893, *Heyde & Lux* 6211 (G, US).

25. GLYTOSTOMA Miers

Tendrilled lianas; branchlets tetragonal to nearly subterete, striate, the young lateral branchlets with numerous conspicuous cataphylls towards the base; nodes with interpetiolar ridges; leaves simple or 2- or 3-foliolate; the terminal leaflet frequently replaced by a simple tendril; pseudostipules small, subulate-lanceolate; inflorescence a few-flowered thyse or cyme or a fascicle of from 1 to 4 simple flowers; calyx broadly campanulate, truncate, usually

denticulate, glandular-lepidote and thin; corolla funnel-shaped, delicate, variously lepidote and short pubescent outside; stamens included; anthers glabrous; disk annular or platter-shaped; ovary oblong to ovoid, densely and minutely tuberculate; fruit a short, oblong or ellipsoid, thick, echinate, loculicidally dehiscent capsule; seeds shortly transversely oblong, more or less corky; wings narrow, rather firm and of about the same color as the body.

Clytostoma ocositense (Donn. Sm.) Seibert, comb. nov.

Adenocalymna (?) *Ocositense* Donn. Sm., Bot. Gaz. **18**: 209. 1893.

Petastoma ocositense (Donn. Sm.) Kraenzl., Fedde Rep. Sp. Nov. **17**: 61. 1921.

Clytostoma elegans Standl., Carnegie Inst. Wash. Publ. **461**: 86. 1935.

Branchlets conspicuously lenticellate, becoming verrucose with age, glabrous, the lateral branchlets with numerous small cataphylls towards the base; leaves 2-foliolate; petioles and petiolules tetragonal and striate, canaliculate, conspicuously articulate to the blade; leaflets elliptic-oblong, oblong or sublanceolate-oblong, acuminate, usually acutely mucronulate, base obtuse, up to 14 cm. long and 6 cm. broad, coriaceous, glandular lepidote above and below, becoming conspicuously punctate upon the removal of these glands; tendrils simple, deciduous; pseudostipules small, covered with large glands; inflorescence a fascicle of 1 to 4 pedicels terminating the branchlets; bracts rotund to narrowly oblong, short acuminate, to 8 mm. long; flowers pinkish purple; calyx subulate-denticulate, somewhat glandular-lepidote with a ciliate margin, 4 to 7 mm. long; corolla 5 to 7.5 cm. long, lepidote near the top, becoming rather densely very short puberulous or sublepidote on the tube and towards the base; disk small, annular; ovary ovate to ovoid, minutely tuberculate; capsule ellipsoid, somewhat compressed, echinate, about 5 cm. long and 4 cm. broad.—Along riverbanks in wet forest; Tabasco to Honduras.

TABASCO: El Paso del Carrizal, fl. February 1888, *J. N. Roviroso* 177 (US). BRITISH HONDURAS: Belize District—Belize River, fl. June 1933, *C. L. Lundell* 4010 (F, M, MBG, NY, US); Northern River, fl. December 1933, *P. H. Gentle* 984 (AA, F, M, MBG, NY); Northern River, on riverbank, fr. July 1934, *Gentle* 1350 (F, M, MBG). El Cayo District—Pine Ridge, Duck Run, fl. April 1931, *H. H. Bartlett* 12969 (M, NY). Toledo District—Rio Grande, alt. 75 m., along creek and riverbanks, fl. March 1933, *W. A. Schipp* 1127 (AA, F type of *Clytostoma elegans* Standl., M, MBG, NY). GUATEMALA: Dept. Izabal, Jocolo, Lago Izabal, alt. 45 m., fl. April 1920, *Harry Johnson* 311 (US); Boca del Rio Polochic, alt. 75 m., fl. April 1889, *J. D. Smith* 1720 (US). Dept. Peten, Santa Teresa, Subin River, fl. April 1933, *Lundell* 2659 (M). Dept. Quetzaltenango, Rio Ocosito, alt. 75 m., fl. April 1892, *J. D. Smith* 2688 (G, US type of *Adenocalymna* (?) *Ocositense* Donn. Sm.).

VERNACULAR NAME: "Bejuco Tres-lomos" (*Roviroso* 117).

26. **CYDISTA** Miers

Tendrilled lianas; branchlets tetragonal, at least when young, with 4 distinct ribs; nodes with interpetiolar ridges; leaves simple or bifoliolate with simple tendrils found occasionally terminating a bifoliolate leaf; pseudostipules inconspicuous to large and foliaceous; inflorescence usually a comparatively few-flowered axillary or terminal thyrse or raceme; flowers varying in color from white to lavender, frequently streaked or variegated; calyx campanulate, truncate or bilabiate, variously dentate and lobed, glandular-lepidote, with or without sunken glands on the upper half, margin frequently ciliated; corolla funnel-shaped, thin, glandular-lepidote outside; disk absent; stamens included; anthers glabrous; ovary densely glandular-lepidote; fruit a long, linear, compressed, septically dehiscent capsule; valves smooth with raised and thickened margins, median longitudinal nerve inconspicuous or

slightly impressed; seeds transversally semiellipsoidal, brown, compressed with broad, firm, opaque wings, frequently with very narrow hyaline margins.

- Pseudostipules foliaceous; leaflets conspicuously cordate 4. *C. diversifolia*
 Pseudostipules inconspicuous; leaflets not cordate.
 Lower leaf surface with impressed glands in axils of the lateral nerves.
 Calyx bilabiate; flowering on leafless branchlets 5. *C. heterophylla*
 Calyx truncate; flowering with leaves.
 Branchlets tetragonous; leaves glandular-lepidote 1. *C. acuinotialis*
 Branchlets nearly subterete; leaves pubescent and glandular-lepidote 2. *C. pubescens*
 Lower leaf surface without impressed glands in axils of the lateral nerves 3. *C. potosina*

1. *CYDISTA AEQUINOCTIALIS* (L.) Miens, Proc. Roy. Hort. Soc. Lond. **3**: 191. 1863.

Bignonia acuinotialis L., Sp. Pl. 623. 1753.

Branchlets tetragonous, usually with 4 distinct ribs, striate between, drying dark brown or blackish when young, glandular-lepidote; nodes with distinct interpetiolar ridges; leaves 2-foliolate, drying reddish brown or purplish; petioles and petiolules canaliculate and striate; leaflets ovate to oblong or narrowly elliptic, acuminate and somewhat cuspidate, base obtuse to rounded or shallowly cordate, to 15 cm. long and 7 cm. broad, subcoriaceous, shiny, glandular-lepidote above and below, otherwise glabrous, with impressed glands in the axiles of the lateral nerves, especially towards the base of the leaflet; tendrils striate; pseudostipules inconspicuous; inflorescence of terminal, few-flowered racemes or thyrses in which the main axis is suppressed; flowers lavender to rose with darker veins or nearly white with lavender streaks; calyx campanulate-truncate, glandular-lepidote with immersed glands on the upper half, 5 to 8 mm. long; corolla 4.5 to 8 cm. long, glandular-lepidote; capsule to 40 cm. long, 2 to 2.5 cm. broad, drying blackish, densely glandular-lepidote.—Wet lowland forests; widely distributed throughout tropical America.

YUCATAN: Without definite locality, st. 1937, *M. Steggerda 26c* (F). YUCATAN or TABASCO: Without definite locality, fl. *E. P. Johnson 117* (NY). BRITISH HONDURAS: Stann Creek District—Stann Creek, fl. May 1931, *W. A. Schipp 771* (AA, F, G, M, MBG, NY). Toledo District—Rio Grande, fl. March 1923, *Schipp S-453* (F). Without definite locality, fl. coll. of 1905-07, *M. E. Peck 898* (G). GUATEMALA: Dept. Izabal, Boca del Rio Polochic, fl. April 1889, *J. D. Smith 1721* (G, US).

VERNACULAR NAME: "*Ac Xux*" (*Steggerda 26c*).

2. *CYDISTA PUBESCENS* Blake, Contr. U. S. Nat. Herb. **24**: 23. 1922.

Branchlets tetragonal when young, becoming somewhat subterete and striate, drying dark brown or blackish, sparsely pubescent and glandular-lepidote; nodes dilated with a nearly indistinct interpetiolar ridge; leaves 2-foliolate, drying brownish; petioles and petiolules striate, glandular-lepidote, pubescent' on the upper, canaliculate side; leaflets suborbicular-ovate to ovate, 7 to 13 cm. long, 4 to 11 cm. broad, abruptly short acuminate, mucronulate, base obtuse to broadly rounded, subcoriaceous, densely pubescent below with long simple, conspicuously multicellular, flat hairs, sparsely pubescent above, somewhat glandular-lepidote above and below, lustrous, with large fields of impressed glands in the axils of the lateral nerves below; tendrils striate, glandular-lepidote; pseudostipules small, caducous, densely pubescent; inflorescence terminating branchlets, usually composed of three few-flowered thyrses with peduncles up to 6 cm. long; bracts linear-spathulate, about 9 mm. long; flowers pink; calyx campanulate, truncate, denticulate, glandular-lepidote, with impressed glands on the upper half, obscurely ciliolate along the margin; corolla 4.5 to 6 cm. long, densely papillose-glandular; capsule with thickened and raised margins, about 40 cm. long, lustrous and glandular-lepidote; seeds with very nearly opaque wings with narrow hyaline margins.—Thickets and waste places, rarely above 600 m. altitude; Guerrero to Honduras.

CHIAPAS: Jiquipilas, fl. May 1904, *E. A. Goldman 1036* (US). GUATEMALA: Dept. Guatemala, Agua Caliente, fl. June 1909, *C. C. Deam 6127* (US). Dept. Jutiapa, Rio de la Paz, fl. July 1894, *Heyde & Lux 6363* (AA, US). Dept. El Progreso, Barranquillo, fl. April 1920, *W. Popenoe 980* (US). Dept. Zacapa, Gualan, Emanuel River, fl. June 1909, *Deam 6309* (G, M, US).

VERNACULAR NAMES: "*Campana*" (*Popenoe 980*); "*Ajillo*" in El Salvador (*Standley 21746*); "*Ito*" in Honduras (*H. Pittier 8488* type).

Being closely related to *C. acuinotialis*, *C. pubescens* may be distinguished by the numerous flat multicellular hairs on the lower surface of the broadly ovate leaflets. Older branchlets become inconspicuously tetragonal, whereas the nodes are conspicuously dilated.

3. CYDISTA POTOSINA (K. Schum. & Loes.) Loes., Fedde Rep. Sp. Nov. **16**: 209. 1919.

Arrabidaea Potosina K. Schum. & Loes., Bull. Herb. Boiss. **3**: 618. 1895.

Clytostoma mayanum Standl., Carnegie Inst. Wash. Publ. **461**: 86. 1935.

Branchlets tetragonous with 4 distinct removable ribs and striate, somewhat glandular-lepidote, especially when young, very short pubescent near the nodes, surrounded at the base with numerous more or less persistent small bracts or cataphylls; nodes with a narrow, conspicuously raised interpetiolar ridge; leaves 2-foliolate, the first leaves to appear on the lateral branchlets are small, simple or of two partly fused leaflets; petioles and petiolules canaliculate and striate, glandular-lepidote and finely pubescent; articulation of the petiolule to the blade pubescent when young, becoming enlarged and wrinkled with some sunken glands in age; leaflets elliptic, oblong elliptic, with a tendency to be predominately obovate-elliptic, acuminate, base rounded or obtuse, sparsely glandular-lepidote above and below, pubescent along the main nerves below, without glands in the axils of the lateral nerves; pseudostipules small, broadly sickle-shaped, densely covered with large sunken glands; inflorescence a few-flowered terminal raceme with the main axis usually more or less compressed; flowers white or cream with lavender throat to lavender throughout; calyx campanulate, nearly truncate, dentate to denticulate, 4.5 to 5.5 mm. long, glandular-lepidote, margin ciliate; corolla 4.5 to 5.5 cm. long, densely glandular-lepidote; capsule somewhat glandular-lepidote, rather broad, 20 to 25 cm. long, 3 to 3.3 cm. broad; seeds subellipsoidal, brown with firm broad wings having a narrow hyaline margin.—Thickets and second growth forest, on rather moist hillsides; San Luis Potosi, Yucatan, Chiapas, British Honduras, Guatemala, El Salvador, and Honduras.

YUCATAN: Chichen Itza, in forest, fl. June 1929, *J. Bequaert 50* (AA, F, US). Chichen Itza, in old second growth, fl. June-July 1938, *C. L. Lundell & Amelia A. Lundell 7600* (M). Chichen Itza, in forest, fl. May 1911, *Ed. Scler 5551* (G). Chichen Itza, near Halekal, in forest, fl. June 1932, *W. C. Steere 1606* (F, M). Chichen Itza, near Piste, in young legume thicket, fl. June-July 1938, *Lundell & Lundell 7347* (M, MBG). Izamal, fl. Gaumer 725 (F, NY, US). Southeast Kancabdzonot, fl. May 1917, *Gaumer & Sons 23888* (F, US). Merida, fl. May 1865, *A. Schott 354* (F). Progreso, fr. April 1934, *R. S. Flores s.n.* (F). Tizimin, fl. July 1932, *J. R. Swallen 2546* (M, US), *2547* (M). Without definite locality, fl. *Gaumer 24024* (F, MBG, NY, US), *24345* (F). QUINTANA ROO: Cozumel, fl. *Gaumer 138* (G). CHIAPAS: Tuxtla Gutierrez, fl. May 1904, *E. A. Goldman 1012* (US). BRITISH HONDURAS: Corozal District—in high ridge, fr. coll. of 1931-32, *Gentle 181* (M), fl. *Gentle 441* (F, M); San Andres, in high ridge, st. coll. of 1931-32, *Gentle 543* (F, M), fr. December 1933, *Gentle 1080* (F, NY). Belize District—Maskall, fl. May 1934, *Gentle 1259* (F, M, MBG). El Cayo District—El Cayo & vic., fl. March-June 1933, *M. Chanek 201* (F, M); road from El Cayo to Benque Viejo, in secondary forest, fl. June-August 1936, *Lundell 6141* (F, M, NY). GUATEMALA: Dept. Escuintla, Hacienda las Fianzas, fl. May 1923, *Rivero 306* (US). Dept.

Peten, Ixlu, Lake Peten, fl. June 1933, *Lundell 4007* (F, US); Uaxactun st. April 1931, *H. H. Bartlett 12439* in part, fruit belongs to *Callichlamys latifolia* (AA, F, M, NY); Yaxha-Remate road, fl. June 1933, *Lundell 4008* (F type of *Clytostoma mayanum* Standl., M).

VERNACULAR NAMES: "Bejuco de coral" (*Rivero 306*); "Ekixil" (*Lundell & Lundell 7347*); "Xek̄k̄ixil" (*Lundell & Lundell 7600*).

Loesener, in his new combination, cited *Seler 5551* which is identical with the type of *Clytostoma mayanum* (*Lundell 4008*), apparently making it necessary to accept the older and little-used name for this quite abundant species. The type of *Arrabidaea potosina* K. Schum. & Loes. from San Luis Potosi (*Seler 616*) has not been seen.

Fruiting material has heretofore been unknown for this species and proves to be typical for the genus. Its proportionally shorter length and greater width serve well as a distinguishing factor.

4. CYDISTA DIVERSIFOLIA (H. B. K.) Miers, Proc. Roy. Hort. Soc. Lond. **3**: 192. 1863.

Bignania diversifolia H. B. K., Nov. Gen. & Sp. **3**: 104. 1819.

Anemopaegma Vargasianum DC., Prod. **9**: 190. 1845.

Cydista Vargasiana (DC.) Miers, Proc. Roy. Hort. Soc. Lond. **3**: 192. 1863.

Pleonotoma diversifolium (H. B. K.) Bur. & K. Schum., Mart. Fl. Bras. **8**²: 274. 1897.

Branchlets tetragonous with 4 distinct removable ribs, striate and glandular-lepidote; nodes with a very narrow, pubescent interpetiolar ridge; leaves 2-foliolate, more rarely simple, the first pair of leaves appearing on a young branchlet are frequently simple; petioles and petiolules tetragonous and glandular-lepidote as the stems; leaflets broadly ovate to oblong-ovate, 4 to 10 cm. long, acuminate, cordate, rarely rounded at the base, densely glandular-lepidote below, slightly so above, occasionally pubescent below, usually trinerved, with large submerged glands in the axils of the main veins; pseudostipules large, foliaceous, broadly ovate or rounded and frequently apiculate, 0.6 to 2 cm. long; inflorescence a terminal or axillary thyrse; calyx bilabiate to irregularly dentate, 4 to 5 mm. long, somewhat glandular-lepidote; corolla pinkish lavender, 3 to 4 cm. long, glandular-lepidote; base of ovary with a narrow band of pubescence, otherwise glandular-lepidote; capsule very narrow and long with the median longitudinal nerve somewhat impressed, 30 cm. long, 1.5 cm. broad, densely glandular-lepidote.—Widespread in thickets and forests; Mexico to Venezuela and the West Indies.

YUCATAN: Chichen Itza, in forest, fl. June 1932, *W. C. Steere 1061* (F, M), fl. *Steere 1366* (F, M, MBG). Dzitas, on fence along street, fl. May-August 1938, *C. L. Lundell & Amelia A. Lundell 7893* (M, MBG). Dzitas, fl. September 1935, *E. C. Stewart 138* (G). Izamal, uncommon in forests, fl. *Gaumer & Sons 795* (F, M, MBG, NY, US). Merida, fl. June-August 1865, *A. Schott 406, 560* (F). Peto, in forest, fl. July 1932, *Steere 2273, 2338* (M), *2340* (F, M). Progreso, in scrub forest, fl. August 1932, *Steere 3007* (M). Progreso-Merida road, in legume thicket, fl. July 1938, *Lundell & Lundell 8000* (M, MBG). Sabcah, fl. July 1865, *A. Schott 530* (F). Suitan, in forests, fl. *Gaumer & Sons 23818* (F, US). Uxmal, in old clearing, fl. July 1932, *Steere 2055* (M). Uxmal road, in young legume thicket, fl. May-August 1938, *Lundell & Lundell 8077* (M, MBG). Without definite locality, fl. *Gaumer & Sons 725* (M); fl. *Gaumer 24267* (F), *24298* (F, US); st. *M. Steggerda 18* (F). CAMPECHE: Tuxpeña, fl. October 1931, *Lundell 839* (F, G, M, MBG, US), fr. *841* (AA, F, G, M, MBG, NY, US). QUINTANA ROO: Chichankanab, fl. *Gaumer 1966* (F, MBG, NY, US). BRITISH HONDURAS: El Cayo District—El Cayo, on tree overhanging river, fl. June-August 1936, *Lundell 6971* (F, M). GUATEMALA: Dept. Peten, El Paso, fr. April 1932, *Lundell 1489* (M).

VERNACULAR NAMES: "Chacxnetoloc" (*Gaumer & Sons 795*); "Sol-ak" (*Steere 1061*,

1366); "*Sol ton-tzimin*" (Stewart 138); "*Sosciak*" (Lundell & Lundell 8000); "*Xcolak*" (Schott 406, 560).

Often incorrectly known as *Pleonotoma diversifolium*. The genus *Pleonotoma* is easily differentiated from *Cydista* on the basis of its large pulvinate disk, trifold tendrils and bipinnately or tripinnately or biternately and triternately compound leaves.

5. *Cydista heterophylla* Seibert, sp. nov.

PL. 6.

Liana cirrhata decidua; ramuli juniores tetragoni, maturitate subteretes striati glanduloso-lepidoti ad nodos ampliati, consocias glandularum inter petiolos nullae; folia simplices raro bifoliolata, cirrho simplice striato terminata; petioli canaliculati, striati 2-3.5 cm. longi; et folia foliola papyracea ovata 8-15 cm. longa et 4-9.5 cm. lata acuto-acuminata, basi truncata vel rotundata vel subcordata, supra subtusque glanduloso-lepidota, trinervia subtus ad axillas nervorum primariorum glandulosa; phylla stipulas simulantia parva; inflorescentia axillaris laxa racemosa in ramulis defoliatis; calyx subcoriaceus 5-7 mm. longus, campanulatus, bilabiatus, dense glanduloso-lepidotus, marginibus loborum membranaceis; corolla purpureo-rosea 5-7 cm. longa, glanduloso-lepidota; lobi 5 subaequales, late obovati, 2-2.5 cm. longi; stamina inclusa, antherarum thecae glabrae divaricatae lineares; discus nullus; ovarium lineare, dense glanduloso-lepidotum; stylus laeviter glanduloso-lepidotus; capsula et semina ignota.

Type in the Herbarium of the University of Michigan, collected near Xocenpich, Yucatan, in a young legume thicket, in flower, May-August 1938, by C. L. Lundell & Amelia A. Lundell (no. 7350).

YUCATAN: Xcholac, fl. G. F. Gaumer 751 (F, MBG). TABASCO OR CHIAPAS: Without definite locality, fl. July 1889, J. N. Rovirosa 522 (US). BRITISH HONDURAS: Stann Creek District—Stann Creek Railway, in primary forest, alt. 30 m., fl. May 1929, W. A. Schipp 224 (AA, F, G, M, MBG, NY, US). GUATEMALA: Dept. Peten, La Libertad & vic., fl. June 1934, M. Aguilar 259 (F, M, MBG, NY); Monte Polol, fl. May 1933, Lundell 3447 (F, G, M, US). Without definite locality, fl. October 1901, Mary Owen 7 (US).

EXTRALIMITAL SPECIMENS EXAMINED: VERACRUZ: Remulatero, fl. April 1922, C. A. Purpus 8791 (G). HONDURAS: Dept. Comayagua, La Cana, San Luis, alt. 750 m., in dense tropical forest, fl. May 1933, J. B. Edwards P-597 (AA).

Readily distinguished from its closest congener, *C. diversifolia*, by having a predominance of simple leaves, flowering in the axils of fallen leaves before the young leaves appear, and by the conspicuously bilabiate calyx, the lobes of which have noticeably thin margins.

27. *MUSSATIA* Bur. ex Baill.

Tendrilled lianas; branchlets tetragonous with distinct ribs on the angles; nodes with interpetiolar ridges; leaves opposite or nearly so, 2- or 3-foliolate, occasionally terminated by a simple tendril; pseudostipules usually foliaceous; inflorescence a terminal thyrse or dichasium; calyx very short, spreading cup-shaped, campanulate, truncate, somewhat lobed or split; corolla funnel-shaped, bilabiate thin, densely stipitate glandular-lepidote outside; stamens included, without the conspicuous zone of hairs at the point of insertion; anthers glabrous; disk short, fleshy, shallowly cup-shaped or pulvinate; ovary oblong, furrowed, densely glandular-lepidote; fruit not known.

- Pseudostipules foliaceous; flowers yellowish with purplish or reddish stripes; 4 fertile stamens, 1 staminode 1. *M. hyacinthina*
 Pseudostipules small, not foliaceous; flowers white or cream; 2 fertile stamens, 2 short sterile stamens, 1 staminode 2. *M. caudiculata*

1. *MUSSATIA HYACINTHINA* (Standl.) Sandw., Recueil Trav. Bot. Neerland. **34**: 218. 1937.

Tynnanthus hyacinthinus Standl., Carnegie Inst. Wash. Publ. **461**: 87. 1935.

Branchlets tetragonous with 4 distinct ribs striate between, drying brownish when young; nodes with interpetiolar ridges which are usually broken in the center; leaves frequently subopposite, especially on young branchlets, bifoliolate; petioles and petiolules striate, canaliculate; leaflets ovate to elliptic, or oblong-ovate, 8 to 16 cm. long, 5 to 8 cm. broad, acute to shortly acuminate, base rotund to truncate, papery, with numerous scattered plate-shaped glands on the under surface; axils of the lateral nerves barbellate; pseudostipules foliaceous, ovate, with a few plate-shaped glands on the under surface, up to 1.8 cm. long and 1 cm. broad; inflorescence a showy, many-flowered terminal thyrse or dichasium; flowers light yellow, brownish- or purplish-streaked; calyx broadly campanulate, spreading, 1.5 to 2.2 mm. long, truncate or somewhat lobed, glandular-lepidote to somewhat short and thinly pubescent; corolla 1.5 to 2 cm. long, conspicuously brownish glandular-lepidote, each gland on a short stipe, the tube abruptly expanding at the base; disk short, shallowly pulvinate; ovary oblong, acute, glandular-lepidote; fruit not known.—In wet forests and along riverbanks; southern British Honduras, Guatemala, Panama and Venezuela.

BRITISH HONDURAS: Toledo District—Jacinto Creek, along creek bank, alt. 15 m., fl. April 1934, *W. A. Schipp S-661* (F type of *Tynnanthus hyacinthinus* Standl., G, NY); Camp 33, British Honduras—Guatemala boundary survey, in forest, fl. April 1934, *Schipp 1241* (AA, F, G, M, MBG, NY). GUATEMALA: Dept. Alta Verapaz, Cajabon to Cherujija Oxec., fl. April 1902, *O. F. Cook & R. F. Griggs 650* (US).

Closely allied to the South American *M. Priourei* (DC.) Bur. ex K. Schum., but having smaller flowers, shorter stamens and shorter anther thecae.

2. *Mussatia caudiculata* (Standl.) Seibert, comb. nov.

Petastoma caudiculatum Standl., Field Mus. Bot. **11**: 141. 1932.

Young branchlets tetragonous and striate, with some of the striations becoming rib-like in age, making the stems multiangular, glabrous, ochraceous, shiny; nodes somewhat dilated with the interpetiolar ridges frequently broken in the center; leaves 2- or 3-foliolate; petioles and petiolules canaliculate and striate; leaflets narrowly elliptic-oblong to slightly obovate-oblong, 4 to 12 cm. long, 2 to 6 cm. broad, acute to acuminate, base obtuse to truncate or slightly rounded, minutely and sparsely glandular-lepidote and becoming sparsely punctate below, very shiny above and glabrous; tendrils simple, about three times as long as the leaflets; pseudostipules ochraceous-subulate, with a broad base, about 3 mm. long; inflorescence a small terminal thyrse; flowers white to cream; calyx campanulate, conspicuously spreading in anthesis, truncate or shortly triangular-dentate, about 4 mm. long, minutely lepidote, shortly ciliate along the margin; corolla bilabiate, broadly campanulate, to 2.5 cm. long, the tube expanding almost immediately above the base, densely stipitate glandular-lepidote; stamens included, 2 normal and fertile, 2 short and sterile, 1 staminode, with a very few small capitate glandular hairs at the points of insertion; anthers glabrous, oblong; disk short, pulvinate; ovary oblong to obovate ribbed; immature fruit a compressed, linear capsule.—Swamps and wet forest; central British Honduras to central Guatemala.

BRITISH HONDURAS: El Cayo District—Vaca, fl. May 1938, *P. H. Gentle 2560* (M, MBG). Stann Creek District—9 miles, Stann Creek Railway, in low swamp, fl. March 1932, *W. A. Schipp S-297* (F type of *Petastoma caudiculatum* Standl.). GUATEMALA: Dept. Alta Verapaz, vic. Secanquin, alt. 250-600 m., fl. April 1904, *O. F. Cook & C. B. Doyle 75* (US); near Finca Sepacuite, fl. April 1902, *Cook & Griggs 690* (US).

A most confusing species because of the two reduced and sterile stamens and only two

fertile stamens. It was originally described without corollas as a species of *Petastoma*. The distinctly angulate branchlets and the very broadly campanulate, bilabiate and densely stipitate glandular-lepidote corolla apparently do not justify its placement into *Petastoma*, a genus with subterete branchlets and corollas which are pubescent only on the lobes. Although the calyx is similar to that of *Petastoma*, it is also the type found in *Mussatia*, which furthermore has angulate branchlets and the same shaped corolla with the peculiar stipitate glandular-lepidote condition on the outer surface. The fruit of *Mussatia* having never been described makes it impossible to use the very young capsule of *Schipp* S-297 as a clue. Until complete material is available for comparative study it seems advisable to transfer the species to *Mussatia* with doubt.

28. **TYNANTHUS** Miers

Tendrilled lianas; branchlets subterete, striate or somewhat subangulate; nodes with interpetiolar ridges which are often V-shaped; leaves 3-foliolate, occasionally 2-foliolate and terminated by a simple tendril; pseudostipules often foliaceous, but soon falling; inflorescence of axillary or terminal thyrses or dichasia; calyx very small, turbinate or campanulate, truncate, denticulate or with small setaceous teeth; corolla very small, conspicuously bilabiate, curved, funnel-shaped, densely tomentellous; stamens slightly exerted; anthers glabrous; disk very small; ovary conical; pubescent; fruit a compressed, elongate-linear, septicidally dehiscent capsule; valves smooth with a raised longitudinal median nerve; seeds small with hyaline wings.

TYNANTHUS GUATEMALENSIS Donn. Sm., Bot. Gaz. **18**: 6. 1893.

Branchlets subterete or indistinctly angulate, striate, becoming roughly lenticellate in age, minutely and sparingly glandular-lepidote, with a short white pubescence at the nodes when young; nodes with distinct V-shaped interpetiolar ridges; leaflets elliptic to ovate, acuminate, base obtuse to rounded, occasionally somewhat oblique, 4 to 10 cm. long, 1.7 to 6.6 cm. broad, papery, glabrous except along the veins, with scattered plate-shaped glands on either side of the midrib below; axiles of the lateral nerves with conspicuous cavities; pseudostipules foliaceous, caducous, 0.5 to 1.5 cm. long, to 1 cm. broad, somewhat ovate and acute, slightly larger on basal shoots; inflorescence of axillary thyrses, occasionally terminal, with cream-colored, sweet-scented flowers; calyx campanulate-truncate, nearly glabrous except for the ciliolate margins, to 2 mm. long; corolla 6 to 8 mm. long, conspicuously bilabiate, tomentellous outside, the lobes tomentellous within, glabrous near the base; stamens slightly exerted; anthers glabrous; ovary conical, seated on a very small disk, densely white-pubescent; style white-pubescent; capsule not known.—In forests and wet thickets; Yucatan, British Honduras and eastern and western Guatemala.

YUCATAN: Without definite locality, st. September 1935, *R. S. Flores s.n.* (F). BRITISH HONDURAS: Belize District—Sibun River, fl. May 1935, *P. H. Gentle* 1652 (M, MBG, NY); Maskall, fl. May 1934, *Gentle* 1324 (M, MBG, NY, US). El Cayo District—Valentin, in advanced forest, limestone hill, fl. June-July 1936, *C. L. Lundell* 6354 (M, NY, US); Arenal-Valentin road, in high forest, fl. June-August 1936, *Lundell* 6168 (M, NY); Vaca, fl. May 1938, *Gentle* 2563 (M). GUATEMALA: Dept. Izabal, trail from Los Amates to Izabal, edge of woods, fl. May 1919, *S. F. Blake* 7802 (US); vic. of Quirigua, in wet thicket, fl. May 1922, *P. C. Standley* 24535 (G, MBG, NY, US). Dept. Quetzaltenango, Rio Ocosito, alt. 75 m., fl. April 1892, *J. D. Smith* 1488 (G, US type).

VERNACULAR NAME: "Cafe-ak" (*Flores s.n.*).

Easily recognized by the V-shaped interpetiolar ridges and the extremely small flowers.

29. **CALLICHLAMYS** Miq.

Tendrilled lianas; branchlets subterete; nodes with indistinct interpetiolar ridges; leaves trifoliolate, rarely bifoliolate, occasionally terminated by a simple tendril; pseudostipules not evident; inflorescence an axillary raceme; calyx very large, inflated campanulate, thick and spongy tissue, irregularly and deeply lobed; corolla funnel-shaped, thin, minutely glandular-lepidote, the tube constricted above the disk and ovary; stamens included; anthers glabrous; ovary ellipsoid, constricted above the broadly depressed-pulvinate disk; fruit a thick, woody, somewhat rugose, compressed ellipsoidal septically dehiscent capsule; valves without a raised median longitudinal nerve, densely glandular-lepidote, appearing granular; seeds transversely oblong, with very broad membranaceous wings of the same tan color as the body.

CALLICHLAMYS LATIFOLIA (L. C. Rich.) K. Schum., Engl. & Prantl, Pflanzenf. 4^{3b}: 223. 1894.

Bignonia latifolia L. C. Rich., Act. Soc. Hist. Nat. Par. 110. 1792.

Callichlamys riparia Miq., Linnaea 18: 254. 1844.

Tabebuia speciosa Standl., Field Mus. Bot. 8: 49. 1930.

Branchlets subterete becoming somewhat ribbed-striate and verrucose-lenticellate, drying purplish black, minutely glandular-lepidote when young; nodes greatly amplified and enlarged; petioles and petiolules glandular-lepidote and conspicuously enlarged where they join; leaflets conspicuously articulated to the petiolule, ovate to ovate-oblong, cuspidate-acuminate, rounded, obtuse or abruptly cuneate at the base; minutely glandular-lepidote and punctate above and below with some impressed glands on either side of the midrib; inflorescence a furfuraceous-puberulus raceme, becoming glabrate; calyx yellow, 2.8 to 3.5 cm. long, minutely furfuraceous at the tip, with scattered immersed blackish plate-shaped glands; corolla deep golden-yellow, 6 to 8 or more cm. long, the limb very broad, minutely glandular-lepidote; capsule to 32 cm. long, 6 to 8 cm. broad, densely pallid glandular-lepidote, appearing granular; seeds about 4 cm. long and 10 cm. broad.—Of occasional occurrence on riverbanks and in the jungle; British Honduras and northern Guatemala to Brazil.

BRITISH HONDURAS: Stann Creek District—Middlesex, alt. 60 m., in jungle, fl. September 1929, *W. A. Schipp* S-51 (F type of *Tabebuia speciosa* Standl.). GUATEMALA: Dept. Peten, Uaxactun, in jungle, fr. April 1931, *H. H. Bartlett* 12439, in part (AA, F, NY, M).

Unattached capsules of *Bartlett* 12439 are those of *Callichlamys latifolia* and do not belong to the leaf specimens representing this collection. Apparently the sterile material is *Cydista potosina* (K. Schum. & Loes.) Loes.

30. **MARTINELLA** Baill.

Tendrilled lianas; branchlets subterete with spreading, capitate-glandular short hairs; nodes with interpetiolar ridges; leaves bifoliolate, terminated by a trifid tendril; pseudostipules not evident; inflorescence an axillary, rarely terminal, flexuous raceme; flower buds ovoid with a closed calyx, apiculate; calyx tubular campanulate, deeply and irregularly 2- or 3-lobed, the lobes being apiculate; corolla funnel-shaped or campanulate-funnel-shaped, thin, glabrous or minutely lepidote, the tube broadened at the base, gradually constricted above the disk; stamens included, attached high on the elongate tube; disk pulvinate or patelliform; ovary cylindrical, minutely glandular-lepidote; fruit a compressed, elongate-linear, thin, septically dehiscent capsule, attenuate at each end; valves with a slightly

thickened margin and an indistinct median longitudinal nerve; seeds transversely oblong with broad membranaceous wings.

MARTINELLA OBOVATA (H. B. K.) Bur. & K. Schum., Mart. Fl. Bras. 8²: 161. pl. 84. 1896.

Spathodea (?) *obovata* H. B. K., Nov. Gen. & Sp. 3: 115. 1819.

Bignonia obovata (H. B. K.) Spreng., Syst. Veg. 2: 830. 1825.

Macfadyena obovata (H. B. K.) Miers, Proc. Roy. Hort. Soc. 3: 200. 1863.

Branchlets terete, finely striate, becoming ribbed, with numerous minute, spreading, capitate-glandular hairs; nodes with broad, flat interpetiolar ridges; leaves bifoliolate, terminated by somewhat caducous trifid tendrils, the arms of which are recurved and somewhat hooked; petioles at right angles to the branchlets, pubescent as the branchlets; leaflets ovate to ovate-elliptic or ovate-lanceolate, conspicuously attenuate-acuminate, base rounded or somewhat cordate, glabrous above and below; flowers with slender flexuous or deflexed pedicels, reddish blue; calyx 1.2 to 1.7 cm. long, minutely puberulous or glabrate with a few impressed glands; corolla 5 to 7 cm. long, minutely lepidote; disk broad, pulvinate; ovary constricted, broadly stipiform above the disk, minutely lepidote; fruit drying brown, to 80 cm. long and 1.9 cm. broad, glandular-lepidote; seeds 1 to 1.7 cm. long and 4 to 6 cm. broad; wings yellowish white or yellowish brown as the body, thin and membranaceous.—Occasional in secondary forest and thickets; British Honduras to Brazil.

BRITISH HONDURAS: El Cayo District—Cohune Ridge, in secondary forest, fr. June-August 1936, C. L. Lundell 6437 (AA, M); San Antonio, in secondary forest, fl. June-August 1936, Lundell 6972 (F, M). Stann Creek District—Big Creek, alt. 30 m., fr. March 1931, W. A. Schipp S-51 (M).

Schipp S-51 as represented in the Field Museum is not the same plant, it being a specimen of *Callichlamys latifolia*.

31. DOXANTHA Miers

Tendrilled lianas; branchlets subterete, rarely somewhat angulate, striate; nodes with small interpetiolar glandular fields, usually disappearing on the old branchlets; leaves bifoliolate, terminated by a trifid, thickened unicate tendril or rudimentary trifid tendril; pseudostipules small, striate, concave-ovate or broadly cymbiform; inflorescence axillary, composed of a single flower or a cluster of 2 or 3 flowers, occasionally a cyme; calyx laxly campanulate with an expanded or plicate margin, irregularly lobed; corolla campanulate funnel-shaped with a broad limb, glabrous, constricted above the ovary and expanding to the base; stamens included; anthers glabrous; disk very large, annular-pulvinate; ovary linear, sharply 4-angled; fruit a compressed, linear, long and narrow, smooth, septicidally dehiscent capsule with a raised median longitudinal nerve on each valve; seeds transversely oblong; wings hyaline.

DOXANTHA UNGUIS-CATI (L.) Rehder, Mitt. Deutsch. Dendr. Ges. 1913: 262. 1913.

Bignonia unguis-cati L., Sp. Pl. 623. 1753.

Bignonia unguis L. ex DC., Prod. 9: 146. 1845.

Doxantha unguis (L. ex DC.) Miers, Proc. Roy. Hort. Soc. 3: 190. 1863.

Branchlets becoming verrucose-lenticellate, glabrescent; leaves bifoliolate, terminated by a short trifid tendril, the arms being conspicuously hooked and thickened, often only a rudimentary tendril terminating the leaf; petioles and petiolules puberulous-glabrescent, remaining ciliate above; leaflets lanceolate-oblong to oblong-ovate, acute to short acuminate, mucronulate, base acute to obtuse or truncate, slightly oblique at times, drying blackish when young, whitish pubescent above and below, somewhat glabrescent, minutely im-

pressed glandular-lepidote below; veins ciliate; inflorescence a single flower or cluster of 2 or 3 orange-yellow or yellow flowers; calyx membranaceous, crenate-lobate, glabrous, 1 to 1.8 cm. long, 1 to 1.5 cm. in diameter; corolla 5 to 8 cm. long, usually drying blackish or yellowish with blackish streaks; disk 2 mm. high, 4 mm. broad; ovary minutely tannish glandular-lepidote; capsule to 60 cm. long, 1 to 1.5 cm. broad with numerous small pallid lenticels.—Widely distributed throughout the lowland forests of tropical America; frequently cultivated.

YUCATAN: Chichen Itza, in forest, fl. June 1932, *W. C. Steere 1473* (F, M, MBG). Izamal, in forests, fl. *G. F. Gaumer 507* (F, MBG, NY). Izamal, fl. February 1906, *J. M. Greenman 414* (F), 428 (F, G, NY), 435 (F). Merida, fl. April 1866, *A. Schott 776, 776a* (F). Near Yokdzonoot, in advanced deciduous forest, fl. May-August 1938, *C. L. Lundell & Amelia A. Lundell 7489* (M). CAMPECHE: Tuxpeña, fr. October 1931, *Lundell 847* (F, M, US). GUATEMALA: Dept. Amatitlan, southern shore of Lake Amatitlan, fl. April 1905, *H. Pittier 124* (US).

VERNACULAR NAME: "Xcanlol-ak" (*Gaumer 507, Schott 776*).

The conspicuously striate pseudostipules are very characteristic and aid in distinguishing it from *Melloa* and *Macfadyena*.

Doxantha unguis-cati* var. *dasyonyx (Blake) Seibert, comb. nov.

Bignonia dasyonyx Blake, Contr. Gray Herb. 52: 93. 1917.

Doxantha dasyonyx (Blake) Blake, Journ. Bot. 61: 192. 1923.

Branchlets subterete, becoming subangulate; leaflets puberulous; calyx crenate-lobate or somewhat crispate; ovary spreading puberulous.—Known only from the type collection in the forests of southern British Honduras.

BRITISH HONDURAS: Toledo District—Toledo, fl. May 1907, *M. E. Peck 919* (G type of *Bignonia dasyonyx* Blake).

The leaves are somewhat more puberulous than those of the species, whereas the ovary is puberulous instead of being glandular-lepidote.

32. **MELLOA** Bur.

Tendrilled lianas; branchlets subterete, striate, with interpetiolar ridges at the nodes; leaves bifoliolate, terminated by a trifold, uncate, somewhat caducous tendril; pseudostipules subulate, not foliaceous; inflorescence terminal or axillary usually on short lateral branchlets, thyrsoid with some of the flowers usually aborted, or reduced to a single flower; bracts foliaceous, lanceolate; calyx ampliate, membranaceous, closed in bud, splitting spathaceously, recurved-apiculate; corolla elongate, tubular-infundibuliform, nearly glabrous, ciliate along the margins of the lobes; stamens included; anthers glabrous; disk large, annular-pulvinate; ovary oblong, glabrous; fruit an oblong, slightly compressed, thick woody, smooth, septically dehiscent capsule; valves very thick, woody, with a longitudinal median nerve along which each valve splits in half at maturity; seeds transversely oblong with broad, hyaline wings.

MELLOA POPULIFOLIA (DC.) Bur. ex Benth. & Hook., Gen. Pl. 2: 1035. 1845.

Bignonia populifolia DC., Prod. 9: 159. 1845.

Branchlets becoming verrucose-lenticellate, glabrous; leaves bifoliolate with a terminal scar of the usually caducous tendril; leaflets ovate to elliptic or oblong, rarely suborbicular, acute to obtuse, mucronulate, base rounded, glabrous except for a few scattered plate-shaped,

impressed glands, conspicuously fine reticulate below; tendrils when they remain are trifid, thickened uncate; pseudostipules subulate, to 3 mm. long; inflorescence usually a thyse in which the two lateral flowers of each cyme are aborted; bracts lanceolate to 2 cm. long; flowers yellow; calyx thin, ampliate, splitting to one-third the way down on one side, recurved-apiculate, 1.5 to 2 cm. long, 1 to 1.5 cm. broad, glabrous or nearly so; corolla 5 to 7 cm. long, minutely lepidote or glabrous, ciliate along the margins of the lobes; disk annular-pulvinate, 1 mm. high; ovary glabrous; capsule 8 to 12 cm. long, 4 to 4.5 cm. broad; valves thick, woody, splitting in half at maturity, with numerous pallid lenticels; seeds 1.5 to 4.5 cm. wide with broad hyaline wings.—Occasional in deep forest; Mexico to Argentina.

YUCATAN: Izamal, in forests, fl. & fr., *G. F. Gaumer 575* (AA, MBG, NY, US), fl. *Gaumer & Sons 725* (AA, M, MBG). Southeast Kancabdzonot, fl. May 1917, *Gaumer & Sons 23902* (F, MBG, NY, US). Sutan, in forests, fl. May 1916, *Gaumer 23304* (AA, F, G, MBG, NY, US). GUATEMALA: Dept. Jutiapa, Rio de la Paz, alt. 960 m., fl. July 1894, *Heyde & Lux 6363* (G, US). Dept. El Progreso, Barranquillo, alt. 550 m., fl. April 1920, *W. Popenoe 983* (US).

VERNACULAR NAMES: "*Chacanicab*" (*Gaumer 575*); "*Chacxnetoloc*" (*Gaumer & Sons 725*); "*Cinaca*" (*Popenoe 983*).

33. STIZOPHYLLUM Miers

Tendrilled lianas; branchlets terete, striate, with faint interpetiolar ridges at the nodes; leaves 2- or 3-foliolate; tendrils simple, or when trifid, the two lateral arms small; leaflets conspicuously pellucid-punctate glandular-lepidote beneath, entire or dentate; pseudostipules inconspicuous; inflorescence a short axillary or terminal raceme; calyx campanulate, membranaceous, somewhat inflated, pubescent outside, irregularly 5-lobed and bilabiate, longitudinally ribbed; corolla campanulate-funnel-shaped, pubescent and glandular-lepidote outside; stamens included; anthers glabrous; disk thick, shallowly pulvinate; ovary oblong, glandular-lepidote; fruit a very narrow, elongate-linear, compressed, smooth, septicidally dehiscent capsule, gradually attenuate to the apex; valves faintly ribbed, with a raised median longitudinal nerve; seeds narrowly transversely oblong with broad, thin membranaceous wings.

STIZOPHYLLUM PERFORATUM (Cham.) Miers, Proc. Roy. Hort. Soc. **3**: 198. 1863.

Bignonia perforata Cham., Linnaea **7**: 667. 1832.

Adenocalymna flos-ardeae Pittier, Contr. U. S. Nat. Herb. **18**: 256. 1917.

Adenocalymna punctifolium Blake, Contr. U. S. Nat. Herb. **24**: 22. 1922.

Stizophyllum flos-ardeae (Pittier) Sandw., Recueil Trav. Bot. Neerland. **34**: 212. 1937.

Stizophyllum punctifolium (Blake) Sandw., Recueil Trav. Bot. Neerland. **34**: 212. 1937.

Branchlets, petioles, petiolules, tendrils and inflorescence densely rusty-tomentose, becoming somewhat glabrescent; leaves 2- or 3-foliolate; tendrils often deciduous, simple, or when trifid the lateral arms are somewhat reduced; leaflets entire or occasionally dentate, ovate to oval-ovate, abruptly short acuminate, base cordate, unequally sided; densely dotted above and especially below with depressed saucer-shaped pellucid glands, rufescent-pubescent, chiefly along the nerves; flowers cream-colored; calyx 1 to 1.6 cm. long, densely rufescent-puberulent, sparsely dotted near the top with pale yellowish glands; corolla 4.5 to 6 cm. long, papillose-puberulent and sparingly yellowish glandular-lepidote on the outside; ovary densely glandular-lepidote, soon becoming tomentellous after fertilization; fruit 30 to 60 cm. long, 7 to 8 mm. broad, densely short rufescent-puberulous and somewhat glandular-

lepidote; the calyx persists loosely at the base of the capsule, having previously been detached by a circumscissile dehiscence.—Forests and thickets; Yucatan to Brazil.

YUCATAN: Chichen Itza—Kaua road, in advanced deciduous forest, fl. June-July 1938, *C. L. Lundell & Amelia A. Lundell* 7910 (M). Chichen Itza, in forest near Piste, fl. June 1932, *W. C. Steere* 1426 (F, M). Chichen Itza, near Piste, in legume thicket, fl. June-July 1938, *Lundell & Lundell* 7382 (M, MBG). CAMPECHE: Tuxpeña, fr. October 1931, *Lundell* 860 (F, G, M, MBG, NY, US). Tuxpeña, fr. December 1931, *Lundell* 1064 (F, M). Tuxpeña, fl. March 1932, *Lundell* 1434 (F, G, M, NY). QUINTANA ROO: Coba, in relic forest east of ruins, fr. June-July 1938, *Lundell & Lundell* 7716 (M), fr. 7829 (M). Lake Chichankanab, common at the lake, fl. April 1917, *G. F. Gaumer & Sons* 23717 (G). BRITISH HONDURAS: Corozal District—Alfonsoville, edge of thicket, fl. July 1933, *P. H. Gentle* (*Lundell* 4762) (F); San Roque, fl. October 1933, *Gentle* 847 (M). Orange Walk District—Honey Camp, coastal region, fl. August 1929, *Lundell* 306 (F, US). Belize District—Maskall, fr. May 1934, *Gentle* 1327 (F, M, NY). El Cayo District—Valentin, in advanced forest, limestone hill, fr. June-July 1936, *Lundell* 6353 (NY, M). Stann Creek District—Middlesex, in open places, fl. August 1929, *W. A. Schipp* S-2 (F, G). Toledo District—Temash River, common on the river in partial shade, alt. 30 m., fl. July 1935, *Schipp* S-909 (AA, F, G, M, MBG, NY). GUATEMALA: Dept. Izabal, Quebradas, edge of thicket, fl. May 1919, *S. F. Blake* 7502 (US); Quebradas, in bushes, fl. May 1919, *H. Pittier* 8570 (G, NY, US type of *Adenocalymna punctifolium* Blake).

34. PETASTOMA Miers

Tendrilled lianas; branchlets subterete or subangulate, or somewhat compressed; nodes with interpetiolar ridges; leaves bifoliolate, occasionally terminated by a simple tendril; pseudostipules somewhat falcate-foliaceous, caducous; inflorescence a terminal or axillary large thyrse; calyx thin or membranaceous, colored, campanulate, truncate, denticulate or somewhat lobed, becoming patelliform and wavy-margined just before anthesis; corolla campanulate-funnel-shaped, thin, the tube conspicuously narrow cylindrical for some distance above the calyx, the lobes when in bud are conspicuously light-colored and tomentellous as compared to the darker-colored, nearly glabrous tube, drying a purplish black; stamens included; anthers glabrous; disk conspicuous, pulvinate; ovary oblong-cylindrical, glabrous or glandular-lepidote; fruit a compressed elongate-linear, smooth septicidally dehiscent capsule; valves with a nearly inconspicuous, slightly raised longitudinal median nerve; seeds transversely oblong with membranaceous wings having broad whitish-hyaline margins and numerous membranaceous nerves extending out from the base of the wings.

PETASTOMA PATELLIFERUM (Schlecht.) Miers., Proc. Roy. Hort. Soc. Lond. **3**: 195. 1863.

Bignonia patellifera Schlecht., Linnaea **8**: 516. 1833.

Branchlets pallid-lenticellate, densely tomentellous or shortly pilose to glabrate, somewhat glandular-lepidote; petioles and petiolules glandular-lepidote and somewhat tomentellous, pilose and canaliculate on the upper side, with a large pulvinate articulation at the junction of the petiolules to the petiole; leaflets ovate-elliptic, elliptic-oblong or obovate-oblong, obtuse to acuminate or cuspidate, base obtuse to narrowly rounded, to 13 cm. long and 9 cm. broad, papery, variously pubescent, tomentellous to glabrate, glandular-lepidote beneath, sparsely so above; veins usually whitish pilose, with the axils of the lateral nerves usually tufted; pseudostipules caducus, falcate-foliaceous, to 8 mm. long and 4 mm. broad; inflorescence a terminal or axillary, large pyramidal thyrse with pink to purple flowers, con-

spicuously whitish tipped in bud; calyx reddish brown, truncate with a wavy margin, becoming expanded and patelliform, 3 to 5 mm. long, slightly glandular-lepidote; corolla 2.5 to 4 cm. long, drying purplish black with whitish, shortly tomentellous lobes, the tube glabrous; disk deeply pulvinate; ovary cylindrical, sparsely glandular-lepidote; capsule 15 to 27 cm. long, 1.2 to 1.5 cm. broad, the edges of the valves somewhat raised, minutely glandular-lepidote and with numerous pale lenticels; seeds about 1 cm. long and 3 cm. broad.—In open forest, along roads and in waste places; southern Mexico to Amazonian Brazil.

CHIAPAS: Road from Ocuilapa to Tuxtla, alt. 640-910 m., fl. August 1895, *E. W. Nelson* 3068 (US). Siltepec, fl. August 1937, *E. Matuda* 1608 (M, MBG). BRITISH HONDURAS: Corozal District—fl. coll. of 1931-32, *P. H. Gentle* 581 (F, M). Stann Creek District—All Pines, open forest on pine flats, alt. 2 m., fl. January 1931, *W. A. Schipp* 701 (AA, F, G, M, MBG, NY). GUATEMALA: Dept. Chimaltenango, Cinlapa, fl. October 1937, *J. R. Johnston* 1039 (F). Dept. Huehuetenango, Nenton, in forest, fl. September 1896, *Ed. Seler* 3217 (G, US). Dept. Jalapa, Jalapa, alt. 1350 m., st. January 1908, *W. A. Kellerman* 7848 (F). Dept. Santa Rosa, Santa Rosa, alt. 1275 m., fl. September 1892, *Heyde & Lux* 4040 (G, US); Santa Rosa, alt. 970 m., fr. December 1892, *Heyde & Lux* 4361 (G, US); Agua Caliente, fr. January 1908, *Kellerman* 7078 (F, NY); Cuajiniquilapa, alt. 720 m., fl. October 1892, *W. A. Shannon* 3602 (US). Without definite locality fl. coll. of 1892, *E. T. Heyde* 278 (US).

The whitish-tomentellous lobes of the corolla are very conspicuous, especially in bud.

35. CHODANTHUS Hassler

Tendrilled lianas; branchlets subterete, striate; nodes with conspicuous interpetiolar ridges projecting partially up the base of the petioles; leaves opposite (alternate or verticillate in abnormal forms) 2- or 3-foliolate, terminal leaflets often replaced by a 3- or rarely 4-fid tendril with recurved arms; pseudostipules small, inconspicuous; inflorescence an axillary raceme; flowers large, lavender in color; calyx campanulate, truncate, dentate, minutely glandular-lepidote or short, sparsely tomentose, somewhat ciliate along the margin; corolla campanulate, infundibuliform; tube nearly glabrous, becoming somewhat short pubescent or furfuraceous on the lobes outside; stamens included; anthers glabrous; disk conspicuous, pulvinate; ovary oblong, minutely glandular-lepidote and somewhat furfuraceous; fruit a linear-oblong, subterete, septicidally dehiscent capsule; valves coriaceous or subligneous with a raised median longitudinal nerve, minutely glandular-lepidote, striate-rugose and raised lenticellate; seeds transversely suboblong, very broadly hyaline-winged.

Chodanthus puberulus Seibert, sp. nov.

PL. 7.

Liana cirrhata; ramuli subteretes striato-rugosi breviter pilosi et sparse glanduloso-lepidoti; consociibus glandularum ad nodos interpetiolos nullis; folia opposita vel subopposita bifoliolata, cirrho apice trifurcato vel raro quadrifurcato recurvo terminata; petioli 1.5-3.5 cm. longi et petioluli 1-1.5 cm. longi breviter pilosi; foliola subcoriacea ovata vel oblongo-ovata breviter obtuso-acuminata, basi obtusa vel rotundata raro paullo obliqua 6.5-11 cm. longa et 4-4.5 cm. lata, subtus breve puberula vel pilosa, supra sparse puberula, supra subtusque dense punctata, subtus ad axillas nervorum lateralium impresso-glandulosa; phylla stipulas simulantia parva; inflorescentia axillaris compressa racemosa pseudo-terminalis, gemma terminali abortiva; bractee lineari-spathulatae vel subulatae 8-9 mm. longae, infimis ad 4 cm. longis foliaceis; calyx campanulatus truncatus denticulatus 7-8 mm. longus sparse breviter tomentosus et glanduloso-lepidotus, marginibus ciliatis; corolla 5.5-6.5 cm. longa;

lobi 1–1.3 cm. longi, extus sparse fulvo-furfuracei; stamina inclusa, antherarum thecae glabrae divaricatae lineari-oblongae; discus pulvinatus 2 mm. altus; ovarium oblongum fulvo-furfuraceum; capsula et semina ignota.

Type in the U. S. National Herbarium, collected at Chiapa, Chiapas, flowering May 17, 1904, by E. A. Goldman (No. 999).

EXTRALIMITAL MATERIAL EXAMINED: VERACRUZ: Zacuapan, on rocks, fl. March 1916, *C. A. Purpus 7551* (G).

From the South American species, *Chodanthus splendens* (Bur. & K. Schum.) Hassl., *C. puberulus* may be differentiated by the puberulous lower surface of the leaflets, the larger impressed glands in the axils of the basal lateral nerves, and the foliaceous bracts subtending the inflorescence.

It is interesting to note that, although the leaves of the type specimen are all opposite, those of *Purpus 7751* are quite abnormal, being subopposite, alternate and verticillate all on the same branch.

36. ANEMOPAEGMA Mart. ex DC.

Tendrilled lianas; branchlets subterete or ribbed; nodes with slight interpetiolar ridges; leaves 2- or 3-foliolate, with the terminal leaflet frequently replaced by a simple (in Yucatan) tendril; pseudostipules conspicuous, foliaceous, or absent; inflorescence a short axillary raceme or thyrse, rarely terminal; calyx campanulate, truncate or slightly lobed, always with glands below the margin on the outer surface; corolla campanulate-funnel-shaped, glandular-lepidote (in Yucatan); stamens included; anthers glabrous; disk pulvinate; ovary ovoid-ellipsoid or ellipsoid, often somewhat angled, conspicuously contracted into the disk, glandular-lepidote or tomentose; fruit a thick, short, ellipsoid or elliptic, smooth, septicidally dehiscent capsule, stipitate at the base; valves with a faint midrib; seeds transversely oblong with broad corky opaque wings (in Central America).

ANEMOPAEGMA BELIZEANUM [balizeanum] Blake, Contr. Gray Herb. **52**: 91. 1917.

Branchlets subterete, striate, puberulous, glabrescent; nodes ampliate and complanate with faint interpetiolar ridges; leaves bifoliolate; petioles and petiolules pubescent as the branchlets; leaflets oval or ovate-oblong, acute to short acuminate, mucronate; base rotund to cuneate, subcoriaceous, densely impressed glandular-lepidote punctate above and below, otherwise glabrous except for the slightly pubescent midvein; pseudostipules foliaceous, orbicular or elliptic, 9 to 9.5 mm. long and 6.5 to 8.5 mm. broad with the same impressed glandular-lepidote punctate condition as the leaflets; flowers yellow, borne singly, geminately or on a very short 3-flowered raceme, axillary; calyx 0.8 to 1 cm. long, truncate or obscurely lobate, coriaceous, sparsely ciliate along the margin, obscurely glandular-lepidote with numerous light-colored, plate-shaped glands on the upper half; corolla 5 to 7 cm. long, densely and minutely glandular-lepidote; disk to 1.8 mm. high; ovary glandular-lepidote, subtetragonal; style glandular-lepidote towards the base; capsule about 8 cm. long, 4 cm. broad.—On moist stream banks along the coastal regions of British Honduras and north-eastern Guatemala.

BRITISH HONDURAS: Toledo District—Jacinto Creek, alt. 15 m., on creek bank in open places, fr. May 1933, *W. A. Schipp S-566* (F, M, MBG), fl. January 1934, *Schipp S-566A* (G, NY); low bank of Rio Grande, fl. March 1907, *M. E. Peck 957* (G type). GUATEMALA: Dept. Izabal, Jocolo, Lake Izabal, alt. 45 m., fl. April 1920, *Harry Johnson 309* (US).

37. PARAGONIA Bur.

Tendrilled lianas; branchlets subterete, striate, lenticellate, with interpetiolar ridges at the nodes; leaves bifoliate with the terminal leaflet replaced by a bifid or trifid tendril which is often deciduous; petioles with plate-shaped glands along the upper side, especially near the upper end; pseudostipules small, subulate-lanceolate; inflorescence usually a many-flowered terminal dichasium, rarely a simple thyrse; calyx campanulate, truncate or slightly lobed; corolla funnel-shaped, velvety tomentose outside, rather thick; stamens included; anthers glabrous; disk large, cupular; ovary subcylindric, glandular-lepidote; fruit an elongate-linear, subcylindrical, acuminate, minutely and densely tuberculate septicidally dehiscent capsule; valves with a raised longitudinal midrib; seeds narrowly transversely suboblong, with broad, membranaceous, translucent, brownish wings.

PARAGONIA PYRAMIDATA (L. C. Rich.) Bur., Vidensk. Medd. Naturh. Foren. 104. 1894.

Bignonia pyramidata L. C. Rich., Act. Soc. Hist. Nat. Paris 110. 1792.

Bignonia Sinclairii Benth., Bot. Voy. Sulph. 129. 1845.

Tabebuia pyramidata (L. C. Rich.) DC., Prod. 9: 214. 1845.

Arrabidaea dichasia Donn. Sm., Bot. Gaz. 20: 6. 1895.

Adenocalymna densiflora Rusby, Mem. N. Y. Bot. Gard. 7: 355. 1927.

Branchlets with numerous raised lenticels, glandular-lepidote, drying blackish with pallid lenticels when young; petioles with numerous large, somewhat sunken plate-shaped glands on the upper side near the apex and extending down over most of the upper edge; leaflets ovate, obovate, elliptic or oblong-elliptic, shortly acuminate, base obtuse, rounded or rarely cuneate, 8 to 17 cm. long, 3 to 9 cm. broad, subcoriaceous, minutely glandular-lepidote; veins drying blackish or purplish; tendrils bifid or trifid; pseudostipules subulate-lanceolate, 5 to 7 mm. long, usually longitudinally striate when old; flowers pinkish purple, drying chocolate brown; calyx campanulate, truncate or slightly lobed, 5 to 9 mm. long, minutely and thickly blunt-tuberculate, appearing very coarsely and densely tomentose, with a few impressed plate-shaped glands; corolla 3 to 6 cm. long, densely velvety tomentose, rather thick; disk cupular, 1 to 1.5 mm. high; ovary subcylindric, glandular-lepidote; capsule to 4.5 cm. long and 1.5 cm. broad, densely and minutely tuberculate; seeds 1.3 cm. long and 4.5 cm. broad; wings translucent, pale brownish.—Widely distributed, usually in rain forests; British Honduras to Brazil and Peru.

BRITISH HONDURAS: Belize District—Hector Creek, Sibun River, fr. December 1934, *P. H. Gentle* 1415 (AA, F, M, MBG, NY, US); Manatee Lagoon, in forest, st. March 1906, *M. E. Peck* 397 (G). El Cayo District—Cohune Ridge, in secondary forest, fl. June-August 1936, *C. L. Lundell* 6463 (M). Stann Creek District—Middlesex, on riverbank, alt. 60 m., fr. *W. A. Schipp* S-71 (F), fl. September 1929, *Schipp* 347 (AA, F, G, M, MBG, NY); Stann Creek—Mullins River road, fr. March 1937, *Gentle* 1943 (M). Toledo District—Sarstoon, fr. November 1928, *N. S. Stevenson* 3 (F). Without definite locality, *Stevenson* 78 (Y). GUATEMALA: Dept. Alta Verapaz, Cubilquitz, alt. 350 m., fl. August 1901, *H. von Tuerckheim* 7648 (AA, G, US). Dept. Escuintla, Escuintla, alt. 330 m., fl. March 1890, *J. D. Smith* 2048 (G, US). Dept. Izabal, vic. Quirigua, alt. 75-225 m., in pasture, st. May 1922, *P. C. Standley* 24603 (US). Dept. Solola, Santa Barbara, alt. 400 m., fl. August 1891, *W. C. Shannon* 118 (US). Without definite locality, fl. June 1936, *M. Pacheco* 1496 (F).

VERNACULAR NAME: "Tie-tie" (*Stevenson* 3, 78).

38. **ADENOCALYMMMA** Mart. ex DC.

Tendrilled lianas; branchlets terete with interpetiolar ridges at the nodes; leaves trifoliolate or bifoliolate and terminated by a simple or rarely trifid tendril; pseudostipules subulate, not foliaceous; inflorescence a narrow axillary or terminal raceme or panicle, or thyrse; bracts usually large and conspicuous, caducous; calyx cupular-campanulate, truncate or denticulate, irregularly lobed or tubular and somewhat spathaceously split, usually with conspicuous plate-shaped glands; corolla funnel-shaped or campanulate-funnel-shaped, densely pubescent outside; stamens included; anthers glabrous; disk pulvinate or cupular, large; ovary more or less glandular-lepidote; fruit an oblong or oblong-linear, thick and somewhat flattened, woody, smooth, tuberculate or rugose, septicidally dehiscent capsule; valves with a more or less inconspicuous median nerve; seeds subtrapeziform and almost wholly corky, or transversely oblong with membranaceous, hyaline wings, the body always being very thick.

Flowers yellow; capsule smooth; calyx irregularly, shallowly lobed; leaflets without plate-shaped glands in the axiles of the lateral nerves 1. *A. Calderoni*
 Flowers pinkish; capsule tuberculate; calyx 5-costate with 5 tortuous subulate teeth;
 leaflets with plate-shaped glands in the axiles of the 2 basal lateral nerves 2. *A. fissum*

1. **Adenocalymma Calderoni** (Standl.) Seibert, comb. nov.

Tabebuia Calderoni Standl., Journ. Wash. Acad. Sci. 14: 244. 1924.

Adenocalymma Hintoni Sandw., Kew Bull. 1936: 10. 1936.

Branchlets drying blackish when young, with numerous pallid lenticels, glabrescent; leaves 2- or 3-foliolate; petioles conspicuously articulated to the branchlets; petiolules articulated to the blade; leaflets ovate, elliptic or oblong, obtuse to short obtusely acuminate or acute, occasionally cuspidate, base obtuse to rounded, occasionally shallowly cordate when older, 3 to 13 cm. long and 2 to 7.5 cm. broad, drying blackish when young and shiny steel-gray above when older, with a distinct but narrow cartilaginous margin, sparsely glandular-lepidote when young, becoming minutely punctate, otherwise glabrous; inflorescence of axillary and terminal narrow racemes or panicles, somewhat furfuraceous-pubescent; bracts 6 to 9 cm. long and 5.5 to 9 cm. broad, minutely puberulous and with conspicuous large patelliform glands; calyx 4 to 8 mm. long, irregularly lobed or split, densely short puberulous-tomentellous, with a few plate-shaped black glands; corolla yellow, 4 to 6 cm. long, base glabrescent, the limb and lobes conspicuously short furfuraceous-pubescent; disk pulvinate, to 2 mm. high; capsule 10 to 18 cm. long, 2 to 3 cm. broad, base rotund, apex short attenuate; valves woody-coriaceous, smooth or slightly rugose, lenticellate; seeds transversely oblong, 1.6 to 2.1 cm. long, 5 to 8 cm. broad; wings membranaceous, grading into hyaline towards the edge.—Rather dry barrancas and cliffs, in sandy soil; central Mexico to El Salvador.

TABASCO: Playas de Paso-Ancho, fl. July 1888, *J. N. Roviroso 240* (US). BRITISH HONDURAS: Toledo District—Jacinto Creek, Machaca, fl. May 1933, *W. A. Schipp S-565* (F); Jacinto Creek, alt. 14 m., fl. July 1933, *Schipp S-573* (F). GUATEMALA: Dept. Zacapa, Gualan, alt. 190 m., fl. June 1909, *C. C. Deam 6302* (G, US).

VERNACULAR NAMES: "*Bejuco blanco*," "*Canilla de zopilote*" (*Roviroso 240*).

Examination of the type of *Tabebuia Calderoni* Standl., *Calderon 1666* from El Salvador (US), has proven it to be synonymous with the well-known but more recently

described *Adenocalymma Hintoni* Sandw. of central Mexico, thus necessitating the new combination. The species blooms from April through July.

2. *ADENOCALYMMMA FISSUM* Loes., Verh. Bot. Ver. Brand. **65**: 102. 1923.

Adenocalymma Seleri Loes., Verh. Bot. Ver. Brand. **65**: 101. 1923.

Branchlets subterete, striate, pallid lenticellate, becoming somewhat verrucose with age; leaves 2- or 3-foliolate; leaflets ovate to ovate-lanceolate, acute to short-acuminate, base obtuse to rounded, frequently oblique, becoming subcoriaceous with age, 6 to 14 cm. long, 2.5 to 8 cm. broad, densely punctate below, frequently becoming somewhat puberulous below with age; axils of the basal lateral nerves with fields of conspicuous plate-shaped glands; tendrils trifid; inflorescence usually a long, narrow terminal or axillary thyse, with the lateral flowers of the cymes not fully developing; flowers pinkish lavender; calyx 0.5 to 1 cm. long, splitting somewhat on one side, with 5 distinct longitudinal ribs, terminating in subulate teeth 1 to 2 mm. long, which are somewhat helicoidal in bud and tortuous after anthesis, glandular-lepidote and puberulous, somewhat verrucose; corolla 4 to 9 cm. long, minutely puberulous and somewhat lepidote; ovary densely glandular-lepidote; capsule about 19 cm. long, 2.5 to 3 cm. in diameter, subcylindrical, densely tuberculate-verrucose, with the tubercles 2 to 3 mm. long; seeds about 1.6 cm. long and 6 cm. broad; wings membranaceous adjoining the body, but grading into a broad hyaline margin.—Barrancas, second growth and waste places; Guerrero to Yucatan and Quintana Roo, south to central Guatemala.

YUCATAN: Buena Vista Xbac, in forests, fl. coll. of 1895, *G. F. Gaumer 1068* (F, MBG, US). S. E. Kancabdzonot, fl. May 1917, *Gaumer & Sons 23844* (F). Chichen Itza, Pisteyokdzonoot road, in low second growth, fr. May-August 1938, *C. L. Lundell & Amelia A. Lundell 7865* (M, MBG). Ticul to Tabi, fl. May 1903, *Ed. Seler 3901* (F isotype of *A. Seleri* Loes.) QUINTANA ROO: Cozumel, fl. *Gaumer 77* (G). Chichankanab, fl. *Gaumer 2162* (F, G, MBG, US), *2440* (F). CAMPECHE: Juarez, fl. March 1932, *Lundell 1424* (F, G, M, NY). GUATEMALA: Dept. Guatemala, Trapichite, fr. January 1907, *W. A. Kellerman 6498* (US). Dept. Peten, Uaxactun, fl. April 1931, *H. H. Bartlett 12567* (F, M).

VERNACULAR NAMES: "Chacanicab" (*Gaumer 1068*); "Oppol-che" (*Seler 3901*).

A most conspicuous plant with its characteristic calyx and fruit. The tuberculate capsule, trifid tendrils, pink corollas and costate tortuous-subulate toothed calyx are not strictly characteristic of the genus *Adenocalymma*, and the plant may be a new genus, as has already been pointed out by N. Y. Sandwith, *Recueil Trav. Bot. Neerland.* **34**: 211-12. 1937. The fruit, and especially the seeds, are closely related to those of *Adenocalymma*; however, the tubercles on the valves of the capsule are unusual.

Adenocalymma fissum is closely related to the Venezuelan species, *A. helicocalyx* O. Ktze., but seems to be distinguishable by having much shorter and more numerous tubercles, which are very irregular in outline, than those of the South American species.

Type material of *A. Seleri* Loes. proves to be synonymous with *A. fissum*. Variation in the size and length of both the corolla and calyx is very evident from the examination of the material at hand. Although both species were described in the same publication, it seems advisable to accept *A. fissum*, since this name has appeared most in literature and is most familiar.

39. **TOURRETTIA** Fouger.

Tendrilled herbaceous vines; branchlets tetragonal; nodes with interpetiolar ridges; leaves opposite, 2- or 3-ternate, frequently terminated by a trifid tendril, each arm usually being divided dichotomously; leaflets serrate, frequently somewhat divided; inflorescence a terminal spicate raceme; flowers small, short pedicellate, dimorphous, the upper ones being sterile and deciduous; calyx 2-parted, deciduous, the lobes entire; corolla slender, tubular, unequally bilabiate, the tube shorter than the calyx; stamens 4, fertile without a staminode, attached at about the middle of the tube; anthers glabrous; disk annular; ovary ovoid, densely covered with short spines; fruit an ovoid, densely uncate-spinose, septicidally dehiscent capsule, frequently never splitting quite to the base; seeds somewhat oblong, small with a narrow membranaceous wing.

TOURRETTIA LAPPACEA (L'Her.) Willd., Sp. Pl. **3**: 263. 1800.

Dombeya lappacea L'Her., Stirp. Nov. **33**, pl. 17. 1784.

Tourretia volubilis J. F. Gmel., Syst. **2**: 940. 1791.

Tendrilled annual vine, somewhat succulent; leaflets ovate or rhombic, thin, acute or acuminate, base acute or obtuse, 3 to 9 cm. long, conspicuously serrate, glabrous, usually with scattered impressed plate-shaped glands above; calyx red, 1 to 1.4 cm. long, somewhat villosulous; corolla 1.2 to 2 cm. long, somewhat villosulous, especially near the tip; capsules 3 to 4 cm. long, 1.5 to 2 cm. in diameter, covered with numerous uncate spines.—Very common in thickets, waste places and forests between 1,200 and 1,800 m.; Mexico to Peru.

GUATEMALA: Dept. Huehuetenango, Jacaltenango, alt. 1060-1635 m., fl. December 1895, *E. W. Nelson* 3585 (F, US). Dept. Quetzaltenango, near Santa Maria, fl. coll. of 1841, *Hartweg* 547 (NY). Dept. Santa Rosa, Cenaguilla, alt. 1300 m., fl. & fr. September 1892, *Heyde & Lux* 3773 (G, US). Without definite locality, fr. coll. of 1892, *E. T. Heyde* 529 (US); alt. 1480 m., fr. January 1928, *M. Ruano* 867 (US).

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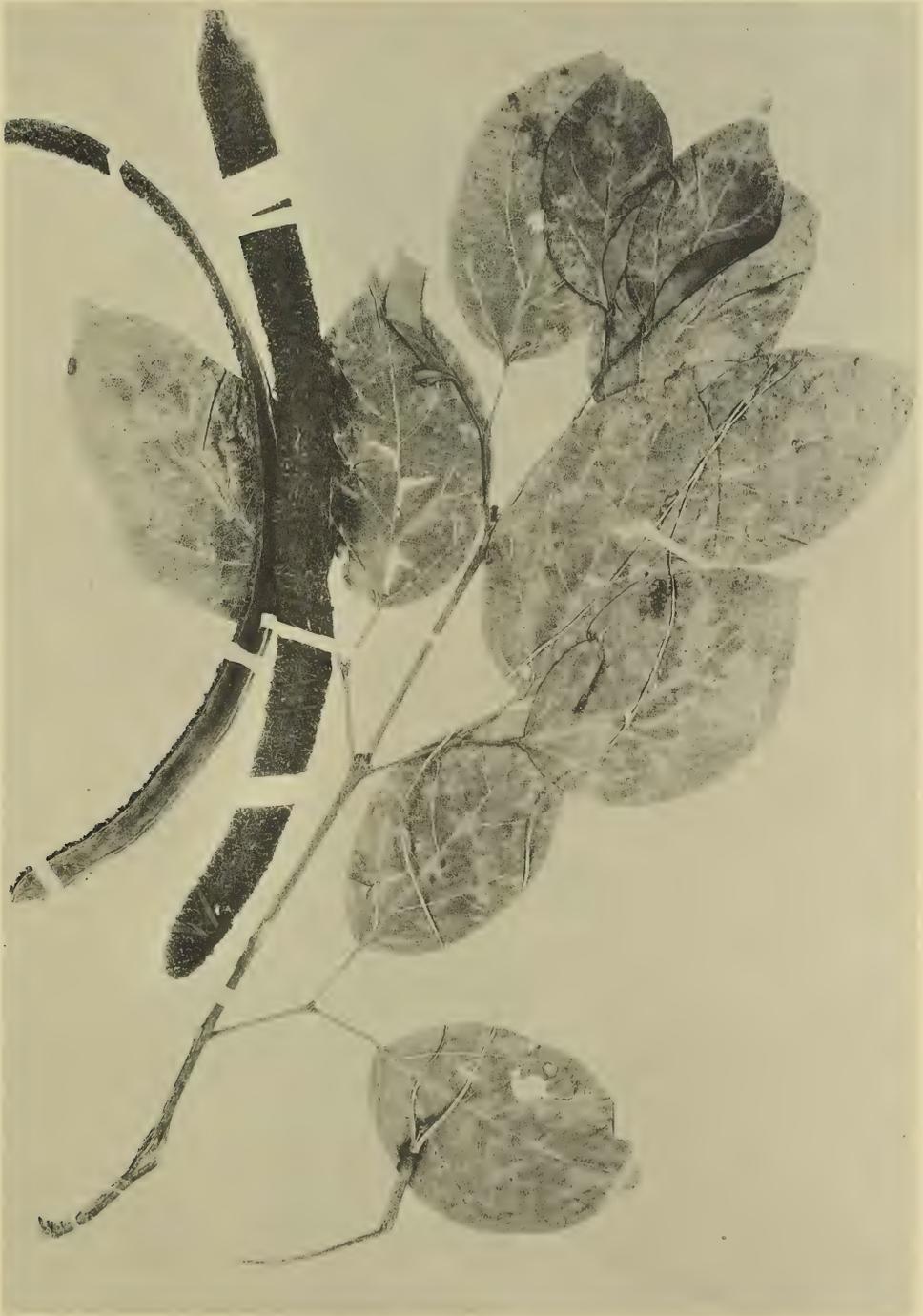
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