













ANNALS  
OF THE  
CARNEGIE MUSEUM

VOL. XI.

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W. J. HOLLAND, *Editor*

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*Polystichum jenningsi* L. S. Hopkins,  
p. 362, Pl. XXXVII. Nisqually River, Washington.

SPERMATOPHYTA.

Family ERIOCAULACEÆ.

*Pæpalanthus alsinoides* var. *minimus* Jennings,  
p. 89, Pl. XVII, figs. E-H. Isle of Pines, Cuba

Family ORCHIDACEÆ.

*Epidendrum obcordatum* Jennings . . . p. 101, Pl. XVIII. Isle of Pines, Cuba.  
*Epidendrum brevifolium* Jennings . . . . p. 103, Pl. XIX. Isle of Pines, Cuba.

Family CÆSALPINIACEÆ.

*Bauhinia caribæa* Jennings . . . . . p. 127, Pl. XX. Isle of Pines, Cuba.

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*Tamonea tomentosa* var. *auriculata* Jennings,  
p. 208, Pl. XXII. Isle of Pines, Cuba.  
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Family LABIATÆ.

*Mesosphærum (Hyptis) hollandianum* Jennings,  
p. 243, Pl. XXV. Isle of Pines, Cuba.  
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Family ACANTHACEÆ.

*Justicia diversifolia* Jennings . . . . . p. 259, Pl. XXVIII. Isle of Pines, Cuba.



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<i>Hypoxis decumbens</i> var. <i>mexicana</i> (Rœmer & Schultes) Jennings	p. 97
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<i>Parsonsia Grisebachiana</i> (Koehne) Jennings	p. 199
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<i>Tamonea androsæmifolia</i> (Grisebach) Jennings	p. 209
<i>Tamonea delicatula</i> (A. Richard) Jennings	p. 210
<i>Tamonea Wrightii</i> (Triana) Jennings	p. 211
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<i>Mesosphærum minutifolium</i> (Grisebach) Jennings	p. 243

## INSECTS.

## LEPIDOPTERA.

<i>Papilio weberi</i> Holland	p. 14, Pl. IV, fig. 1.	Cameroons.
<i>Charaxes lydiæ</i> Holland	p. 16, Pl. IV, fig. 2.	Cameroons.

## RHYNCHOTA.

## HEMIPTERA-HOMOPTERA.

## Family FULGORIDÆ.

<i>Rhamphixius pallidus</i> Osborn	p. 347.	Isle of Pines, Cuba.
<i>Ormenis linki</i> Holland	p. 347.	Isle of Pines, Cuba.

## HEMIPTERA-HOMOPTERA.

## Family PENTATOMIDÆ.

<i>Mormidea linki</i> Heidemann	p. 351.	Isle of Pines, Cuba.
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## DIPTERA.

## Family DROSOPHILIDÆ.

<i>Leucophenga argenteo-fasciata</i> Kahl	p. 371.	Brazil.
<i>Leucophenga brunneipennis</i> Kahl	p. 373.	Bolivia.
<i>Leucophenga hasemani</i> Kahl	p. 375.	Brazil.
<i>Leucophenga argenteiventris</i> Kahl	p. 378.	Bolivia.
<i>Leucophenga ornativentris</i> Kahl	p. 379.	Bolivia.
<i>Leucophenga bistriata</i> Kahl	p. 386.	Mindanao, P. I.
<i>Leucophenga goodi</i> Kahl	p. 388.	Cameroons.
<i>Leucophenga ambigua</i> Kahl	p. 389.	Cameroons.

FISHES.

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- Labeo fisheri* Jordan & Starks . . . . . p. 436, Pl. XLIII. Ceylon.  
*Amblypharyngodon grandisquamis* Jordan & Starks,  
p. 438, Pl. XLIV. Ceylon.

Family SILURIDÆ.

- Rhamdia microps* Eigenmann,  
p. 394, Pl. XXXVIII. Brazil. Uruguayana, Brazil.  
*Cheirocerus* (gen. nov.) *eques*, Eigenmann . . . . . p. 398, Pl. XXXIX. Brazil.  
*Doras lentiginosus* Eigenmann . . . . . p. 401, Pl. XL. Brazil.  
*Entomocorus* (gen. nov.) *benjamini* Eigenmann . . . . . p. 403, Pl. XLI. Brazil.  
*Ageneiosus madeirensis* Fisher . . . . . p. 426, Pl. XLII. Brazil.

Family LORICARIIDÆ.

- Farlowella azygia* Eigenmann & Vance . . . . . p. 299, Pl. XXIX. Brazil.  
*Farlowella jauruënsis* Eigenmann & Vance . . . p. 300, Pl. XXX, fig. 3. Jaurú.  
*Farlowella hasemani* Eigenmann & Vance . . . . . p. 301, figs. 1, 2. Brazil.

Family HÆMULIDÆ.

- Dacymba* (gen. nov. Jordan) *bennetti* (Lowe) . . p. 465, pl. XLVII. Port Said.

REPTILES.

Order LACERTILIA.

Family GECKONIDÆ.

- Gonatodes hasemani* Griffin . . . . . p. 304, Pl. XXXII. Bolivia.

Family IGUANIDÆ.

- Anolis steinbachi* Griffin . . . . . p. 308, Pl. XXXIII. Bolivia.

Family TEIIDÆ.

- Prionodactylus albostrigatus* Griffin . . . . . p. 314, Pl. XXXIV. Brazil.  
*Prionodactylus eigenmanni* Griffin . . . . . p. 316, Pl. XXXV. Bolivia.





## ERRATA AND CORRIGENDA.

---

- P. 39, line 2 strike out the words "and Percy Wilson."  
P. 41, line 36, for "*Neprodium*" read *Nephrodium*.  
P. 42, lines 12 and 23, for "*Neprodium*" read *Nephrodium*.  
P. 43, line 5, for "*Neprodium*" read *Nephrodium*; line 6, for "170" read 178.  
Pp. 79-80, **Rynchospora** read **Rhynchospora**.  
P. 93, line 26, for "*havensis*" read *havanensis*.  
P. 140, line 3 from bottom, for "*angustifolia*" read *angustifolia*.  
P. 156, heading of page, read 157, and on page 157, read 156; transpose pages thus corrected.  
P. 167, for "*Chamæscye*" read *Chamæsyce*.  
P. 169, line 8, for "*pseudomyrobal nus*" read *pseudomyrobalanus*.  
P. 270, line 10, for "*crocera*" read *crocea*.  
P. 300, for "Rio Jaura" read Rio Jaurú.  
P. 338, for "*Thonalnus*" read *Thonalmus*.  
P. 362, line 12, after the word *wide* add—by 3.5-4.5 cm. long, gradually becoming longer, until near the middle of the leaf, where they are about 2.5-3 cm. wide, and  
P. 399, for "*goeldi*" read *goeldii*.  
P. 403, 4th line from top, for "*Centromochles*" read *Centromochlus*.  
P. 408, 17th line from bottom, for "*minutus*" read *minuta*.  
P. 430, for "*Charcharinus*" read *Carcharhinus*; for "*Pteroplatæa*" read *Pteroplatea*.  
P. 431, 21st line from bottom, for "*Sardinia*" read *Sardina*.  
P. 433, for "*Eucrasicolus*" read *Encrasicholus*.  
P. 443, for "*bailleni*" read *bailloni*.  
P. 469, line 14, after the word *is*, read "one quarter of a mile, its length one and one-half of a mile."



# ANNALS

OF THE

# CARNEGIE MUSEUM

VOL. XI, NOS. I AND 2.

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## EDITORIAL NOTES.

DURING the summer and fall of 1916 various members of the staff were absent either on vacations or making collections in distant parts of the country. Mr. O. J. Murie was at work in Oregon, where he assembled for us a considerable collection of birds and mammals. Mr. and Mrs. O. E. Jennings continued the work of exploring the country north of Lake Superior, visiting regions which had not previously been investigated by them and bringing back large and interesting collections of plants and quite a number of insects. Mr. David R. Sumstine made collections of about seven hundred botanical specimens in western Pennsylvania, some of the plants being species new to the herbarium. He is still engaged in identifying some of this material.

Considerable additions representing the fauna and flora of western Pennsylvania were made by various members of the staff during minor excursions made to various localities in the vicinity of the city.

A steady stream of contributions to our collections has flowed in month by month, and the list of accessions reflects a very wide popular interest in the work of the Museum.

---

DURING the week beginning with Sunday, September 28, the city of Pittsburgh celebrated in an appropriate manner the centennial of the granting by the commonwealth of Pennsylvania of its charter as



a city. On November 3 there was a civic parade, which was witnessed by hundreds of thousands of spectators. In anticipation of this parade a committee was appointed by the Board of Trustees to prepare a float, which should represent in an appropriate manner the activities of the Institute. It fell to the Director of the Museum to act as the chairman of this committee. Unfortunately, owing to the absence of some of the members of the committee, the duty of elaborating a plan and carrying it into execution devolved upon the chairman, as is very frequently the case in such undertakings. He resolved to construct an accurate model, showing the Forbes Street front of the main building of the Institute, on a scale of three-eighths of an inch to the foot, mounted upon a base appropriately inscribed and draped.

The execution of the design was carried out with the assistance of the members of the staff of the Museum who are skilful in such matters, who entered with willing enthusiasm into the plans of the Director. Mr. Craver of the Library, and Mr. Beatty of the Department of Fine Arts, kindly contributed the help of certain members of their force, who, it was found, could be utilized. From the drawings of Messrs. Alden & Harlow, the architects of the building, Mr. Sidney Prentice made an enlargement, three times larger than the originals, which were drawn to the scale of one-eighth of an inch. Mr. Banks, Mr. Adam Gochincki, and Mr. Love, the cabinet-makers of the Museum, gave proof of their nimbleness of finger and their resourcefulness in attending to that part of the work which was entrusted to them. Mr. Theodore A. Mills and the Director, assisted by Mr. Arthur Coggeshall and Mr. Agostini, whose skill as a worker in plaster is unequaled, provided the miniature reproductions and ornaments of the exterior and of the shields. Mr. Prentice also lent a willing hand in working at the architectural details. Mr. Polis, of the Department of Fine Arts, patiently carried out the tasks entrusted to him. Mr. G. A. Link, Jr., and Miss Florence Stribling finished and put in place the inscriptions made of raised letters, which had been sawn out of wood by our cabinet-makers after designs prepared for them by the Director. Mr. Link, Mr. Prentice, and Mr. Mills, together with the Director, elaborated the shields, of which there were eight. The draperies were attended to by Miss Dierdorf and Mrs. Clayton, assisted by Mr. Scott and his associates in the book-binding, who kindly put their electrically driven sewing-machine at our



Side View of the Float designed and built by Dr. W. J. Holland for the Parade Commemorating the Centennial of the Chartering of the City of Pittsburgh, November 3, 1916.





Rear View of the Float exhibited in the Centennial Parade, November 3, 1916.





service. The painting was the joint work of the Director, Mr. Link, Mr. Rosenberg, and Mr. Polis. The whole undertaking, which was conceived in a flash, was executed with a speed which elicited astonishment from those who witnessed from day to day the steady growth of the design. The finishing touch to the whole structure was given by Mr. D. C. Hughes, who with his own hands fashioned out of a tin can and some bits of brass the armillary which surmounts the main building. The undertaking took us back to the days of our childhood, when we "played with blocks," and we were all happy as children while the work was in hand.

We received very complimentary notices of our work from many of those who witnessed the parade, and in the columns of the press. The float was subsequently displayed at the exhibition of the Pittsburgh Architectural Club during the month of December.

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DR. J. A. REIS and the Rev. Albert I. Good have returned from Kamerun, Africa, bringing with them large collections of entomological specimens and a number of birds and mammals.

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THE administrators of the estate of the late G. A. Steiner have loaned to the Museum twenty-nine additional pieces of Indian basketry. These have been added to the large collection which was deposited in the Museum by Mr. Steiner before his death.

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THE Cambridge Glass Company of Cambridge, Ohio, has loaned to the Museum a very beautiful collection of their manufactures, consisting of sixty-eight specimens. This exhibit is made at a particularly fortunate time, as it shows what useful and artistic work can be done by American manufacturers.

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RICHARD HARTJE, ESQ., has loaned to the Museum a splendidly preserved specimen of fifteenth century Bavarian tapestry, depicting Diana at the hunt. This is also displayed in the Gallery of Useful Arts.

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MISS ELIZABETH LAUDER has loaned to the Museum a very beautiful collection of Chinese and Japanese embroideries and brocades. The collection, consisting of eighteen pieces, was obtained by Miss

Lauder in Tokio during the past year. It has been displayed in the Gallery of Useful Arts in two cases which were especially constructed for this exhibit.

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COÖPERATING with the Art Department of the Carnegie Institute, the Museum gathered and placed on display a collection of documents and other relics pertaining to the early history of the city of Pittsburgh. This collection was on exhibition until the end of November, and awakened great interest in the public. The exhibition was made in connection with the centennial celebration of the granting of a charter to the city.

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COLONEL S. H. CHURCH, President of the Board of Trustees of the Carnegie Institute, has presented the Museum with a very complete set of Japanese armor, and also with a death mask of Oliver Cromwell, taken from the original, formerly in the possession of Thomas Carlyle.

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EXTENSIVE collections of birds and mammals have been received from Mr. M. A. Carriker, Jr., who for some time has been working for the Museum in Colombia.

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MR. B. PRESTON CLARK has donated a number of entomological specimens from Seward, Kodiak, and Skaguay, Alaska.

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MR. JOHN M. PHILLIPS, who has always been most generous, has added to our collections a male jaguar, killed at Tamaulipas, Mexico, in 1915.

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A LETTER has been received from Mr. Samuel M. Klages stating that he had reached Trinidad, and that it was his intention to begin collecting for the Museum in French Guiana.

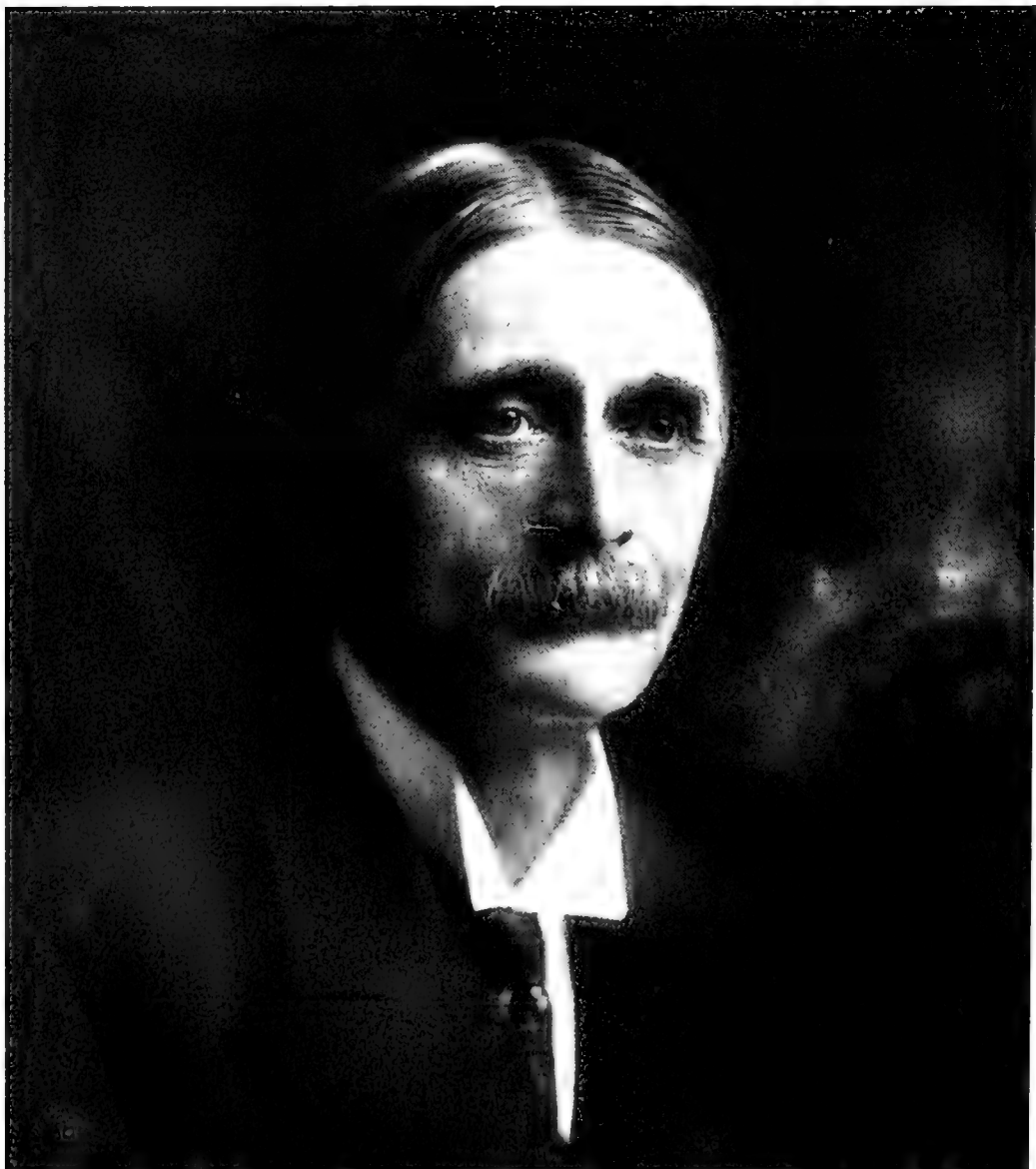




GUSTAV A. LINK



THEODORE A. MILLS



EDWARD MANNING BIGELOW

## OBITUARY NOTES.

By W. J. HOLLAND.

GUSTAV ADOLPH LINK, SENIOR.

Born May 15, 1860, Died August 16, 1916.

At half past five o'clock on the morning of August 16, 1916, Mr. Gustav A. Link, Sr., died at Mercy Hospital, Pittsburgh. He had been bitten about the middle of the afternoon of the day before by a rattlesnake, which six years before he had captured at Ohiopyle Falls, and had since kept as a "pet" in a cage in the Taxidermic Laboratory of the Museum, and which, in spite of the warnings and protests of his superior officers, he had come to handle with more or less familiarity, not unmingled with contempt. He had successfully administered remedies on two occasions to associates when they had been bitten by venomous snakes, and had treated himself with success in the past, when bitten, and in conversation used to make light of injuries of this sort. For many years he had made it a practice to carry the necessary antidotes in his vest-pocket, but for some months before the accident he had neglected to do so. He was bitten on August 15, while he was talking to a company of students from the University of Pittsburgh, who had been given permission to visit the Taxidermic Laboratory. The snake, which he had been handling with his accustomed fearlessness, as he was putting it back into its cage, struck him upon the index finger of the right hand. One of the students called attention to a drop of blood upon Mr. Link's finger, and asked him if he had not been bitten. He evaded the question, and stated that he had scratched his finger. He continued to talk to the boys for fully half an hour afterwards, and only after they had withdrawn did he admit to his associates in the laboratory that he had been bitten. Every effort was made at once to arrest and counteract the effects of the poison. A ligature



was applied well up upon the arm, the wound was scored and a quantity of blood was removed by sucking and by free bleeding. Antidotes were also applied externally and administered internally. Medical aid was instantly summoned. Dr. C. H. Eigenmann by long distance telephone succeeded in reaching Mr. Raymond L. Ditmars, of the New York Zoölogical Garden, who promptly sent a supply of antitoxic serum at the hands of the conductor of the first fast express train from New York to Pittsburgh. This did not reach the city until after midnight on the 16th, and although administered as soon as it came to hand, it failed to be effective, the case being already beyond control.

Mr. Gustav Adolph Link was born in Pittsburgh on May 15, 1860. His parents, John George and Elizabeth Link, were immigrants from Germany. After passing through the common schools, he became a baker's apprentice, and having completed his apprenticeship, continued to follow this calling, having established a baking and confectionery shop, in which he was able to obtain a living for himself and family. The love of nature, however, was born in him, and all the time which he could spare from his business he devoted to the study of the living things of the fields and woodlands. He took up the self-imposed task of making a collection of the birds of the vicinity, and, in order to this, acquired a knowledge of taxidermy. He presently won reputation among his neighbors, and his services came to be in demand in mounting trophies of the chase and in preserving the skins of domestic pets. And so it came about that along with the work of the bakery he carried on in a small way the work of a taxidermist. Early in the year 1897, after it had been decided to employ Mr. Frederic S. Webster of New York as the Chief Taxidermist at the Carnegie Museum, Mr. Link applied to be taken into employment as an assistant. He was to work during regular hours while the baking and confectionery business would be carried on by his good wife. He justified the expectations raised concerning himself, and until his death remained with the Museum, he after a while having entirely abandoned his original calling.

Mr. Link was a capable collector in the field. He accompanied Dr. Atkinson and Dr. O. E. Jennings on the journeys which

they took a number of years ago through the mountain regions of western Pennsylvania to make zoölogical and botanical collections for the Museum, and in his capacity as a preparator rendered excellent service. He constantly aided Mr. Todd in the collection and preservation of birds and mammals. He was one of the party of three who went to Arkansas, Oklahoma, and Texas in the spring of 1907 to make collections for the Museum, and twice visited the Isle of Pines, residing there on the occasion of his last visit more than a year, from May, 1912, to the end of June, 1913. The collections of birds and insects which he made during his stay on the island is undoubtedly the largest and best which up to the present time has been made in this locality. When not at work in the field he devoted himself assiduously to his duties in the laboratory. He became particularly skilful in mounting birds and reptiles. The larger part of the birds on exhibition at the present time in the Gallery of Ornithology were either originally mounted by him or remounted. He assisted Mr. Frederic S. Webster, and later Mr. R. H. Santens, in the preparation of a number of the groups both of birds and mammals which adorn the galleries of the Museum. At the time of his death he was engaged in preparing a group of boa-constrictors and iguanas collected by himself in the Isle of Pines. The largest boa in the group, which is in fact the largest specimen hitherto reported from that island, was captured alive by Mr. Link, who found it in the jungle engaged in swallowing a white heron. He slipped a bag over the head of the brute, and with the help of an assistant thrust the wriggling body of the monster into the sack, tied it up, and brought it home with him. It lived for a long while in the Museum, where he made a careful study of its form and colors.

Mr. Link was intrepid, fearless, and indefatigable in the field, in the laboratory industrious and painstaking. In his bearing he was modest and unassuming. His death removes from his associates a friend whose loss is severely felt. He was a member of the First German Methodist Episcopal Church of the South Hills, at which the funeral services were held on the afternoon of August 19.

## BOYD CRUMRINE.

Born February 9, 1838, Died August 21, 1916.

It is with sorrow that we record the death of Mr. Boyd Crumrine, on August 21, 1916, at his home in Washington, Pa. He was born, February 9, 1838, in Washington County, on the farm originally acquired by his grandfather in 1800. Graduating from Jefferson College in 1860 with highest honors, he was admitted to the bar of Washington County, Pa., on August 2, 1861. In November of the same year he enlisted in the Eighty-fifth Pennsylvania Volunteers, and was made quartermaster-sergeant of the regiment. He subsequently was transferred to a regiment of Virginian troops, in which he served as first lieutenant. At the close of the war he engaged in the practice of law, becoming District Attorney of Washington County, in which office he served for three years, and in 1870 he was appointed United States Deputy Marshall for the Western District of Pennsylvania. In 1877 Governor James A. Beaver appointed him reporter of the Supreme Court of Pennsylvania. He was a member of the bar of Washington County for fifty-five years, and practised law in Allegheny County for the last forty-five years.

Mr. Crumrine early in life became interested in local history and devoted a great deal of time to painstaking research in this field. He was the organizer of the Washington County Historical Society, in which from its beginning he held the Presidency for fifteen consecutive years, resigning some years ago, feeling unable any longer to perform the duties required of him, and being made President *emeritus*. He was one of the most thoroughly informed students of the history of the region of which Pittsburgh is the metropolis. In the ANNALS OF THE CARNEGIE MUSEUM, Vols. I-III, we had the pleasure of publishing the Records of the Courts of Virginia, held during the Boundary Controversy between Virginia and Pennsylvania, in Western Pennsylvania and Western Virginia. These interesting old documents were very carefully edited by Mr. Crumrine, and for the first time made accessible to the general public in the ANNALS OF THE CARNEGIE MUSEUM.

They are a mine of information, and the descendants of the persons who figured in these old law-suits, now scattered all over the United States, from time to time apply for copies, with the result that what was regarded at the time of their publication as a liberal edition is not far from exhausted.

THEODORE A. MILLS.

Born April 24, 1839, Died December 11, 1916.

Theodore A. Mills was the son of Clark Mills, the eminent sculptor, and Eliza S. Mills his wife. He was born on April 24, 1839, at Charleston, South Carolina, the native place of his mother. His father was born in Hamilton County, New York. Eliza S. Mills, his mother, died in 1854 at Lancaster, Pa., and was buried there. Clark Mills, his father, died in Washington, D. C., in 1873. Besides Theodore A. Mills, who was the eldest, three other sons were born to Clark Mills, John, Clark, and Fish, only one of whom (John) survives at the present time and resides in Washington, D. C.

At the age of fourteen Mr. Mills entered the Brookville Academy in the City of Washington. Here he completed a course with credit, and subsequently, after having spent some time in his father's atelier, in 1860 entered the Royal Academy of Art in Munich. He distinguished himself as a student at the Academy, and was the first American to take the highest honors in the Biennial Competition proposed to students in that institution. Having won the first prize, it became necessary for him under the rules to remain for six months longer than the regular time, in order to make a life-size figure for presentation to the Academy. He returned to America in 1865, and almost his first task was to assist his father, Clark Mills the elder, in taking a life-mask of Abraham Lincoln. This was just sixty days before the assassination of the great President. The original cast made from the life-mask was presented by Mr. Mills to the Carnegie Museum,

where it may now be seen. During the following years he pursued his art in Washington, working in marble and in bronze, at first assisting his father, later establishing a studio for himself. A number of statues and monuments in Washington attest his skill. The bust of John C. Calhoun in the Senate Chamber was from his chisel, so also is the bust of Admiral Dahlgren in the possession of the government. The latter was reproduced in bronze for Mrs. Dahlgren. In the grounds of the White House and in some of the parks of the capital his works may be seen. One of the tasks which he performed while in Washington, which attracted much attention at the time and involved great physical risk, was the restoration of the figure of the Goddess of Liberty on the dome of the Capitol, originally modeled in plaster by Crawford and executed in bronze by Clark Mills, his father. The figure had been broken, some of the pieces had fallen out, and it was in danger of collapsing. Mr. Theodore A. Mills, was raised to the figure by means of derricks, swinging in which he made the necessary casts and from them the pieces, which he restored to their places, securing them so as to prevent further accident.

Subsequently, when it was decided at the United States National Museum to prepare and execute a number of groups representing the rapidly vanishing Indian tribes of the continent, he was employed by the Bureau of Ethnology to make figures and portraits to be utilized in the preparation of these groups, many of which still adorn the United States National Museum. In this work he was extremely skilful, and in 1898, the Carnegie Museum, in order to display the ethnological collections which had come into its possession, invited Mr. Mills to come to Pittsburgh to prepare similar figures for the use of this Museum. His engagement was originally temporary, but he made himself so useful that he was continued in the employment of the Museum until the time of his death.

He was a remarkably skilful modeler, familiar with all the devices of his craft. He worked not only at the various groups of Indians, but made himself of great assistance in the Section of Paleontology, helping to model many of the restorations of extinct animals under the direction of the writer of these lines and his

associates. He could be relied upon to do whatever was entrusted to him with skill and in the most artistic manner. He was gentle, kind, abounding in good humor, and endeared himself to those about him by his affectionate and warm-hearted disposition. Though he had passed the scriptural limits of life when he came to the end, his eyes and fingers had lost none of their cunning, and he was busily at work to the last. His final illness was of very brief duration. He was seized with pneumonia and passed away almost before those about him realized that he was ill. He is interred in the Allegheny Cemetery.

Mr. Mills was married in 1875 to Miss Mary Elizabeth Frederick of Georgetown, who died on July 16, 1899, in Pittsburgh. The issue of this marriage was three daughters, Margaret, Clara, and Lillian, of whom only Lillian (Mrs. Frank J. Reed, of Cleveland, Ohio) survives. He also leaves four grandchildren: Theodore and Edward Armiger, of Washington, D. C., sons of his daughter Margaret, Theodore H. Wills, of Pittsburgh, the only son of his daughter Clara, and Frank J. Reed, Jr., of Cleveland, the son of Lillian.

The death of Mr. Mills removes from the staff of the Museum a friend and fellow-worker, whose place it will be exceedingly hard to fill.

EDWARD MANNING BIGELOW.

Born November 6, 1850, Died December 6, 1916.

The death of Mr. E. M. Bigelow has robbed the city of Pittsburgh of one of its most prominent and useful citizens. His achievements during the many years in which he successfully filled the office of Director of Public Works are destined to perpetuate his memory in this city which he loved, and the great work which he accomplished as Commissioner of Highways for the State during recent years will leave its mark forever upon the face of the Commonwealth. He was aptly styled "the Father of the Parks." To him, perhaps more than to any other individual



is due the development of the system of boulevards and parks which adorns the city and contributes so much to the comfort and welfare of the people. The acquisition of Highland Park as a place of recreation for the populace was due altogether to his initiative, and it is within the knowledge of the writer of these lines that in carrying out his purpose he personally assumed great financial responsibilities and risks, for he either purchased with his own money or gave his own individual obligations for the various tracts of land which it was necessary to acquire in order to create this park, and subsequently turned over the land to the city at the purchase price which he himself had assumed. He was a member *ex-officio* of the Filtration Commission of the City of Pittsburgh, and it became his duty subsequently to carry into effect the plans formed by the Commission for giving the city a supply of pure and potable water. Not only was Mr. Bigelow a very skilful engineer, but he was gifted to a high degree with prophetic insight. He had the good fortune to be called to official station at a time when the city was emerging from what may be called its period of adolescence into the period of its greatest growth and advancement. Little more than an overgrown village when he was born, he saw it expand to metropolitan proportions, and realized the necessity for meeting this larger growth. Under his administration not only the parks and boulevards and the Filtration plant were erected, but he was responsible to a large degree for the development of the entire system of streets, sewers, and bridges in the newer portions of the city. In carrying on his work he had an eye not merely to utility, but also to beauty, for he was a lover of the beautiful. He consecrated himself with ardor to the service of all good causes, and with fidelity discharged his duties as a trustee in many educational and philanthropic institutions. He was a Trustee of the Carnegie Institute from the beginning, as well as a Trustee of the Carnegie Hero Fund. In the Hero Fund he was an efficient member of the Executive Committee. In the Institute he served upon various committees, and more recently upon the Committee in charge of the Museum. Though in later years suffering more or less from ill health, he faithfully attended to his duties in the various Boards with which he was connected,

and his presence and counsel will be greatly missed in the office of the Director of the Carnegie Museum.

To Mrs. Bigelow, who survives him, the Director and all his associates in the Museum extend their heartfelt sympathies in her bereavement.

## I. TWO NEW WEST AFRICAN RHOPALOCERA.

BY W. J. HOLLAND.

(PLATE IV.)

While recently restudying and labelling the *Papilionidæ* of Africa in our collections, I came across a specimen, which I am unable to refer to any species known to me in nature, or described and figured in any of the literature accessible to me. It comes nearest to *Papilio ucalegonides* Staudinger, of which specimens are before me as I write, but differs from that species, in having the median band of light spots on the fore wing widely interrupted, in not having a large whitish spot at the lower outer angle of the cell of the fore wing, and in having a series of submarginal spots in both fore and hind wings. In addition on the lower side of the wings the markings are much less clearly defined than in *P. ucalegonides*, though the light spots of the upper side reappear faintly on the lower side, including the submarginal spots, and the spots at the base of the hind wings are but two, whereas in *P. ucalegonides*, there are three. The figures I give will enable students to recognize this form. I append a detailed description.

Genus PAPILIO Linnæus.

### 1. *Papilio weberi* sp. nov. ♂. (Plate IV, figs. 1, 1a.)

Antennæ, palpi, head, thorax, legs, dorsal region and sides of abdomen as far down as the spiracles, black, except that above each spiracle there is a sublunulate yellowish-white spot, with its longer axis running diagonally from below upward and backward. Below this series of spots there is a narrow longitudinal yellow line, running the length of the abdomen, which is succeeded ventrad by a more or less broken longitudinal line of black spots, which are largest upon the anterior segments. The middle of the abdomen on the under side is orange-yellow throughout, save that the first two segments are each marked with a small black annulus or circle on the median line. Minute spots, composed of tufts of white hair-like scales, are located, one below, one in front of, and one behind each eye. The

trochanters of the legs are clothed with white hairs, and thus reveal three white spots on either side of the otherwise black lower side of the thorax. There are also three small white tufts of hairs arranged longitudinally on the last segment of the thorax dorsad the white spot on the last trochanter. *Upper side of wings:* The ground-color of the wings above is brownish-black, darkest on the cell and at the base of the primaries, becoming lighter toward the outer margins, and on the outer half of the secondaries passing into chocolate-brown. The fore wing is ornamented by an interrupted median band of five pale yellow spots, extending from the middle of the inner margin as far as the fifth nervule. Of the spots composing this band the first and the third are relatively narrow, the second and the fourth the largest and suboval, the fifth a mere narrow streak. Beyond the end of the cell near the costa there are two pale yellow subapical spots, which are outwardly bifid, and only half as large as the corresponding spots in the wing of *P. ucalegon* and *P. ucalegonides*. On the hind wings the median band of spots is continued across the wing to the middle of the inner margin, where it is widest. On this wing the band is not interrupted, or broken, and changes in color as it approaches the inner margin from pale yellow to grayish-white. The hind marginal fold is densely clothed with long hairs and androconia. The outer half of the hind wing is chocolate-brown, upon which the black veins stand forth conspicuously, as well as the long black rays which run from the outer margin to the median band at the middle of each interspace. The fringes are concolorous, without any trace of marginal white lunettes, as in some other species of this group. *Under side of wings:* Both wings are much paler below than on the upper side, being pale chocolate-brown, shading at the base of both wings, and on the inner margin of the secondaries into reddish. The spots of the upper side reappear faintly on the lower side, and are not as well-defined as upon the upper surface. The hind wing has two small black spots at the base, one at the origin of the cell pupilled with white, the other at the origin of the precostal vein solidly black. Expanse, as spread, 80 mm. The type, which is unique, was taken in the vicinity of Lolodorf, Cameroon.

I name the species in honor of its discoverer, Rev. H. L. Weber, who in recent years has added many new and interesting species to the African collections of the Carnegie Museum. The type, which is unique, is in the Carnegie Museum.

## Genus CHARAXES Ochsenheimer.

For a number of years there has been in our collection of African *Charaxes* a female specimen, which I have hesitated to describe, thinking that perhaps it might be the female of a species, the male of which has already been named. As students well know, there is in certain of the species of this interesting genus a great dissimilarity between the two sexes, though there is generally some clue to relationship furnished by the markings of the under side of the wings. Having recently had occasion to go over the material in our possession, in which almost all the known species of the genus are represented, I am led to conclude that I am dealing with an insect which has not been as yet named, and I venture therefore to describe it as new.

I take pleasure in naming this insect in honor of Mrs. Lydia Good, the noble woman who shared with my friend, the late Rev. Dr. A. C. Good, the trials and joys of those years in which he so successfully labored as a missionary and man of science in Africa, where she bore to him the son, who with distinction has taken his father's place.

2. *Charaxes lydiæ* sp. nov. ♀. (Plate IV, figs. 2, 2a.)

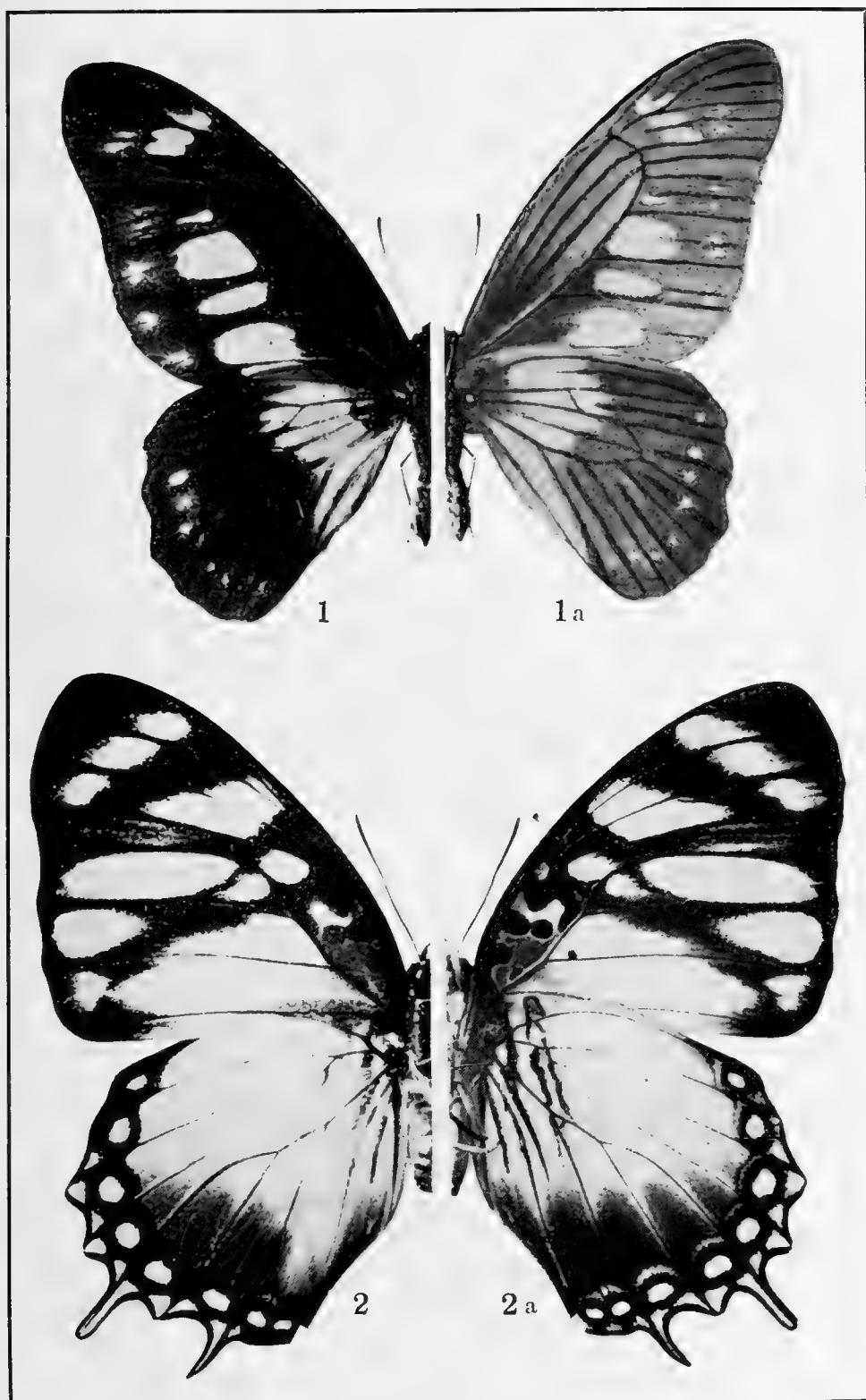
The antennæ are black. The palpi are black above, brilliant white below. The front and head are black, with a minute white spot before and behind the insertion of each antenna. The upper side of the thorax is clothed with whitish gray hairs, the upper side of the abdomen is whitish, with the hind edges of the six posterior segments marked with black. The pectus and lower side of the abdomen are white. The legs are white below, black above. *Upper side of wings:* The fore wing at the base is densely clothed with glaucous gray scales as far as the middle of the cell, but through this vestiture the dark markings at the base of the cell on the lower side faintly appear. The end of the cell is deep black, but with a small trapezoidal white spot intervening between the black area and the glaucous gray area at the base. A broad white triangular area, extends upward from the inner three-fourths of the margin to the origin of vein 3, but does not reach the outer angle. The remainder of the wing above and beyond this white area is black, ornamented with conspicuous white spots. At the outer angle is a triangular white spot. Above this spot, between the extremities of veins 2 and 3, there is a lanceolate

spot, with its apex pointing inwardly. Above this, between veins 3 and 4, there are two spots, the outer one large and long, fusiform, the inner small and subtriangular, with its base at the point of origin of vein 4. Between veins 4 and 5, immediately before the end of the cell, is a small suboval spot, which is rounded inwardly, conforming to the course of the lower discocellular vein, and outwardly is less clearly defined. Above vein 5 and a little beyond the last mentioned white spot there is a band of white running inwardly and upwardly to the costa, narrowing from vein 5 as it approaches the costal margin. There are three smaller white spots, forming a subapical band, located on the fifth, sixth, and seventh interspaces. The inner half of the hindwing is white, passing into ochre-yellow near the inner margin and on the outer third as far forward as the extremity of vein 5. The hind wing is tailed at the extremity of the first and second median nervules (veins 2 and 4). The outer border is broadly black, each interspace ornamented with a more or less oval white submarginal spot, except at the inner angle, where there are two such spots in the interspace between the extremities of the inner vein and the first median nervule. At the end of veins 2 to 6 on either side are subtriangular small white spots, which at the end of veins 2 and 4 are continued outwardly upon the tails, which, as also the entire outer border of the wing, are narrowly margined with black. A few blue scales form a faint lunule over the small white spot which is the innermost of the two nearest the anal angle. *Under side of the wings:* The markings of the upper side are for the most part repeated on the under side, with the following differences: the fore wings at the base are deep ochre-yellow, in the cell there are a number of deep black spots, one immediately at the base, coalescing with another just beyond it projecting inwardly from the costa, opposite the latter spot on the lower margin of the cell is a small round spot, at the middle of the cell are two conspicuous somewhat oval spots tending to coalesce with each other, at the end of the cell is a large irregular spot suggesting the rude outline of a comma, in the head of which is a small quadrangular spot of pale yellow, beyond the cell on vein 2, just beyond its origin, is a small black spot, about a millimeter in diameter, which stands forth conspicuously upon the white ground of this part of the wing. Near the base of the hind wing are six narrow black streaks conforming at their extremities in their course to the venation of this part of the wing, but crossing the cell; the outer



border has the same maculation as the upper side, but the submarginal white spots on the lower side are distinctly ringed about with black, each ring being surmounted inwardly by a narrow pale green lunule, which is again bordered on the side of the base of the wing with a fine black line. Expanse, as spread, 90 mm. The type, which is thus far unique, was taken by the Rev. Albert I. Good at Lolodorf, Cameroon, August 12, 1910, and is in the Carnegie Museum.

The only species of *Charaxes* of which this insect might seem to be the female is *C. nobilis* Druce, but the female of this species is said by Aurivillius (cf. Seitz, *Die Grossschmetterlinge des Afrikanischen Faungebietes*, p. 137) to be known, and his scanty description of it (*l. c.*) fails to remotely indicate a resemblance to this form. It is not the female of *C. hadrianus* Ward, as I have specimens of the female of that species, which do not differ greatly in their markings from the male.



FIGS. 1, 1a. *Papilio Weberi* Holland. Type. ♂.

FIGS. 2, 2a. *Charaxes lydiae* Holland. Type. ♀.



II. A CONTRIBUTION TO THE BOTANY OF THE ISLE OF PINES, CUBA, BASED UPON THE SPECIMENS OF PLANTS FROM THAT ISLAND CONTAINED IN THE HERBARIUM OF THE CARNEGIE MUSEUM UNDER DATE OF OCTOBER, 1916.

BY O. E. JENNINGS.

(PLATES V-XXVIII.)

INTRODUCTORY.

The present paper is primarily an annotated list of the plants collected in the Isle of Pines and now contained in the Herbarium of the Carnegie Museum. The list has been supplemented by references to other specimens collected in the Island, wherever records of such specimens have been found in the literature consulted.

The greater part of the material studied in the preparation of this list was collected by the writer from May 5 to 26, 1910, while a member of a party sent out by the Carnegie Museum to make collections in the Isle of Pines. The party consisted of Dr. D. A. Atkinson, Mr. J. L. Graf, Mr. G. A. Link, Sr., and the writer. Most of the time was devoted to the exploration of the northern and northwestern parts of the island. Nueva Gerona was made the base of operations, and the surrounding savannas and the rugged mountains nearby were quite thoroughly explored. On May 7 the writer visited the ridge at Bibijagua in the northeastern part of the island. On May 16 a trip was made to the mouth of the Nuevas River in the northwestern corner of the island. On May 17 a move was made to Los Indios and from this base the surrounding region was explored. On May 21 in company with Mr. Graf the writer visited the Cañada Mountains and climbed the highest peak. On May 21 in company with Dr. Atkinson and Col. T. J. Keenan a trip was made on foot to Sigüanea. On the following day we crossed Sigüanea Bay in a launch to Bogarona, and thence walked about six miles to Caleta Grande on the southern coast. The last two days of our stay on the island, May 25 and 26, were spent collecting in the vicinity of Santa Fé.

The collections made comprised about two thousand specimens, included under about six hundred and fifty field-numbers. In addition to those specimens collected by the writer, there are in the Herbarium of the Carnegie Museum two hundred and ninety-eight specimens collected in the Isle of Pines by Mr. A. H. Curtiss in 1903 and 1904, these having been distributed from the New York Botanical Garden a number of years ago as one of a number of sets into which the Curtiss Collection was divided. There are also in the Carnegie Museum a small number of specimens obtained in the Isle of Pines in 1910 by Dr. Jared F. Shafer, of Pittsburgh, and a small collection made by Mr. G. A. Link, Sr., on the occasion of his sojourn in the island in 1912-1913. The Curtiss Collection was made in the vicinity of Nueva Gerona, that of Dr. Shafer mainly in the vicinity of Columbia and Nueva Gerona, and that of Mr. Link in the vicinity of Nueva Gerona and Los Indios.

The most complete set of the specimens collected by the writer in the Isle of Pines, the set which is now in the Herbarium of the Carnegie Museum, together with a duplicate set now in the Herbarium of the New York Botanical Garden, was submitted during the summer of 1910 to Dr. N. L. Britton, Director of the New York Botanical Garden. The specimens were studied by Dr. Britton and Mr. Percy Wilson, many of them being submitted to specialists both at the New York Botanical Garden and elsewhere. The fungi were studied by Professor D. R. Sumstine, of Pittsburgh. To all of these gentlemen I take the present opportunity to extend my grateful acknowledgment for their labors, which have facilitated my own.

In the preparation of the present report it has been found necessary to reëxamine the specimens, because during the past few years great progress has been made in the study of the flora of the West Indies. Much of the credit for this progress belongs to the gentlemen connected with the New York Botanical Garden, whose explorations and collections in the West Indies have been extensive and thorough. Dr. Ignatius Urban, of Berlin, assisted by various collaborators, has published much upon the flora of the West Indies in the seven volumes of his *Symbolæ Antillanæ*; and in the United States a number of specialists have monographed the North American plants of certain groups, including the West Indian species. An examination of the specimens of the Curtiss Collection shows that quite a number of them, according to the latest literature, belong to species other than

those originally indicated on the labels. As these specimens supplement those collected by the writer, it has been thought advisable to include in this list a reference to them also.

To facilitate further work upon the flora of this interesting island analytical keys for the species of the various families have been incorporated. These keys have been mainly based on the more readily observable characters of leaves and flowers. In some of the more difficult families the writer has taken the liberty of remodelling certain keys published by other authors, to whom he renders thanks and makes apology, if apology be necessary.

The sequence followed in this list is essentially that of Engler's *Syllabus der Pflanzenfamilien* and the nomenclature is based upon the *International Rules of Botanical Nomenclature*, excepting as to the "Nomina Conservanda" in matters of priority.

Great care has been exercised in the preparation of the synonymy. When synonyms are very numerous a selection has been made, preference being given to those based upon West Indian material, or most likely to be accessible to American botanists working upon West Indian plants.

Before closing these brief preliminary remarks I wish to express my sense of indebtedness to Dr. C. F. Millspaugh for his kindness in identifying certain of the *Euphorbiaceæ*. I wish also to put upon record my appreciation of the services rendered me by my travelling companions during the expedition of 1910, and of the courtesy and hospitality shown us on that occasion by Colonel Thomas J. Keenan, a citizen of Pittsburgh, who has done much to promote the industrial development of the Isle of Pines. To Dr. Jared F. Shafer the Carnegie Museum is indebted for the specimens collected by him, and the writer, in particular, wishes to acknowledge the assistance received from him in the study of the orchids, some of which he has successfully propagated and brought to flower in his conservatory, where it has been possible to view them from time to time and to obtain additional specimens. To Mrs. O. E. Jennings, for assistance in consulting the literature and in preparing photographs, and to Mr. Sidney Prentice, for his careful drawings of the plates, my thanks are due. I wish gratefully to acknowledge the support and encouragement given me by Dr. W. J. Holland, the Director of the Carnegie Museum, which made possible the collection of the specimens and the preparation of the present report. I am indebted to him for his

editorial revision of the manuscript and the care bestowed upon the preparation of the plates. Finally, I wish to pay my tribute of respect to the memory of my associate, Mr. G. A. Link, Sr., who since the completion of the following catalog passed away on August 16, 1916, under tragic circumstances. By his labors, which already have been referred to, he contributed to the formation of the collections upon which this catalog is based, and the writer will always cherish pleasant memories of the weeks spent with him during the expedition of 1910.

#### BOTANICAL COLLECTIONS MADE IN THE ISLE OF PINES.

Botanical collections have been made in the Isle of Pines as follows\*:

1. A collection was made in 1831 by A. H. Lanier, the French consul at Trinidad, Cuba. This collection was studied and reported upon by Achille Richard in the botanical volumes of Sagra's *Historia fisica, politica y natural de la Isla de Cuba*, Volumes X and XI, 1845 and 1850, Volume XII, plates. Note has been made under various species listed in the following pages when Lanier's specimens have been mentioned by Richard. Richard cites thirty-eight species as having been collected by Lanier.

2. A collection of about one hundred and eighty-five specimens was made by Don José Blain, probably about 1849, or 1850, and was studied and listed by Dr. C. F. Millspaugh, *Field Columbian Museum, Botanical Series*, I, 1900, pp. 425-439. A number of new species based on Blain's specimens were described by Millspaugh. These specimens are noted in the following pages under the various species.

3. A small collection was made at the southwestern corner of the island (Pedernales Point) by Dr. C. F. Millspaugh, February 16, 1899, when the yacht *Utowana* stopped there for a few hours. These specimens were studied and listed, with notes and critical reports upon a number of the species, by Millspaugh (*Field Columbian Museum, Botanical Series*, II, 1900, pp. 1-110. "Plantæ Utowanæ.")

4. In 1900, from June 27 to July 13 inclusive, Messrs. William Palmer and Joseph H. Riley, under the auspices of the Smithsonian Institution, collected in the vicinity of Nueva Gerona, excepting for a part of two days which Mr. Palmer spent at Manigua, a plantation along the Nuevas River above McKinley, which since has been abandoned. A rather large collection was made by these gentlemen.

5. In the spring of 1901, Mr. A. A. Taylor, principally under the

\* See also, p. 95, reference to Dr. Wm. Trelease.



auspices of Cornell University, made a collection of about two hundred species, mostly in the vicinity of Columbia.

6. During the winter of 1901-1902 Dr. W. W. Rowlee, of Cornell University, made a small collection, adding a few species to the Taylor Collection.

7. From November, 1903, to June, 1904, Mr. A. H. Curtiss made a fine collection, practically all from the vicinity of Nueva Gerona. This collection was studied at the New York Botanical Garden and a number of sets distributed. One of these sets is in the Carnegie Museum and its specimens have been included in the present annotated list.

8. In February and March, 1910, Dr. Jared F. Shafer, of Pittsburgh, an enthusiastic collector and grower of orchids, visited the island and made a collection of botanical specimens chiefly in the vicinity of Columbia and of Nueva Gerona. These collections were turned over to the Carnegie Museum. Dr. Shafer brought to Pittsburgh quite a number of live orchids, most of which grew and flowered in his conservatory. Dr. Shafer's specimens are reported upon in the present list.

9. About two thousand specimens (about six hundred and fifty field-numbers) were collected from May 5 to May 26, 1910, by the writer and they constitute the basis of the present report. The main collection is in the herbarium of the Carnegie Museum, and a number of smaller sets have been distributed in exchange, the next largest set being now in the Herbarium of the New York Botanical Garden.

10. A collection of about sixty specimens was collected by Mr. G. A. Link, Sr., during May and June, 1912, in the vicinity of Nueva Gerona, and in November, 1912, at Los Indios. These specimens are in the herbarium of the Carnegie Museum, and have been listed in the present report.

11. A large collection has been recently made by Dr. N. L. Britton, Mrs. Britton, and Mr. Percy Wilson, of the New York Botanical Garden, the expedition occupying the period from the middle of February to the latter part of March, 1916. In a recent account of this trip Dr. Britton notes that the flora of the island has been represented up to this date by specimens in the various collections to the number of seven hundred and forty species. Writing of the recent collection he notes: "Our collection aggregates one thousand six

hundred and fifty-seven numbers, and, taken with the others, indicates that the total natural flora of the island is not less than one thousand five hundred species."—Britton, *Journal of the New York Botanical Garden*, XVIII, 1916, pp. 64-71.

PUBLICATIONS RELATING TO THE FLORA OF THE ISLE OF PINES.\*

The following list includes the titles of all publications relating to the flora of the Isle of Pines, so far as known to the writer. No mention has been made in this list of various popular articles, which have little or no botanical value:

1. Richard, Achille. In Sagra, *Historia física, política y natural de la Isla de Cuba*, X, 1845, XI, 1850, and XII, plates, no date.

Richard, under various species in these volumes, refers to the Lanier Collection made in the Isle of Pines in 1831, by noting "*Crescit in insula Pinorum*." A few of the plates in volume XII were made from Lanier's specimens.

2. The collections made about 1860 in the Isle of Pines by Don José Blain were reported on by Dr. C. F. Millspaugh, "*Plantæ Insulæ Ananasensis*," *Field Columbian Museum, Botanical Series*, I, 1900, pp. 425-439.

This report consists of an annotated list, with discussions as to the botanical relationships or characteristics of a number of the species, and descriptions of a few species proposed as new. Don José Blain is mentioned in one of Charles Wright's letters to Asa Gray as a botanical enthusiast of some ability.

3. Under the title "*Plantæ Utowanæ*," Dr. C. F. Millspaugh published an annotated list of the plants collected during a West Indian cruise of the yacht *Utowana* in the winter of 1898-1899.—*Field Columbian Museum*, II, 1900, pp. 1-110. During the course of this cruise, a stop of a few hours was made at Pedernales Point, on the southwestern corner of the island, February 16, 1899, when a small botanical collection was made.

Millspaugh's list contains the names of a number of species which have not otherwise been reported for the Isle of Pines.

4. Rowlee, W. W. "Conditions of Plant Growth in the Isle of Pines." *Plant World*, VI, 1903, pp. 34-37. See also *Science*, Ser. II, XVII, 1903, p. 461.

This article is devoted mainly to a discussion of the ecological distribution of the plants of the northern part of the island.

\* See also page 95, reference to Dr. Wm. Trelease.

5. Rowlee, W. W. "Notes on Antillean Pines with Description of a New Species from the Isle of Pines." *Bulletin of the Torrey Botanical Club*, XXX, 1903, pp. 106-108.

*Pinus recurvata* Rowlee and *Pinus cubensis* var. *anomala* Rowlee are here described as new.

6. Urban, Ignatius. In his "*Flora Portoricensis*," *Symbolæ Antillanæ seu Fundamenta Floræ Indiæ Occidentalis*, IV, 1903-1911, Urban gives the general distribution of the various species cataloged therein for Porto Rico, and, among the various localities listed, the Isle of Pines frequently occurs, evidently based on the A. H. Curtiss Collection. Volumes V, VI, and VII of the *Symbolæ Antillanæ* also contain a number of references to plants from the Isle of Pines, mainly from the Curtiss Collection. Descriptions of new, and reports as to the distribution of previously described, species are given.

7. Britton, N. L. In the *Bulletin of the Torrey Botanical Club* there have appeared at irregular intervals for a number of years past a series of articles, entitled "Studies of West Indian Plants." In these articles Dr. Britton has dealt to a limited extent with specimens collected in the Isle of Pines, giving descriptions of a few new species.

8. *North American Flora*. In certain recent numbers of the *North American Flora* there are to be found references to the Isle of Pines, either in the paragraphs on general distribution of the species, or, in a few cases, new species are proposed based on specimens from the Isle of Pines.

For new species see *Lotoxalis pinetorum* Small, *North American Flora*, XXV, 1907, p. 49, *Kalmiella aggregata* Small, *op. cit.*, XXIX, 1914, pp. 54-55, *Xolisma vaccinioides* Small, *op. cit.*, XXIX, 1914, p. 68.

9. Harshberger, John W. *Phytogeographic Survey of North America*, in Engler & Drude, *Die Vegetation der Erde*, XIII, 1917.

Under the heading "Cuban District," in the treatment of the Antillean Region, Harshberger gives lists of species under various ecological groups, these lists being mainly derived from Rowlee's articles. (See above.)

10. Hitchcock, A. S. "Grasses of Cuba," *Contributions from the U. S. National Herbarium*, XII, 1909, pp. 183-258. The Isle of Pines is included in Cuba by Hitchcock, and various references are made to the Taylor, Palmer & Riley, and Curtiss Collections from the Isle of Pines. Curtiss' No. 420, Isle of Pines, is proposed as a new species, *Eragrostis cubensis* Hitchcock.

11. Jennings, O. E. "Notes on the Ferns of the Isle of Pines," *American Fern Journal*, I, 1911, pp. 129-136.

In this article there is given a general account of the species collected in 1910, with a discussion of their habitat and general distribution on the island. There were included also lists of the ferns collected on the island by Dr. J. F. Shafer, A. H. Curtiss, and Dr. C. F. Millspaugh.

12. Britton, N. L. "The Natural Vegetation of the Isle of Pines, Cuba," *Journal of the New York Botanical Garden*, XVIII, 1916, pp. 64-71.

A short account of the vegetation and general features of the island, with particular mention of some of the more noteworthy or striking species, a list of previous botanical collections on the island, and a statement as to the general results of the Expedition of the New York Botanical Garden in 1916.

#### PHYSICAL FEATURES.

For the purposes of the present paper it suffices to say that the Isle of Pines lies about sixty miles south of the west central portion of Cuba, somewhat farther west than Havana, and has an area of about eight hundred square miles.<sup>1</sup> The Island consists, generally speaking, of a northern and a southern part, separated by a fresh-water swamp which, to the east and west, passes into salt-water marshes and mangrove swamps, the latter eventually opening out into wide bays.

The northern portion of the island is roughly elliptic in shape averaging about twenty-five miles in diameter. It consists of a low-lying and rather level plain, from which, in the northeastern part of the island, the Caballos Mountains rise to a height of about one thousand feet. The mountains consist of crystalline limestone lying in thick strata which dip steeply to the east-northeast, the general trend of the ridges being from northwest to southeast. A short

<sup>1</sup> See in this connection the general discussion of the physiography and geology of the island in Jennings, "Notes on the Ferns on the Isle of Pines," *American Fern Journal*, I, 1911, pp. 129-136 and "A Note on the Geology of the Isle of Pines," *Journal of Geology*, XXI, 1912, pp. 367-369; Britton, "The Natural Vegetation of the Isle of Pines, Cuba," *Journal of the New York Botanical Garden*, XVIII, 1916, pp. 64-67; also (mainly contributed by the present writer) the discussion of the general natural features and vegetation in Todd, W. E. C., "Birds of the Isle of Pines," *ANNALS CARNEGIE MUSEUM*, X, 1916, pp. 146-296.

distance to the west of these mountains are the Casas Mountains, slightly lower, but very similar in their general features. On the northeastern coast is a still lower ridge (Bibijagua) of the same character as the other two. In the southwest, the Cañada Mountains rise to about one thousand feet (985 feet, Jennings; 1015 feet, Britton), being composed of an impure quartzose mica-schist, with some sandstone, and they have generally gentle slopes.

The mountains and hills in the south-central and southeastern parts of the island were not explored by me, but according to Britton, *l. c.*, they are partly limestone and partly sandstone and schist.

The plains of the northern part of the island, from which rise the hills and mountains just mentioned, are gently undulating, reaching an elevation of about two hundred feet above the sea in the central portion whence the drainage systems radiate towards the sea with broad, gently sloping valleys. This plain is mainly of subaërial erosion, but around the bases of the northern mountains there is a fine series of wave-cut cliffs at about fifty or sixty feet above the present sea-level. The outer margins of the plain mostly slope gently into the sea and marginal coastal deposits are of considerable extent.

There appears to have been in geologically recent times an elevation sufficient to enable the streams to cut down steep channels, at least in their lower courses, and subsequent depression has converted the lower parts of the rivers into deep inlets which are subject to tide-water for several miles above their outlets.

The soil of the plain in the northern part of the island consists mainly of a yellowish-red or brownish-red (iron-stained) gravelly clay, known as the "Mal Pais" gravel. This soil is evidently residual and has been derived by subaërial erosion from underlying marbles and schists. In depressions, however, and especially on the low plain below the level of the ancient sea-cliffs, the soil is more largely a yellowish or grayish sandy loam, while towards Los Indios in the western part of the island the soil becomes chiefly sand, or sometimes a pure white, angular, quartz gravel, with more or less iron ore (limonite).

The part of the island south of the swamps consists of a rather narrow area convex to the south and extending out to the west and northwest in a long curve. This component of the island, known locally as the "South Coast," is essentially a low plain of coralline (or partly æolian) limestone, rising somewhat to the south, where it

faces the sea in a more or less prominent, perpendicular, and extremely jagged cliff, broken here and there by inlets and sandy beaches, but constituting, altogether, a dangerous coast with but very few harbors. This "South Coast" plain has a very scanty, but yet rich, dark, loamy soil filling the holes and pockets in the jagged surface of the rock and supporting a hardwood forest with many large trees.

The climate of the island is, of course, oceanic and equable. The extreme annual range of temperature lies between 50° and 100° Fahr., the temperature during May, 1910, ranging from 82° to 92° during the warmest part of the day, the minimum rarely falling to 70° at night. The water taken from the wells and springs usually registered between 70° and 80° Fahr., while the temperature of the ocean water on the beaches was 80°-82° Fahr.

The season is sharply divided into a wet season and a dry season. The rains, frequently torrential thunderstorms, occur from May or early June to about November, then occur scattering showers until early spring, followed by a severe drought till the rains begin again. The drought must be ecologically a very important factor in determining the character of the vegetation of the island, particularly where associated with extensive grass and brush fires, as appears to have been the case at least since the occupation of the island by Europeans.

#### PLANT ASSOCIATIONS.

The vegetation of the various parts of the island is very closely related to the major features of the physiography and geology as outlined above. Briefly, the following ecological groups are outstanding features of the landscape. For purposes of uniformity the nomenclature adopted for these groups is essentially that of Harshberger's *Phytogeographic Survey of North America*.

##### 1. *The Mangrove Forest Formation.*

This formation consists of a low thick forest of halophytic shrubs fringing the low coasts of the island and extending inland, particularly along the lower courses of the rivers, up to the limits of brackish water. Towards the mouth of the Nuevas River, in particular, the mangroves have been instrumental in catching and retaining river sands and coastal débris to the extent of adding considerably to the area of the island.

The margin of the mangrove forest nearest the water consists, in

the Isle of Pines, of *Rhizophora Mangle* but, towards the land, this species is mainly supplanted by the White Mangrove, *Avicennia nitida*. Under these latter trees are large tussocks of *Acrostichum aureum*, the leaves of this fern often reaching a height of five or six feet. In the clumps of *Acrostichum*, but apparently rarely forming tussocks independently, are great clumps of *Nephrolepis biserrata*. The ground under the *Avicennia* is often covered almost completely by *Batis maritima*, this species constituting there a distinct society.

### 2. *The River-bank Forest Formation.*

This forest constitutes a veritable jungle along the banks of the rivers where the water is non-saline. Among the various trees of this forest some of the most prominent are the royal palm (*Roystonea regia*), the majagua (*Hibiscus tiliaceus*), and the alligator-apple (*Annona palustris*). There are a large number of smaller trees, shrubs, and herbaceous plants competing vigorously for space, among these being *Lonchocarpus latifolius*, *Hirtella mollicoma*, *Eugenia faramoides*, *Ternstræmia obovalis*, *Dendropanax cuneifolium*, *Xylopia grandiflora*, *Matayba oppositifolia*, *Cyrilla racemiflora*, *Cecropia peltata*, *Miconia tomentosa*, and *Miconia prasina*.

This forest extends in an ever narrowing fringe up the rivers and terminates in a scattering fringe, or in a series of individuals, along the banks of periodically dry arroyos. This constitutes a more or less distinct vegetational unit, which may be termed the "Arroyo Formation."

### 3. *The Arroyo Formation.*

This vegetation is characterized best, perhaps, by *Chrysobalanus pellocarpus*, the Coco-plum. Accompanying this species are various other shrubs and smaller plants, many of them common in the river-bank forest. This is the habitat of the tree-fern, *Alsophila myosuroides* and of *Adiantum fragile* and *Adiantum cristatum*.

### 4. *The Freshwater Lagoon Formation.*

While there are apparently some good examples of this formation in the southern portion of the island, little opportunity was afforded to study them. At Los Indios the river forms an ox-bow approaching lagoon conditions. Here were *Castalia ampla* and *Utricularia spirandra*, and the small pond about one and one-half miles east of Nueva Gerona also shows this formation.

### 5. *The Mud-swamp Formation.*

Probably the nearest approach to this formation in the region explored by the writer is the muddy margin of the pond about one and one-half miles east of Nueva Gerona. One of the most striking plants is *Odontosoria Wrightiana* forming large clumps or tussocks, much in the same manner as does *Osmunda cinnamomea* in our Northern swamps.

### 6. *The Strand Formation.*

The strand formation is well developed near Bibijagua, and at that place it may be seen to consist of three well-defined members, as follows:

(a) The *Ipomæa Pes-Capræ* Association characterized by the beach morning-glory (*Ipomæa Pes-Capræ*). (See Plate V.)

(b) The *Suriana-Scævola* Association characterized by *Suriana maritima* and *Scævola Plumierii*.

(c) The *Coccolobis uvifera* Association. The sea grape is sometimes supplanted in such locations by the poisonous *Metopium Brownei*, as at Siguanea Beach.

### 7. *The Salt-marsh Formation.*

Very little salt-marsh was seen on the Isle of Pines. Near the mouth of the Nuevas River there was a small area of it and some of the halophytic swamp between the northern and southern portions of the island probably should be so classed. Photographs taken up the channels of this swamp by Dr. D. A. Atkinson show *Mariscus jamaicensis* to be apparently a characteristic member of this salt marsh. *Distichlis spicata* is also a member of this formation.

### 8. *The Fresh-water Marsh Formation.*

This formation is probably represented in the middle portions of the swamp mentioned above, but it was not personally studied.

### 9. *The Sand-plain Formation.*

Near the mouth of the Nuevas River there are areas probably derived from a salt-marsh by the accumulation of loose sand. This is perhaps best characterized by *Andropogon tenuispathaceus* and includes *Opuntia*.

### 10. *The Savanna Formation.*

This is one of the most prominent and characteristic formations on the island, occupying most of the lower areas of the plain, excepting



where too sandy. It is preëminently characteristic of the "Mal Pais" gravels near Nueva Gerona, and is itself characterized by a considerable number of species of scraggly shrubs and palmettoes, associated rather openly on a more or less grassy plain. The most characteristic of these shrubs are *Byrsonima crassifolia*, *Miconia delicatula*, *Tabebuia lepidophylla*, *Brya Ebenus*, *Curatella americana*, the large-leaved and mullein-like *Byrsonima verbascifolia*, and the common palmetto, perhaps the most characteristic species of the savanna, *Acelorraphe Wrightii*.

Probably these savannas largely owe their existence, at least their very open character, to the grass and brush fires which formerly were of common occurrence during the dry season. If left undisturbed, there can be little doubt that much of the savanna would eventually pass more or less completely into the Open Forest Formation.

#### 11. *The Open Forest Formation.*

This consists of an open pine forest with palmettoes and a sparse undergrowth of many of the species characteristic of the savanna. The pine is *Pinus caribæa* and the formation occupies the higher and drier parts of the "Mal Pais" gravel plain, towards Los Indios merging into the pine-barren forest. The open forest formation, as noted above, would very likely succeed much of the savanna were it not for man's use of the trees and for the fires.

#### 12. *The Pine-barren Formation.*

I have seen fit to distinguish between this open pine forest, of the white sands and gravels of the Los Indios region, and the "Open Forest Formation." In the pine barrens the soil shows its acid character and the undergrowth is not to any large extent composed of species characteristic of the savanna.

These lower plants constituting the undergrowth are *Pachyanthus cubensis*, *Pachyanthus ovatus*, *Kalmiella aggregata*, *Miconia delicatula*, *Polygala uncinata*, *Xolisma myrtilloides*, *Pinguicula filifolia*, *Stenorhynchos squamulosus*, *Tetramicra Eulophiæ*, etc., altogether a considerable number of interesting plants not found elsewhere on the island but some of them occurring also in Pinar del Rio Province, Cuba.

#### 13. *The Tropical Forest Formation.*

This is the hardwood forest formation covering the crystalline limestone hills and ridges and the limestone plain constituting the

southern portion of the island. The forest is dense and contains many vines and epiphytes.

On the hills and ridges near Nueva Gerona this forest is characterized by the large-trunked *Bombax emarginata*, the cabbage-palm (*Sabal parviflora*), *Casearia sylvestris*, *Trichilia hirta*, *Amyris balsamifera*, *Cordia globosa*, etc. On open exposed knobs and cliffs *Agave papyrocarpa*, and *Plumiera emarginata* become conspicuous.

The forest on the limestone plain of the "South Coast" is quite similar but with a larger proportion of leguminous plants. Here occur *Bauhinia*, *Lysiloma bahamense*, etc., and towards the interior, especially where burned or where lumbered, there are areas which may be termed "chaparral."

#### 14. *The Chaparral Formation.*

This formation, as exemplified near Hato, in the interior of the peninsula between Bogarona and Caleta Grande, is a dry forest of small-leaved trees of low stature, and with a rather large proportion of thorny species. Here occur *Bucida Buceras*, *Tecoma pentaphylla*, *Pithecolobium arboreum*, *Lysiloma bahamense*, *Ouratea agrophylla*, etc.

#### 15. *The Sea-cliff Formation.*

Wherever the mountains or the limestone plains form a cliff along the coast, there appears a very characteristic fringe composed of a palm, *Thrinax Wendlandiana*, and the peculiar clubby, branched Apocynaceous plant, *Plumiera emarginata*, accompanied by a number of other less conspicuous species, these constituting altogether what may be termed the Sea-cliff Formation. Good examples of this vegetation are to be seen along the steeper seaward slopes and cliffs of the Colombo and Bibijagua mountains.

Owing to the brief time spent in the Isle of Pines no attempt was made to study the marine formations along the coasts, although the few observations which were made indicated a rich flora.

### ANNOTATED LIST OF SPECIES

#### MYXOMYCETES.

##### 1. *Fuligo ovata* (Schæffer) Macbride.

*Mucor septicus* LINNÆUS, Species Plantarum, ed. 2, 1763, p. 1656(?).

*Mucor primus ovatus* SCHÆFFER, Fungorum qui in Bavaria et Palatinatu circa Ratisbonam nascuntur, 1763, p. 132, fig. 192.

*Æthidium flavum* LINK, Dissertatio I, Magazin der Gesellschaft Naturforschender Freunde zu Berlin, III, 1809, p. 42.

*Fuligo varians* SOMMERFELT, in Rostafinski, Sluzowce (Mycetozoa) Monographia, 1875, p. 134.

*Fuligo ovata* MACBRIDE, North American Slime moulds, 1899, p. 23.

On an old log near Los Indios, May 19, 1910, *O. E. Jennings*, No. 381. General Distribution: On dead wood, or, less often, on other organic matter, widely distributed throughout the temperate and warmer regions of the earth.

### ALGÆ.

(Determined by M. A. Howe.)

#### CHLOROPHYCEÆ.

Family CLADOPHORACEÆ.

#### 2. *Cladophora* sp.

On coralline limestone along little stretch of rocky beach west of the base of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 258 (*in part*).

#### PHÆOPHYCEÆ.

Family FUCACEÆ.

#### 3. *Sargassum bacciferum* (Turner) Agardh.

*Fucus natans* LINNÆUS, Species Plantarum, 1753, p. 1628.

*Fucus Sargasso* GMELIN, Historia Fucorum, 1768, p. 92.

*Fucus bacciferus* TURNER, Historia Fucorum, I, 1808, p. 55, tab. 47.

*Sargassum bacciferum* AGARDH, Species, Genera, et Ordines Algarum, 1848, p. 6.

Thrown up by waves on beach at Mt. Colombo, May 14, 1910, *O. E. Jennings*, Nos. 255, 256. General Distribution: Warmer parts of the Atlantic Ocean.

#### RHODOPHYCEÆ.

Family RHODOMELACEÆ.

#### 4. *Digenea simplex* (Wulfen) Agardh.

*Conferva simplex* WULFEN, Cryptogamia Aquatica, 1803, p. 17, n. 16.

*Digenea Wulfeni* KÜTZING, Phycologia Generalis, 1843, p. 433, pl. 50.

*Digenea simplex* AGARDH, Species, Genera, et Ordines Algarum, I, 1848, p. 389.

(For a number of other synonyms see DeToni, Sylloge Algarum, IV, (3), 1903, p. 963.)

On rocks of coralline limestone, beach at base of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 258 (*in part*). General Distribution: Warmer parts of the Atlantic and Indian Oceans.

5. *Polysiphonia* sp.

On rocks of coralline limestone, beach at base of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 258 (*in part*).

## Family CERAMIACEÆ.

6. *Ceramium* sp.

On rocks of coralline limestone, beach at base of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 258 (*in part*).

7. *Centroceras clavellatum* (Agardh) Montagne.

*Ceramium clavellatum* AGARDH, in Kunth, Synopsis Plantarum Æquinoxialium Orbis Novi, I, 1822, p. 2.

*Centroceras clavellatum* MONTAGNE, Novitiæ Floræ Sueciæ ex Algarum Familia, 1836, p. 140.

(For a number of other synonyms see DeToni, Sylloge Algarum, IV, (3), 1903, p. 1491.)

On rocks of coralline limestone, beach at base of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 258 (*in part*). General Distribution: In the warmer parts of the oceans of both hemispheres.

## LICHENES.

## Family PARMELIACEÆ.

8. *Ramalina usneoides* (Acharius) Fries.

*Lichen Usnea* LINNÆUS, Mantissa, I, 1767, p. 131.

*Parmelia usneoides* ACHARIUS, Synopsis Methodica Lichenum, 1803, p. 270.

*Ramalina usneoides* FRIES, Lichenographia Europæa reformata, 1831, p. 468.

On trees along lower Nuevas River, May 16, 1910, *O. E. Jennings*, No. 293. General Distribution: Florida, Isle of Pines, Jamaica, Santo Domingo, and Mexico.

## FUNGI.

(Determined by D. R. Sumstine.)

## Family POLYPORACEÆ.

9. *Coriolus pinsutus* (Fries) Patouillard.

*Polyporus pinsutus* FRIES, Elenchus Fungorum, 1828, p. 95.

*Polyporus tener* Lévillé, Annales des Sciences Naturelles, Series III, V, 1846, p. 139.

*Polystictus umbonatus* FRIES, Nova Acta Regiæ Societatis Scientiarum Upsaliensis, III, I, 1851, p. 87.

*Hexagona Friesiana* SPEGAZZINI, Anales de la Sociedad de Ciencias Argentina, XVII, 1884, p. 69.

*Polystictus jamaicensis* HENNINGS, Hedwigia, XXXVII, 1898, p. 280.

*Coriolus pinsutus* Patouillard, Essai Taxonomique sur les Familles et les Genres des Hyménomycètes, 1900, p. 94.

On an old log on the slope of Bibijagua ridge, May 7, 1910, *O. E. Jennings*, No. 130; on old tree trunk on slope of Caballos Mts., May 12, 1910, *O. E. Jennings*, No. 226a. General Distribution: Southern Florida and Mexico, and southward through the West Indies and continental tropical America to Brazil.

#### 10. *Coriolus maximus* (Montagne) Murrill.

*Irpex maximus* MONTAGNE, Annales des Sciences Naturelles, Series II, VIII, 1837, p. 364.

*Polyporus labyrinthicus* MONTAGNE, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, IX, 1842, p. 406. (Not Schweinitz.)

*Polyporus Meyenii* KLOTZSCH, Nova Acta Academiae Caesareae Leopoldino-Carolinæ, XIX, 1843, Suppl., p. 236.

*Trametes obstinatus* COOKE, Grevillea, XII, 1883, p. 17.

*Coriolus maximus* MURRILL, Bulletin Torrey Botanical Club, XXXIV, 1907, p. 467.

On dead log north of Caleta Grande, May 22, 1910, *O. E. Jennings*, No. 603a. General Distribution: West Indies and Central America, also the tropics of the Old World.

#### 11. *Tyromyces versicutis* (Berkeley & Curtis) Murrill.

*Polyporus versicutis* BERKELEY & CURTIS, Journal of the Linnean Society, London, X, 1868, p. 308.

*Trametes versicutis* MURRILL, North American Flora, IX, 1907, p. 33.

On old wood along sandy beach at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 109a. General Distribution: Cuba and the Isle of Pines.

#### 12. *Pycnoporus sanguineus* (Linnæus) Murrill.

*Boletus sanguineus* LINNÆUS, Species Plantarum, Ed. 2, 1762, p. 1646.

*Xylometron sanguineum* PAULET, Traité des Champignons, 1812?, Pl. III, figs. 3, 4.

*Polyporus sanguineus* G. MEYER, Floræ Primitiæ Essequiboensis, 1818, p. 304.

*Polystictus sanguineus* FRIES, Nova Acta Regiæ Societatis Scientiarum Upsaliensis, III, 1, 1851, p. 75.

*Polyporus argentatus* COOKE, Grevillea, XV, 1886, p. 20.

*Pycnoporus sanguineus* MURRILL, Bulletin Torrey Botanical Club, XXXI, 1904, p. 421.

On rotten log in swamp near Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 68; Los Indios, May 19, 1910, *O. E. Jennings*, No. 431. General Distribution: On dead wood throughout the tropical regions of the earth.

13. *Corioloopsis occidentalis* (Klotzsch) Murrill.

*Polyporus occidentalis* KLOTZSCH, Linnæa, VIII, 1833, p. 436.

*Polyporus lanatus* FRIES, Epicrisis Systematis Mycologici seu Synopsis Hymenomycetum, 1838, p. 490.

*Polyporus lenis* LÉVEILLÉ, Annales des Sciences Naturelles, Series III, IX, 1848, p. 123.

*Polystictus cyclodes homoporus* FRIES, Nova Acta Regiæ Societatis Scientiarum Upsaliensis, III, I, 1851, p. 90.

*Polyporus scorteus* FRIES, *op. cit.*, p. 89.

*Corioloopsis occidentalis* MURRILL, Bulletin Torrey Botanical Club, XXXII, 1905, p. 358.

On old log between Bogarona and Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings, No. 602a*. General Distribution: On dead wood in the tropical regions of both hemispheres.

14. *Favolus tenuis* (Hooker) Murrill.

*Boletus reticulatus* HOOKER, in Kunth, Synopsis Plantarum, I, 1822, (9). Not Schæffer.

*Boletus tenuis* HOOKER, *op. cit.*, p. 10.

*Hexagona polygramma* FRIES, Epicrisis Systematis Mycologici seu Synopsis Hymenomycetum, 1838, p. 497.

*Hexagona favoloides* PECK, Bulletin Torrey Botanical Club, X, 1883, p. 73.

*Favolus tenuis* MURRILL, *op. cit.*, XXXII, 1905, p. 100.

(For a number of other synonyms see Murrill, North American Flora, IX, 1908, p. 83.)

On trunk and limbs of *Muntingia Calabura*, at base of the ridge at Bibijagua, May 7, 1910, *O. E. Jennings, No. 129*. General Distribution: On dead wood of deciduous trees in tropical regions, somewhat generally.

This "shelf-fungus" has a thin and widely expanding body. Some of the specimens measure as much as a foot in diameter.

15. *Pogonomyces hydroides* (Swartz) Murrill.

*Boletus hydroides* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 149.

*Boletus hydnatinus* BOSC, Magazin d. Gesellschaft Naturforschenden Freunde, Berlin, V, 1811, Taf. IV, fig. 3.

*Polyporus pellitus* G. MEYER, Primitiæ Floræ Essequiboensis, 1818, p. 304.

*Boletus crinitus* SPRENGEL, Kongliga Svenska Vetenskaps-Akademien Handlingar, 1820, p. 51.

*Boletus fibrosus* HOOKER, in Kunth, Synopsis Plantarum, I, 1822, p. 10.

*Trametes ocella* BERKELEY & CURTIS, Journal of the Linnean Society, London, X, 1868, p. 319.

*Polyporus Feathermanni* RAVENEL, Grevillea, VI, 1877, p. 130.

*Pogonomyces hydnoides* MURRILL, Bulletin Torrey Botanical Club, XXXI, 1904, p. 609.

On old log near McKinley, May 16, 1910, *O. E. Jennings*, No. 306; on dead wood in forest along river bank at Los Indios, May 20, 1910, *O. E. Jennings*, No. 440a; near Sante Fé springs, May 26, 1910, *O. E. Jennings*, No. 604. General Distribution: On dead wood in the Gulf States and in tropical America.

#### 16. *Coltricia cinnamomea* (Jacquin) Murrill.

*Boletus cinnamomeus* JACQUIN, Collectanea ad Botanicam, Chemiam, et Historiam Naturalem Spectantia, I, 1786, p. 116.

*Strilia cinnamomea* S. F. GRAY, Natural Arrangement of British Plants, I, 1821, p. 645.

*Polyporus parvulus* KLOTZSCH, Linnæa, VIII, 1833, p. 483. Not Schweinitz, 1832.

*Polyporus oblectans* BERKELEY, London Journal of Botany, IV, 1845, p. 51.

*Polyporus splendens* PECK, Annual Report New York State Museum, XXVI, 1874, p. 68.

*Polystictus cinnamomeus* SACCARDO, Michelia, I, 1878, p. 362.

*Polyporus subsericeus* PECK, *op. cit.*, XXXIII, 1880, p. 37.

*Coltricia cinnamomea* MURRILL, Bulletin Torrey Botanical Club, XXXI, 1904, p. 343.

Near Los Indios, May 18, 1910. *O. E. Jennings*, No. 358a. General Distribution: On humus or well-decayed wood, practically cosmopolitan.

#### 17. *Pyropolyporus yucatanensis* Murrill.

*Pyropolyporus yucatanensis* MURRILL, Bulletin Torrey Botanical Club, XXX-1903, p. 119.

On trunk of tree on the rocky slope of the ridge at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 128. General Distribution: Yucatan, Nicaragua, and the Isle of Pines.

#### 18. *Dædalea amanitoides* Beauvois.

*Dædalea amanitoides* BEAUVOIS, Flore d'Oware et de Benin en Afrique, I, 1805, p. 44.

*Dædalea elegans* SPRENGEL, Kongliga Svenska Vetenskaps Akademien, Handlingar, 1820, p. 51.

*Dædalea repanda* PERSON, Voyage autour du Monde . . . exécuté sur les Corvettes de S. M. l'Uranie et la Physicienne . . . par M. Louis de Freycinet, Botanique, 1826, p. 168; MONTAGNE, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, IX, 1842, p. 382, Pl. XIV, fig. 4.

*Trametes elegans* FRIES, Epicrisis Systematis Mycologici seu Synopsis Hymenomycetum, 1838, p. 492.

On log between Bogarona and Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 605a. General Distribution: On dead wood of deciduous trees in the tropics of both hemispheres.

19. *Gloeophyllum* sp.

On slope of the ridge at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 131; Sante Fé, May 25, 1910, *O. E. Jennings*, No. 569.

Family AGARICACEÆ.

20. *Lentodium squamosum* (Schæffer) Murrill.

*Agaricus squamosus* SCHÆFFER, Fungorum qui in Bavaria et Palatinatu circa Ratisbonam nascuntur, Icones, IV, 1774, Index, p. 15.

*Agaricus lepideus* FRIES, Observationes Mycologicæ, I, 1815, p. 21.

*Lentinus lepideus* FRIES, Systema Orbis Vegetabilis, 1825, p. 78.

*Lentinus suffrutescens* FRIES, Epicrisis Systematis Mycologici seu Synopsis Hymenomycetum, 1838, p. 393.

*Lentinus magnus* PECK, Bulletin Torrey Botanical Club, XXIII, 1896, p. 413.

*Lentinus spretus* PECK, Bulletin New York State Museum, 105, 1906, p. 24.

*Lentodium squamosum* MURRILL, Mycologia, III, 1911, p. 27.

On base of stump in the pine-barrens at Los Indios, May 18, 1910, *O. E. Jennings*, No. 607a. General Distribution: Widely distributed in eastern and southeastern North America, and occurring, possibly less commonly, in tropical America.

21. *Lentinus crinitus* (Linnæus) Fries.

*Agaricus crinitus* LINNÆUS, Species Plantarum, Ed. 2, 1763, p. 1644.

*Agaricus Bertieri* FRIES, Systema Mycologicum, I, 1821, p. 175.

*Lentinus crinitus* FRIES, Systema Orbis Vegetabilis, 1825, p. 77.

*Lentinus nigripes* FRIES, in Klotzsch, Linnæa, VIII, 1833, p. 479.

*Lentinus nicaraguensis* BERKELEY & CURTIS, Proceedings American Academy Arts and Sciences, IV, 1858, p. 121.

*Lentinus Wrightii* BERKELEY & CURTIS, Journal of the Linnean Society, London, X, 1868, p. 300.

*Lentinus subcervinus* BERKELEY & CURTIS, *Idem*.

*Lentinus rigidulus* BERKELEY & CURTIS, *Idem*.

*Pocillaria vestida* EARLE, Informe anual de la Estación Central Agronómica de Cuba, I, 1906, p. 231.

In swamp near the base of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 261a; on old log in the pine-barrens near Los Indios, May 18, 1910, *O. E. Jennings*, No. 379. General Distribution: Widely distributed throughout the tropics and, in North America, extending up to the Gulf States. For other synonyms see Murrill, North American Flora, IX, 1915, pp. 291, 292.



**MUSCI.** (MOSSES.)

(Mostly determined by Elizabeth G. Britton and Percy Wilson.)

Family SPHAGNACEÆ. (SPHAGNUM OR BOG MOSSES.)

**22. Sphagnum** sp.

On sand-covered rocks in the bed of the upper part of the Los Indios River, near the Cañada Mts., May 18, 1910, *O. E. Jennings*, No. 372a. Specimens not in fruit.

Family BRYACEÆ. (WOOD MOSSES.)

**23. Octoblepharum albidum** (Linnæus) Hedwig.

*Bryum albidum* LINNÆUS, Species Plantarum, 1753, p. 1583.

*Bryum octoblepharis* GMELIN, Linnæi Systema Vegetabilium, II, 1791, p. 1331.

*Octoblepharum albidum* HEDWIG, Descriptiones et Adumbrationes Microscopico-analytica Muscorum Frondosorum, III, 1792, p. 15, Pl. 6.

On the base of a Royal Palm (*Roystonea regia*) near Nueva Gerona, May 9, 1910, *O. E. Jennings*; similar substratum in an arroyo north of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 198. General Distribution: Florida, the West Indies, Hawaii, Japan, the Himalayas, and tropical Africa.

**24. Callicostella** sp.

On roots in a pool in an arroyo near Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 199.

**25. Macromitrium** sp.

On top of Caballos Mts., May 13, 1910, *O. E. Jennings*, No. 227. Non-fruiting specimens.

Family HYPNACEÆ.

**26. Isopterygium micans** (Swartz) Renauld & Cardot.

*Hypnum micans* SWARTZ, Adnotationes Botanicae, 1829, p. 175.

*Hypnum albulum* C. MUELLER, Synopsis Muscorum Frondosorum, II, 1851, p. 280.

*Raphidostegium albulum* (C. MUELLER) BRUCH & SCHIMPER, in Sullivant & Lesquereux, Musci Boreali Americani, 1856, No. 302.

*Rhynchostegium micans* AUSTIN, Botanical Gazette, I, 1875, p. 30.

*Isopterygium albulum* JÆGER, Adumbratio Floræ Muscorum Totius Orbis Terrarum, 1876-77, p. 436.

*Raphidostegium micans* RENAULD & CARDOT, Musci Americæ Septentrionalis, 1893, p. 54.

On rotten stump in swamp at base of Mt. Colombo, May 14, 1910,

*O. E. Jennings, No. 243.* General Distribution: On earth and on rotten wood in moist woods of eastern North America from New York southwards to the West Indies.

## PTERIDOPHYTA.

(FERNS AND FERN ALLIES.)

Family HYMENOPHYLLACEÆ. (FILMY FERNS.)

### 27. *Trichomanes pinnatum* Hedwig.

*Trichomanes pinnatum* HEDWIG, *Filicum Genera et Species*, Fascicle I, 1799, p. 16, Pl. 4, fig. 1.

*Neurophyllum pinnatum* PRESL, *Hymenophyllaceæ*, 1843, p. 19, Pl. 4, fig. C.

Near Nueva Gerona, January 28, 1904, *A. H. Curtiss, No. 317.* General Distribution: Quite commonly found all over the West Indies and continental tropical America.

### 28. *Trichomanes* sp.

Along edge of arroyo in pine-barrens east of Los Indios, May 18, 1910, *O. E. Jennings, No. 370*; bank of Majagua River near Los Indios, May 19, 1910, *O. E. Jennings, No. 398.*

Family CYATHEACEÆ. (TREE FERNS.)

### 29. *Alsophila myosuroides* Liebmann.

*Alsophila myosuroides* LIEBMANN, *Kgl. Danske Videnskabernes Selskabs Afhandling*, Ser. V, I, 1849, p. 286.

*Alsophila Wrightii* UNDERWOOD. (Herbarium name not published).

Near Nueva Gerona, February 15, 1904, *A. H. Curtiss, No. 346*; Dr. J. F. Shafer, February–March, 1910, near Sante Fé, on bank of arroyo about one and one-half miles south of Nueva Gerona, May 12, 1910, *O. E. Jennings, No. 222.* General Distribution: The Isle of Pines and Mexico.

Family SCHIZEACEÆ.

### 30. *Lygodium venustum* Swartz.

*Lygodium venustum* SWARTZ, in Schrader, *Journal für die Botanik*, 1801, (2), p. 503.

Near Nueva Gerona, January 6, 1904, *A. H. Curtiss, No. 275.* General Distribution: West Indies (not common), and from Mexico through continental tropical America to Brazil and Peru.

Leaves thin, the sterile portions of the tertiary segments distinctly crenate-serrate to incised below.

31. **Lygodium cubense** Humboldt, Bonpland, & Kunth.

*Lygodium cubense* HUMBOLDT, BONPLAND, & KUNTZ, Nova Genera et Species Plantarum, I, 1815, p. 31.

On sand-plain near bank of the Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 409; in pine-barrens east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 354. General Distribution: Cuba and the Isle of Pines.

The sterile specimens from the Los Indios pine-barrens have coriaceous, mostly obtuse ultimate segments.

32. **Dicranopteris flexuosa** (Schrader) Underwood.

*Mertensia flexuosa* SCHRADER, Göttingische Gelehrte Anzeigen, 1824, p. 863.

*Mertensia rigida* KUNTZE, Linnæa, IX, 1834, p. 16.

*Dicranopteris flexuosa* UNDERWOOD, Bulletin of the Torrey Botanical Club, XXXIV, 1907, p. 254.

Near Nueva Gerona, January 28, 1904, *A. H. Curtiss*, No. 316, along bank of an arroyo east of Los Indios, near the Cañada Mts., May 18, 1910, *O. E. Jennings*, No. 378. General Distribution: Generally distributed in the Greater Antilles, less so in the Lesser Antilles, occurring also from southern Mexico to Brazil.

33. **Dryopteris sancta** (Linnæus) Kuntze.

*Acrostichum sanctum* LINNÆUS, Systema Naturæ, Ed. X, II, 1759, p. 1320.

*Polypodium sanctum* SWARTZ, Prodrromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 133.

*Aspidium sanctum* GRISEBACH, Flora of the British West Indian Islands, 1864, p. 691.

*Dryopteris sancta* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 813.

Along arroyo bank near Sante Fé, May 24, 1910, *O. E. Jennings*, No. 560; along an arroyo south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 620; *G. A. Link*, near Nueva Gerona, June 12, 1912. General Distribution: Cuba, the Isle of Pines, Hispaniola, Jamaica, Guadeloupe, Dominica, Martinique, and Central America.

34. **Dryopteris patens** (Swartz) O. Kuntze.

*Polyporus patens* SWARTZ, Prodrromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 133.

*Aspidium patens* (SWARTZ), Schrader's Journal für die Botanik, II, 1800, p. 34.

*Neprodium patens* DESVAUX, Annales de la Société Linnéenne de Paris, Mémoires, VI, 1827, p. 258.

*Dryopteris patens* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 813.

In swamp near Mt. Colombo, May 12, 1910, *O. E. Jennings*, No. 262; margin of ravine at magnesia springs, Sante Fé, May 26, 1910, *O. E. Jennings*, No. 580; near Nueva Gerona, June 12, 1912, *G. A. Link*. General Distribution: Cuba, the Isle of Pines, Hispaniola, St. Thomas, Barbados, Grenada, Tobago, Montserrat, Trinidad, from Alabama to Chile, tropical Africa, Japan, China, and Polynesia.

### 35. *Dryopteris deltoidea* (Swartz) O. Kuntze.

*Polypodium deltoideum* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 133.

*Polypodium appendiculatum* POIRET, in Lamarck, Encyclopédie Méthodique, Botanique, V, 1804, p. 533.

*Neprodium deltoideum* DESVAUX, Annales de la Société Linnéenne, Paris, VI, 1827, p. 259.

*Dryopteris deltoidea* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 812.

Along bank of an arroyo in pine-barrens east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 377; *Dr. J. F. Shafer*, February–March, 1910. General Distribution: The West Indies and continental tropical America.

### 36. *Tectaria martinicensis* (Sprengel) Copeland.

*Aspidium martinicense* SPRENGEL, Anleitung zur Kenntniss der Gewächse, III, 1804, p. 133.

*Aspidium repandum* VAHL, Eclogæ Americanæ, 1807.

*Neprodium macrophyllum* HOOKER & BAKER, Synopsis Filicum, Ed. II, 1874, p. 300.

*Dryopteris martinicensis* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 812.

*Tectaria martinicensis* COPELAND, Philippine Journal of Science, Botany, II, 1907, p. 410.

In brackish swamp north of Nueva Gerona, May 8, 1910, *O. E. Jennings*, No. 619. General Distribution: West Indies and continental tropical America.

### 37. *Goniopteris obliterated* (Swartz) Presl.

*Polypodium oblitteratum* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 132.

*Goniopteris obliterated* PRESL, Tentamen Pteridographiæ, 1836, p. 183.

*Dryopteris obliterated* CHRISTENSEN, Index Filicum, 1905, p. 280.

Near Nueva Gerona, February 15, 1904, *A. H. Curtiss*, No. 345; February–March, 1910, *Dr. J. F. Shafer*. General Distribution: West Indies and tropical continental America.

38. *Meniscium reticulatum* (Linnæus) Swartz.

*Polypodium reticulatum* LINNÆUS, Systema Naturæ, Ed. X, II, 1759, p. 1325.

*Meniscium reticulatum* SWARTZ, in Schrader's Journal für die Botanik, II, 1800, p. 10.

*Neprodium reticulatum* DIELS, in Engler & Prantl, Natürliche Pflanzenfamilien, I, (4), 1899, p. 170.

*Dryopteris reticulata* URBAN, Symbolæ Antillanæ, IV, 1903, p. 22.

In swamp, southwest of Bibijagua, May 7, 1910, *O. E. Jennings*, No. 91; in river-bank forest near Los Indios, May 20, 1910, *O. E. Jennings*, No. 451; along moist margin of ravine at magnesia springs, Sante Fé, May 26, 1910, *O. E. Jennings*, No. 573. General Distribution: From Florida and Cuba southwards through the West Indies and continental tropical America.

39. *Tectaria heracleifolia* (Willdenow) Underwood.

*Aspidium heracleifolium* WILLDENOW, Species Plantarum, V, 1810, p. 217.

*Tectaria heracleifolia* UNDERWOOD, Bulletin of the Torrey Botanical Club, XXXIII, 1906, p. 200.

Along margin of ravine near magnesia springs, Sante Fé, May 26, 1910, *O. E. Jennings*, No. 574. General Distribution: Florida, Texas, and southwards through tropical America.

40. *Nephrolepis biserrata* (Swartz) Schott.

*Aspidium biserratum* SWARTZ, in Schrader's Journal für die Botanik, II, 1800, p. 32.

*Aspidium punctulatum* SWARTZ, Synopsis Filicum, 1806, p. 46; Grisebach, Flora of the British West Indian Islands, 1864, p. 688.

*Nephrolepis biserrata* SCHOTT, Genera Filicum, 1834, Pl. 3.

Near Nueva Gerona, January 14, 1904, *A. H. Curtiss*, No. 289; in swamp, one mile north of Nueva Gerona, in clumps with *Phlebodium aureum*, May 8, 1910, *O. E. Jennings*, No. 132. General Distribution: Rather generally distributed through the West Indies; also in continental tropical America, Africa, Asia, and Australia.

41. *Odontosoria Wrightiana* Maxon.

*Odontosoria Wrightiana* MAXON, Contributions from the U. S. National Herbarium, XVII, 1913, p. 164; Pl. III.

*Palmer & Riley*, No. 984, July 3, 1900, and No. 1022, July 7, 1900; *A. A. Taylor*, No. 5, 1901; *A. H. Curtiss*, near Nueva Gerona, 1904; *Dr. J. F. Shafer*, February-March, 1910; No. 362. Forming large raised bunches in the swamp, one mile north of Nueva Gerona, May 6,

1910, *O. E. Jennings, No. 59*. General Distribution: Cuba and the Isle of Pines.

42. ***Lindsæa cubensis*** Underwood & Maxon.

*Lindsæa cubensis* UNDERWOOD & MAXON, Smithsonian Miscellaneous Collections, L, 1907, p. 336.

On wet bank, Majagua River near Los Indios, May 19, 1910, *O. E. Jennings, No. 418*. General Distribution: Cuba and the Isle of Pines.

43. ***Asplenium dentatum*** Linnæus.

*Asplenium dentatum* LINNÆUS, Species Plantarum, 1753, p. 1079; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 680.

Pedernales Point, February 16, 1899, *C. F. Millspaugh, No. 1441*. General Distribution: West Indies, continental tropical America, and Society Islands.

44. ***Asplenium*** sp.

Near Nueva Gerona, June 12, 1912, *G. A. Link*.

These specimens, perhaps referable to *A. dentatum*, have been listed separately while undergoing further investigation. The stipe and rachis are sparsely stipitate-glandular with dark brown glands, often several on the petiolules, which latter are slightly more distinct than in the material from Florida and Cuba which appears to be referable to *A. dentatum*. A smaller specimen in the Herbarium of the Carnegie Museum from the Guttentberg collection from Jamaica (no data) appears to be identical with Mr. Link's collection.

45. ***Blechnum occidentale*** Linnæus.

*Blechnum occidentale* LINNÆUS, Systema Naturæ, Ed. X, 1759, p. 1322; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 673.

Near Nueva Gerona, February 7, 1904, *A. H. Curtiss, No. 334*; February–March, 1900, *Dr. J. F. Shafer*; along arroyo east of Los Indios, May 18, 1910, *O. E. Jennings, No. 345*; near Nueva Gerona, *G. A. Link*, June, 1912. General Distribution: West Indies and continental tropical America.

46. ***Blechnum serrulatum*** L. C. Richard.

*Blechnum serrulatum* L. C. RICHARD, Actes de la Société d'Histoire Naturelle de Paris, 1792, p. 114; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 673.

North of Nueva Gerona, May 8, 1910, *O. E. Jennings, No. 613*.

General Distribution: Florida, the Bahamas, West Indies, continental tropical America, New Caledonia, and Australia.

47. **Pityrogramma tartarea** (Cavanilles) Maxon.

*Acrostichum tartarea* CAVANILLES, Descripción de las Plantas, 1801, p. 242.

*Ceropteris tartarea* LINK, Filicum Species in Horto Regio Botanico Berolinense Cultæ, 1841, p. 142.

*Pityrogramma tartarea* MAXON, Contributions from the U. S. National Herbarium, XVII, 1913, pp. 173-175.

Along moist side of ravine near magnesia springs, Sante Fé, May 26, 1910, *O. E. Jennings*, No. 570. General Distribution: Cuba, Isle of Pines, Jamaica, and continental tropical America.

48. **Adiantum villosum** Linnæus.

*Adiantum villosum* LINNÆUS, Systema Naturæ, Ed. X, II, 1759, p. 1328; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 664.

Near Nueva Gerona, January 6, 1904, *A. H. Curtiss*, No. 276; on lower slope of Caballos Mts., May 13, 1910, *O. E. Jennings*, No. 237. General Distribution: West Indies, central and northern South America.

49. **Adiantum melanoleucum** Willdenow.

*Adiantum melanoleucum* WILLDENOW, Species Plantarum, V, (I), 1810, p. 443.

*Adiantum Kunzeanum* KLOTZSCH, Linnæa, XVIII, 1844, p. 555; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 665.

Near Nueva Gerona, February 7, 1904, *A. H. Curtiss*, No. 333; February-March, 1910, *J. F. Shafer*; *G. A. Link*, near Nueva Gerona, June 12, 1912. General Distribution: Cuba, Isle of Pines, Jamaica, Haiti, and Porto Rico.

50. **Adiantum cristatum** Linnæus.

*Adiantum cristatum* LINNÆUS, Systema Naturæ, Ed. X, II, 1759, p. 1328; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 665.

Along wet arroyo bank east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 62; along river bank near magnesia springs, Sante Fé, May 26, 1910, *O. E. Jennings*, No. 579. General Distribution: The West Indies, Guiana, Venezuela.

51. **Adiantum fragile** Swartz.

*Adiantum fragile* SWARTZ, Prodomus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 135; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 666.

Near Nueva Gerona, January 6, 1904, *A. H. Curtiss*, No. 277; on shaded clay sides of an arroyo northeast of Nueva Gerona, May 14, 1910, *O. E. Jennings*, No. 279; near Nueva Gerona, June 12, 1912, *G. A. Link*. General Distribution: Cuba, Isle of Pines, Jamaica, Haiti, Porto Rico, St. Thomas, St. Jan, Guadeloupe, Martinique.

52. ***Pteridium caudatum*** (Linnæus) Maxon. BRACKEN.

*Pteris caudata* LINNÆUS, Species Plantarum, 1753, p. 1075; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 670.

*Pteridium aquilinum* var. *caudatum* HOOKER, in Hooker & Baker, Synopsis Filicum, Ed. II, 1874, p. 162.

In dry thicket on savanna east of Nueva Gerona, May 13, 1910, *O. E. Jennings*, No. 239. General Distribution: From Florida and the Bahamas south through the West Indies and tropical continental America.

53. ***Polypodium polypodioides*** (Linnæus) Hitchcock.

ROCK POLYPODY.

*Acrostichum polypodioides* LINNÆUS, Species Plantarum, 1753, p. 1068.

*Polypodium polypodioides* HITCHCOCK, Report of the Missouri Botanical Garden, IV, 1893, p. 156.

On old tree-trunk at top of Caballos Mts., May 13, 1910, *O. E. Jennings*, No. 224. General Distribution: From Pennsylvania and Illinois south to Argentina and Chile, also south Africa.

This fern is rare, at least, in the northern part of the island, it having been much sought after by the local inhabitants, by whom it is said to have been shipped to Havana as a medicinal herb.

54. ***Goniophlebium ampliatus*** Maxon.

*Polypodium gladiatum* KUNTZE, Linnæa, IX, 1834, p. 45. Not Vell, 1827.

*Goniophlebium ampliatus* MAXON, Contributions from the U. S. National Herbarium, X, 1908, p. 492.

In 1901, by *A. A. Taylor*, No. 9, see Maxon, *l. c.* General Distribution: Cuba, Isle of Pines, and Jamaica.

55. ***Campyloneuron phyllitidis*** (Linnæus) Presl.

*Polypodium phyllitidis* LINNÆUS, Species Plantarum, 1753, p. 1083; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 702.

*Campyloneuron phyllitidis* PRESL, Tentamen Pteridographiæ, 1836, p. 190.

In swamp northeast of Bibijagua, May 13, 1910, *O. E. Jennings*, No. 242. General Distribution: The Bahamas, West Indies, and from Florida to Argentina.



56. **Phlebodium aureum** (Linnæus) Robert Brown.

## GOLDEN POLYPODY.

*Polypodium aureum* LINNÆUS, Species Plantarum, 1753, p. 1087; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 698.

*Phlebodium aureum* ROBERT BROWN, in Horsfield, Plantæ Javanicæ Rariores, I, 1838, p. 4.

On trunks of Royal Palm (*Roystonea regia*) along an arroyo north of Sante Fé, May 25, 1910, *O. E. Jennings*, Nos. 535a and 609; similar habitat south of Sante Fé, May 25, 1910, *O. E. Jennings*, Nos. 610 and 611. General Distribution: The Bahamas and West Indies southwards to South America.

The smaller specimens seem to approach very closely *Phlebodium areolatum* Willdenow.

57. **Acrostichum aureum** Linnæus.

*Acrostichum aureum* LINNÆUS, Species Plantarum, 1753, p. 1069.

*Chrysodium vulgare* FÉE, Histoire de Acrostichées, 1845, p. 97.

*Chrysodium aureum* METTENIUS, Filices Horti Botanici Lipsiansis, 1856, p. 21.

In swamp southwest of Bibijagua, May 7, 1910, *O. E. Jennings*, No. 84. General Distribution: Tropics and subtropics generally, in America extending north as far as the Bermudas and Bahamas.

## Family MARSILEACEÆ.

58. **Marsilea polycarpa** Hooker & Greville.

*Marsilea polycarpa* HOOKER & GREVILLE, Icones Filicum, II, 1831, pl. 160.

*Marsilea caribæa* UNDERWOOD (Herbarium name, unpublished).

Near Nueva Gerona, December 10, 1903, *A. H. Curtiss*, No. 220. General Distribution: Cuba, the Isle of Pines, Jamaica, continental tropical America; the Society Islands.

## Family LYCOPODIACEÆ.

59. **Lycopodium cernuum** Linnæus.

*Lycopodium cernuum* LINNÆUS, Species Plantarum, II, Ed. I, 1753, p. 1103.

Near Nueva Gerona, January 28, 1904, *A. H. Curtiss*, No. 318; near Nueva Gerona, February–March, 1910, *J. F. Shafer*; in swampy border of pond one mile east of Nueva Gerona, May 6, 1910, *O. E. Jennings*; near base of Caballos Mts., May 13, 1910, *O. E. Jennings*, No. 224a; winter of 1912, *G. A. Link*. General Distribution: From Florida to Mississippi, through the West Indies, common in the tropics.

60. *Lycopodium* sp.

On peaty-sand (apparently acid) one mile north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 385. Prostrate, complanate, and stiff, but non-fruiting.

## Family SELAGINELLACEÆ.

61. *Selaginella rhodospora* Baker, var.

*Selaginella rhodospora* BAKER, The Fern-Allies, 1887, p. 1-6.

In pine-barrens east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 361. (Det. by Hieronymus.) General Distribution: Florida, Cuba, and the Isle of Pines.

62. *Selaginella* sp.

On moist bank along arroyo near Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 63. Non-fruiting.

## SPERMATOPHYTA.

## Family CYCADACEÆ.

63. *Zamia silicea* Britton.

*Zamia silicea* BRITTON, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 462.

In swampy place east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 60; near Los Indios, November 4, 1912, *G. A. Link*; *Britton & Wilson*, No. 14,166, near Los Indios, type, spring, 1916. General Distribution: The Isle of Pines.

The specimen collected by Mr. Link, is a carpellate plant with a fine ripe cone. The cone is oblong-ovoid, 5 cm. long by nearly 3 cm. thick, mounted on a stout peduncle which is 3 cm. long and 4 mm. thick, and densely and softly brownish-pubescent. The cone contains about twenty carpels, the peltate flat-topped scales being densely brown pubescent, hexagonal, in lateral diameter about 12-15 mm., the vertical dimension about 6 mm., and the middle portion being marked off by a light colored line and somewhat sunken. The apex of the cone consists of a stout point about 5 mm. long.

## Family PINACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Leaves in two-leaved clusters, light-colored, slender, usually not over 1 mm. in diameter and often 3 dm. long.....65. *Pinus tropicalis*.

Leaves in three- (or two-) leaved clusters, fairly dark green, rather stiff, usually 1.5-2 mm. wide and less than two dm. long.....64. *Pinus caribæa*.

#### 64. *Pinus caribæa* Morelet. CARIBBEAN PINE.

*Pinus caribæa* MORELET, Bulletin de la Société d'Histoire Naturelle du Département de la Moselle, VII, 1885, p. 97.

On "Mal Pais" gravel plain southwest of Bibijagua, May 7, 1910, *O. E. Jennings*, No. 82; in sandy field southwest of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 685; Sante Fé, February 11, 1903, *George R. Shaw*. General Distribution: Southern Florida to Georgia and Mississippi, the Bahamas, Cuba, and the Isle of Pines.

In the *Bulletin of the Torrey Botanical Club* (XXX, 1903, pp. 106-108.) W. W. Rowlee has published some notes on the pines of the Isle of Pines, including in these notes descriptions of a new species (*Pinus recurvata* Rowlee) and a new variety (*Pinus cubensis* var. *anomala* Rowlee), also recording the occurrence on the island of *Pinus cubensis* Grisebach.

*Pinus caribæa* is the common pine which probably formerly covered almost completely the "Mal Pais" gravel plains, the sandy or gravelly (quartzose) plains in the western and southwestern parts of the island, and the gentle slopes and rounded tops of the mica-schist hills and mountains in the south-central and southwestern parts. At the time of the writer's visit in 1910, the view from the top of the Cañada Mts., looking to the west and northwest over the pine-barrens, was as over a sea of light green, broken here and there in the hazy distance by the darker green jungle and mangrove forest along the moist valleys and near the coast.

#### 65. *Pinus tropicalis* Morelet.

*Pinus tropicalis* MORELET, Bulletin de la Société d'Histoire Naturelle du Département de la Moselle, VII, 1885, p. 97.

*Pinus occidentalis* RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, XI, 1850, pp. 232, 233 (at least in part, not Swartz).

*Pinus cubensis* var.? *terthrocarpa* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 217.

*Pinus recurvata* ROWLEE, Bulletin of the Torrey Botanical Club, XXX, 1903, p. 107 (in part).

*Pinus cubensis* var. *anomala* ROWLEE, *op. cit.*, p. 108 (in part).

*Pinus terthrocarpa* SHAW, Trees and Shrubs, I, 1905, p. 149.

Collected in the Isle of Pines, 1831, *A. H. Lanier* (*A. Richard, l. c.*); February, 1901, *W. W. Rowlee*, Nos. 231, 232, 233 (in part); Sante Fé,

George R. Shaw, February, 1903; probably near Sante Fé, March, 1910, *Dr. Jared F. Shafer*. General Distribution: Western Cuba and the Isle of Pines.

Shaw notes ("Trees and Shrubs," I, 1905, p. 149) that at Sante Fé the species grows both alone and in mixture with *Pinus heterophylla* (= *P. caribæa* as to the Isle of Pines reference).

Rowlee's description of *Pinus cubensis* var. *anomala* (*Bulletin of the Torrey Botanical Club*, XXX, 1903, pp. 106-108), as collected by him at Jucaro Landing in 1901, is as follows: "Tree 6-9 m. high. Slender needles 3, bracts 6-8 mm. long, green and remaining on the shoots the first season, resembling the leaves of a spruce."

#### Family TYPHACEÆ.

##### 66. *Typha angustifolia* Linnæus. NARROW-LEAVED CAT-TAIL.

*Typha angustifolia* LINNÆUS, *Species Plantarum*, Ed. I, 1753, p. 971.

In stream from spring, Keenan's estate, south of Nueva Gerona, May 9, 1910. *O. E. Jennings*, *Number 164*.

The hairs accompanying the pistillate flowers do not have the club-shaped tips which are supposed to indicate the distinctive character of *Typha domingensis* Persoon, and, it appears probable that there are good reasons for reducing the latter species to the position of a form of *T. angustifolia*, or even to pure synonymy, as has been done by Wilson, in the "North American Flora," XVII, 1909, p. 3.

#### Family ALISMACEÆ.

##### 67. *Sagittaria falcata* Pursh.

*Sagittaria falcata* PURSH, *Flora Americæ Septentrionalis*, 1814, p. 397.

*Sagittaria lancifolia* var. *media* MICHELI, in De Candolle, *Monographiæ Phanerogamarum*, III, 1881, p. 73.

*Sagittaria lancifolia* var. *falcata* J. G. SMITH, *Memoirs*, *Torrey Botanical Club*, V, 1894, p. 25.

In swale along stream near the west base of Mount Colombo, May 14, 1910, *O. E. Jennings*, *No. 259*.

This species, now reported to extend from "Delaware to Florida, Texas, and Mexico" ("North American Flora," XVII, 1909, p. 57), has probably been confused with typical *Sagittaria lancifolia*, as to a number of West Indian records. It is quite distinct from *S. lancifolia*, however, in the specimens from the Isle of Pines. A brief description of the specimen from the Isle of Pines follows:

Leaves emersed, arising from a strong horizontal rhizome, the petioles about 15 to 20 cm. long, the blades about 6 to 10 cm. long by 3 to 5 mm. wide, thick, pseudo-penninervate, with usually 5 nerves, the apex narrow but obtuse, scape simple, 6 to 6.5 dm. tall, the whorls of the inflorescence 4 to 7 in number, peduncles of the staminate flowers 1.5 to 2 cm. long, slender, ascending, those of the pistillate flowers about 8 to 17 mm. long, somewhat thicker than those of the staminate flowers, bracts ovate, acute, strongly veined, dorsally minutely papillose, 8 to 13 mm. long, sepals obtuse, about 6 mm. long, petals about 1.5 cm. long, anthers slightly shorter than the very sparingly pubescent filaments, mature achenes rounded-obovate, about 2 mm. long by 1.2 mm. wide, margined all around by a lighter colored wing, the beak about 0.5 mm. long, spreading horizontally from the apex of the achene, but with the extreme tip usually upturned.

### Family GRAMINEÆ.

#### KEY TO THE SPECIES ENUMERATED.

(Adapted from Hitchcock, *Grasses of Cuba*.<sup>2</sup>)

#### Series I. Paniceæ.

Spikelets 1- or rarely 2-flowered; if 2-flowered the terminal floret perfect, the lower staminate or neutral; rachilla articulated below the glumes; spikelets not laterally compressed.

Lemma and palea hyaline; glumes more or less indurated, the first largest; sterile and fertile lemma alike in texture.

Joints of the rachis much thickened and excavated to receive the spikelets.

68. *Hackelochloa granularis*.

Joints of the rachis not thickened nor excavated.

Spikelets all alike, perfect; panicle plume-like. 69. *Imperata brasiliensis*.

Spikelets not all alike.

Racemes of several to many joints, at least some of the racemes sessile.

Racemes numerous in a leafless terminal panicle.

73. *Andropogon leucopogon*.

Racemes 1-4, solitary or fascicled from spathes.

Racemes solitary.

Spikelets awnless. . . . . 75. *Andropogon spathiflorus*.

Spikelets awned. . . . . 72. *Andropogon gracilis*.

Racemes 2-4 from each spathe.

Spathes numerous in a large corymb.

Spikelets awnless. . . . . 70. *Andropogon bicornis*.

Spikelets long-awned. . . . . 71. *Andropogon tenuispatheus*.

<sup>2</sup> HITCHCOCK, A. S. Contributions from the United States National Herbarium, XII, 1909, pp. 183-258.

Racemes naked and terminal; spikelets awnless.

74. *Andropogon leucostachys*.

Racemes reduced to one or two joints; all racemes more or less pedunculate.....76. *Rhaphis pauciflora*.

Lemma and palea membranaceous or indurated; sterile lemma when present like the glumes in texture.

Spikelets unisexual; plants monœcious; blades abruptly contracted into petiole-like bases.....123. *Olyra latifolia*.

Spikelets all perfect.

Spikelets 2-4 together, sunken in alternate notches of a broad thickened rachis; creeping grasses.....122. *Stenotaphrum secundum*.

Spikelets not sunken in the notches of a thickened rachis.

Spikelets solitary or in small clusters subtended by an involucre consisting of one to many bristles, these sometimes grown together.

Involucre persistent on the rachis, spikelets deciduous.

Inflorescence dense and spike-like; bristles of the involucre 5 or more.....117. *Chatochloa imberbis*.

Inflorescence comparatively loose; bristles 1-3.

118. *Chatochloa setosa*.

Involucre deciduous with and attached to the spikelets.

Involucre a spiny bur enclosing 1-5 spikelets.

119. *Cenchrus echinatus*.

Involucre of a single sterile branch produced beyond each spikelet.....121. *Paratheria prostrata*.

Spikelets not involucre.

Fruits not rigid, margins of lemma not inrolled.

Inflorescence of slender racemes, divergently digitate at summit of culm, both glumes wanting.

77. *Reimarochloa brasiliensis*.

Inflorescence paniculate.

Fruit open at the white-margined summit; spikelets tuberculate-hispid between the nerves.

92. *Leptocoryphium lanatum*.

Fruit not open nor white-margined at the summit.

Spikelets clothed with long silky hairs.

95. *Valota insularis*.

Spikelets glabrous or pubescent only.

Spikelets 3-4 mm. long, more or less villous on the nerves; rachis not pilose.

94. *Syntherisma sanguinalis*.

Spikelets 2 mm. long, glabrous; rachis sparsely long-pilose.....93. *Syntherisma digitata*.

Fruits indurated-rigid, or if thin not open at the summit nor hyaline-margined.

Spikelets placed with the back of the fruit turned away from the main axis.

First glume as long as the spikelet or nearly so.

96. *Mesosetum Rottbællioides*.

First glume wanting or not over one-fourth the length of the spikelet. . . . . 91. *Axonopus compressus*.

Spikelets with the back of the fruit turned towards the main axis.

Spikelets plano-convex, sessile in spike-like racemes, typically lacking the first glume (*Paspalum*).

Racemes terminal and also from the upper sheath.

85. *Paspalum pedunculatum*.

Racemes terminal only.

Racemes normally in pairs, and approximate.

Plants with creeping rootstocks.

79. *Paspalum distichum*.

Plants without creeping rootstocks.

Both glumes obsolete.

87. *Paspalum pulchellum*.

First glume only obsolete.

Spikelets circular, 1.5 mm. long or less.

78. *Paspalum conjugatum*.

Spikelets lanceolate or elliptic, 2 mm. long or more.

Spikelets loosely imbricated; spikes ascending. . . . 81. *Paspalum Neesii*.

Spikelets densely imbricated; spikes spreading.

Spikelets 2 mm. long.

82. *Paspalum minus*.

Spikelets 3 mm. long.

84. *Paspalum notatum*.

Racemes 1 to several; if 2, the lower at some distance below the terminal and the number not constant.

Raceme usually 1, sometimes 2.

Spikelets transversely wrinkled.

Blades involute, glabrous, elongated, 40-60 cm. long.

80. *Paspalum filiforme*.

Blades flat, pubescent, 5-15 cm. long.

83. *Paspalum nanum*.

Spikelets not transversely wrinkled.

88. *Paspalum Rottbællioides*.

Racemes more than 1, often numerous.

Sterile lemma transversely wrinkled; spikelets brown. . . . . 86. *Paspalum plicatulum*.

Sterile lemma not transversely wrinkled.

Spikelets pubescent.

89. *Paspalum virgatum*.

Spikelets glabrous.

90. *Paspalum virgatum* var. *Schreberianum*.

Spikelets unequally biconvex; paniculate, or if racemose, with the first glume present.

Glumes awnless.

Second glume broad and saccate; panicle contracted or spike-like.

Spikelets 2 mm. long, panicle dense.

97. *Sacciolepis Myuros*.

Spikelets 3 mm. long, panicle often interrupted.

98. *Sacciolepis vilvoides*.

Second glume not broad nor saccate; margins of lemma inrolled (*Panicum*).

Inflorescence consisting of several spike-like, more or less secund racemes.

Fruit smooth and shining, spikelets not over 1.5 mm. long.

Rachis pilose; pedicel short, subequal.

114. *Panicum pilosum*.

Rachis not pilose; pedicels unequal, panicle less regular.

110. *Panicum laxum*,

Fruit transversely wrinkled; spikelets turgid.

Spikelets hispidulous pointed, first glume acute. . . . . 103. *Panicum adspersum*.

Spikelets glabrous; first glume truncate.

109. *Panicum geminatum*.

Inflorescence a more or less diffuse panicle, not consisting of spike-like racemes.

Stems woody, resembling bamboos.

Panicle large and spreading, 10-20 cm. long. . . . . 112. *Panicum Sloanei*.

Panicle small and few-flowered, usually 5 cm. long. . . . . 101. *Lasiacis divaricata*.

Stems herbaceous.

Plants forming winter-rosettes; secondary reduced panicles borne after the maturity of the primary terminal panicle.

Ligule a ring of hairs 1-1.5 mm. long; spikelets pubescent, 1-1.5 mm. long.

102. *Panicum acuminatum*.

Ligule inconspicuous.

Autumnal state a flat mat or



rosette of soft leaves; blades ciliate; spikelets 1.5-2 mm. long, glabrous.

111. *Panicum polycaulon*.

Autumnal state erect or spreading.

Sheath velvety or pilose.

106. *Panicum chrysopsidifolium*.

Sheaths not velvety or pilose.

Blades long and narrow; spikelets papillose.

108. *Panicum fusiforme*.

Blades not elongated; spikelets not papillose.

115. *Panicum albomarginatum*.

Plants not forming winter-rosettes.

Panicles narrow and compact with appressed branches.

113. *Panicum stenodes*.

Panicles open usually diffusely spreading.

Spikelets 1.5 mm. long, short-pedicelled.

107. *Panicum exiguiusculum*.

Spikelets on more or less elongated pedicels.

Sheaths glabrous.

105. *Panicum diffusum*.

Sheaths hispid.

104. *Panicum cayennense*.

One or both glumes awned or cuspidate.

Fruit cuspidate, palea free at the tip; second glume and sterile lemma tapering into a cuspidate point or awn (*Echinochloa*).

Spikelets pointed, not awned.

99. *Echinochloa colonum*.

Spikelets awned. . . . 100. *Echinochloa Crusgalli*.

Fruit not cuspidate, palea not free; awns arising from a toothed summit. . 116. *Oplismenus hirtellus*.

## Series II. Poaceæ.

Spikelets one to many-flowered, the imperfect or rudimentary floret, if any, uppermost; rachilla articulated (except in *Achlæna* and *Reynaudia*) above the glumes, which are persistent on the pedicel or rachis after the fall of the florets; when 2- or many-flowered a manifest internode of the rachilla separating the florets and articulated below them; spikelets laterally compressed. Spikelets articulated below the glumes.

Glumes tapering into awns; spikelets, including awns, over 3 cm. long.

124. *Achlæna piptostachya*.

- Glumes awned from the notched apex; spikelets including awns, scarcely 1 cm. long. . . . . 125. *Reynaudia filiformis*.
- Spikelets articulated above the glumes.
- Inflorescence of one-sided spikes or racemes; spikelets sessile or nearly so.
- Spikelets with one or two sterile florets above the perfect one.
- Spikelets awnless; spikes dark brown. . . . . 131. *Chloris petræa*.
- Spikelets awned; spikes green or yellow. . . . 130. *Chloris paraguayensis*.
- Spikelets with 2 or 3 perfect florets.
- Spikes alternate, more or less remote along the main axis, spikelets not crowded. . . . . 133. *Leptochloa filiformis*.
- Spikes digitate or nearly so, spikelets crowded. . . . 132. *Eleusine indica*.
- Inflorescence paniculate, sometimes contracted but spikelets never sessile in 1-sided spikes.
- Spikelets 1-flowered.
- Lemma awnless.
- Plants with long rhizomes; blades distichous. . . . . 129. *Sporobolus virginicus*
- Plants caespitose, not with rhizomes; blades not distichous.
- Panicle dense and spike-like. . . . . 128. *Sporobolus indicus*.
- Panicle open; basal sheaths copiously felty-ciliate. . . . . 127. *Sporobolus cubensis*.
- Lemma awned, indurate, convolute; awn 3-fid. . . . 126. *Aristida refracta*.
- Spikelets 2-many-flowered.
- Lemmas 3-nerved, not at all indurated.
- Creeping annuals with dioecious flowers. . . 137. *Eragrostis hypnoides*.
- Not creeping; flowers perfect.
- Annuals; palea prominently ciliate. . . . . 134. *Eragrostis ciliaris*.
- Perennials.
- Plants low, 10-20 cm. high; blades involute; panicle not diffuse. . . . . 135. *Eragrostis cubensis*.
- Plants tall; blades flat; panicles very diffuse. . . . . 136. *Eragrostis Elliottii*.
- Lemmas many-nerved, somewhat indurated and rigid. . . . . 138. *Distichlis spicata*.

#### 68. *Hackelochloa granularis* (Linnæus) Kuntze.

*Cenchrus granularis* LINNÆUS, Mantissa Plantarum, 1771, p. 575.

*Manisurus granularis* SWARTZ, Prodrromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 25.

*Manisurus polystachya* BEAUVOIS, Flore de Royaumes d'Owaré et de Benin, I, 1805, p. 24.

*Ryttilix granularis* SKEELS, Bureau Plant Industry, U. S. Dept. Agriculture, XX, 1913, p. 282.

Near Nueva Gerona, May 12, 1904, *A. H. Curtiss*, No. 493. General Distribution: General throughout tropical regions, extending northwards in America to Florida, Georgia, Arizona, and Lower California.

69. *Imperata brasiliensis* Trinius.

*Imperata brasiliensis* TRINIUS, Mémoires de l'Académie Imperiale des Sciences de St. Petersburg, VI, (2), 1832, p. 331.

*Imperata Sape* ANDERSSON, Oefversigt Svenska Vetenskaps Akademien Forhandlingar, 1855, p. 159.

*Syllepis Ruprechtii* FOURNIER, Mexicanas Plantas, Gramineæ, 1881, p. 52.

*Imperata caudata* CHAPMAN, Flora of the Southern U. S., Ed. II, 1884, p. 668. Not Trinius.

Near Nueva Gerona, 1904, *A. H. Curtiss* (Hitchcock, Cat. Grasses of Cuba, Contrib. U. S. Nat. Herb., XII, 1909, p. 190); common in lower parts of the savanna, near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 18; in pine woods north of McKinley, May 16, 1910, *O. E. Jennings*, Nos. 295 and 296. General Distribution: Florida, Cuba, the Isle of Pines, and from Vera Cruz to Brazil.

70. *Andropogon bicornis* Linnæus.

*Andropogon bicornis* LINNÆUS, Species Plantarum, 1753, p. 1046.

*Anatherium bicornis* BEAUVOIS, Essai d'une nouvelle Agrostographie, 1812, p. 150.

*Sorgum bicornis* KUNTZE, Revisio Generum Plantarum, I, 1891, p. 791.

Near Nueva Gerona, January and May, 1904, *A. H. Curtiss*, No. 294; Nueva Gerona, *Palmer & Riley*, No. 1125 (Hitchcock); near Nueva Gerona, June 12, 1912, *G. A. Link*. General Distribution: Throughout the West Indies and from southern Mexico to Brazil.

71. *Andropogon tenuispatheus* Nash.

*Andropogon macrourus pumilus* VASEY, Botanical Gazette, XVI, 1891, p. 27.

Not *A. pumilus* ROXB., 1820.

*Andropogon glomeratus tenuispatheus* NASH, in Small, Flora of the Southeastern U. S., 1903, p. 61.

Moist bank of stream at Keenan's estate, south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 180; in everglade meadow at mouth of Nuevas River, May 16, 1910, *O. E. Jennings*, No. 283. (Also part of *Curtiss*, No. 294, and *Taylor*, No. 18.—See report on *A. glomeratus* in Hitchcock, "Grasses of Cuba," Contrib. U. S. Nat. Herb., XII, 1909, p. 193.) General Distribution: From Georgia, Florida, and southern California, through the West Indies and Central America to tropical South America.

72. *Andropogon gracilis* Sprengel.

*Andropogon gracilis* SPRENGEL, Systema Vegetabilium, I, 1825, p. 284.

*Sorgum gracile* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 791.

*Schizachyrium gracile* NASH, in Small, Flora of the Southeastern U. S., 1903, p. 60.

Near Nueva Gerona, 1904, *A. H. Curtiss*, No. 380 and *Taylor*, No. 17 (Hitchcock). Growing as a "bunch-grass" in savanna east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 58. General Distribution: Florida and the Bahamas, and from Cuba and Jamaica to Guadeloupe.

**73. *Andropogon leucopogon* Nees.**

*Andropogon leucopogon* NEES, Linnæa, XIX, 1847, p. 694.

*Andropogon saccharoides leucopogon* HACKEL, DeCandolle, Monographiæ Phanerogamarum, VI, 1889, p. 496.

*Amphilophis barbinodis* NASH, in Small, Flora of the Southeastern U. S., 1903, p. 65.

Near Nueva Gerona, March 2, 1904, *A. H. Curtiss*, No. 382. Distributed in "West Indian Plants" as "*Amphilopus saccharoides* (Sw.)." General Distribution: Cuba, Isle of Pines, Haiti, and Colombia.

**74. *Andropogon leuchostachyus* Humboldt, Bonpland, & Kunth.**

*Andropogon leuchostachyus* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, I, 1816, p. 187.

*Andropogon domingensis* ROEMER & SCHULTES, Systema Vegetabilium, II, 1817, p. 809.

*Sorgum leuchostachyum* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 792.

Near Nueva Gerona, January 26, 1904, *A. H. Curtiss*, No. 314; *Taylor*, No. 16 (Hitchcock). General Distribution: West Indies and southern Mexico to Brazil.

**75. *Andropogon spathiflorus* (Nees) Kunth.**

*Hypogynium spathiflorum* NEES, Agrostologia Brasiliensis, 1829, p. 366.

*Andropogon spathiflorus* KUNTH, Agrostographia sive Enumeratio Graminum, I, 1833, p. 496.

*Anatherum spathiflorum* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 236.

Near Nueva Gerona, April 24, 1904, *A. H. Curtiss*, No. 460; *Taylor*, No. 23 (Hitchcock). General Distribution: Cuba, Isle of Pines, Haiti, Porto Rico, and South America.

**76. *Rhaphis pauciflora* (Chapman) Nash.**

*Sorgum pauciflorum* CHAPMAN, Botanical Gazette, III, 1878, p. 20.

*Chrysopogon pauciflorus* BENTHAM; Vasey, Grasses of the U. S., 1883, p. 20.

*Chrysopogon Wrightii* MUNRO, in Vasey, Descriptive Catalogue of the Grasses of the U. S., 1885, p. 29.

*Andropogon pauciflorus* HACKEL, in DeCandolle, Monographiæ Phanerogamarum, VI, 1889, p. 548.

*Raphis pauciflora* NASH, in Small, Flora of the Southeastern U. S., 1903, p. 67.

Reported by Hitchcock, *A. A. Taylor*, No. 46. General Distribution: Florida, Cuba, and the Isle of Pines.

77. **Reimarochloa brasiliensis** (Sprengel) Hitchcock.

*Agrostis brasiliensis* SPRENGEL, *Novi Proventus Hortorum Halensis et Berolinensis*, 1819, p. 45.

*Reimaria brasiliensis* SCHLECHTENDAL, *Flora oder Botanische Zeitung*, X, 1852, p. 17.

*Panicum oxyanthum* STEUDEL, *Synopsis Plantarum Glumacearum*, I, 1854, p. 41.

*Reimarochloa brasiliensis* HITCHCOCK, *Contributions U. S. National Herbarium*, XII, 1909, p. 198.

Near Nueva Gerona, 1904, *A. H. Curtiss*, No. 497 (Hitchcock). General Distribution: Cuba, Isle of Pines, Haiti, and tropical South America.

78. **Paspulum conjugatum** Bergius.

*Paspulum conjugatum* BERGIUS, *Acta Helvetica Physico-Mathematico-Botanico-Medica*, etc., VII, 1772, p. 129, t. 8.

*Paspalum tenue* GAERTNER, *De Fructibus et Seminibus Plantarum*, II, 1791, p. 2.

Isle of Pines, 1904, *A. H. Curtiss* (Hitchcock); in open spot in river-bank forest, Los Indios, May 20, 1910, *O. E. Jennings*, No. 445. General Distribution: Tropics and subtropics generally, extending north in America as far as Florida and Bermuda.

79. **Paspalum distichum** Linnæus.

*Paspalum distichum* LINNÆUS, *Systema Naturæ*, Ed. X, 1759, p. 899.

*Digitaria paspalodes* MICHAUX, *Flora Boreali-Americana*, I, 1803, p. 46.

(See list of synonyms in Nash, *North American Flora*, XVII, 1912, p. 195.)

Near Nueva Gerona, 1904, *A. H. Curtiss* (Hitchcock). General Distribution: From New Jersey, Arizona, and Washington south through the West Indies and continental tropical America. Also tropics of the Old World.

80. **Paspalum filiforme** Swartz.

*Paspalum filiforme* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 22.

*Paspalum Swartzianum* FLUEGGE, *Graminum Monographiæ*, 1810, p. 96.

*Paspalum longifolium* STEUDEL, *Synopsis Plantarum Glumacearum*, 1854, p. 21.

*Paspalum approximatum* DOELL, in Martius, *Flora Brasiliensis*, II, (2), 1877, p. 82.

Near Nueva Gerona, February 27 and June 3, 1904, *A. H. Curtiss*, Nos. 374 and 523; *Palmer & Riley*, No. 949, 1900 (Hitchcock). General Distribution: Cuba, Isle of Pines, Jamaica, and Brazil.

81. ***Paspalum Neesii* Kunth.**

*Paspalum angustifolium* NEES, *Agrostologia Brasiliensis*, 1829, p. 64. Not Le-Conte, 1820, nor Nees, in Trinius *De Graminibus Paniceis*, 1826.

*Paspalum Neesii* KUNTH, *Revision de Graminées*, I, 1829, p. 25.

Near Nueva Gerona, 1904, *A. H. Curtiss*, No. 379 (Hitchcock); in pine-barrens at Los Indios, May 19, 1910, *O. E. Jennings*, No. 428. General Distribution: Cuba, Isle of Pines, southern Mexico (Hemslley), Costa Rica, Brazil. Miss Agnes Chase informs the writer in a recent letter that *Paspalum lineare* Trinius, for which these specimens were mistaken, is a larger plant not found in the West Indies.

82. ***Paspalum minus* Fournier.**

*Paspalum minus* FOURNIER, *Mexicanas Plantas*, *Gramineæ*, 1886, p. 6.

Moist bank of stream on Keenan's estate south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 179; *Palmer & Riley*, No. 978 (Hitchcock); *A. H. Curtiss* in 1904 (Hitchcock). General Distribution: Cuba, Isle of Pines, Jamaica, southern Mexico, Guatemala, and Colombia.

83. ***Paspalum nanum* Wright.**

*Paspalum nanum* WRIGHT, in Grisebach *Catalogus Plantarum Cubensium*, 1866, p. 230.

*Paspalum caudicatum* WRIGHT, *Anales del Academia de Ciencias Médicas, Físicas y Naturales de la Habana*, VIII, 1871, p. 205.

"Isle of Pines, *Taylor*, 40, *Curtiss* in 1904" (Hitchcock). General Distribution: Cuba and the Isle of Pines.

84. ***Paspalum notatum* Fluegge.**

*Paspalum notatum* FLUEGGE, *Graminum Monographiæ*, 1810, p. 106.

"Isle of Pines, *Palmer & Riley* 1119" (Hitchcock). General Distribution: Central Mexico to the West Indies and South America.

85. ***Paspalum pedunculatum* Poir.**

*Paspalum decumbens* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 22. Not Rottbæll, 1778.

*Paspalum pedunculatum* POIRET, *Encyclopédie Méthodique, Supplementa in Dictionnaire de Botanique*, IV, 1816, p. 315.

*Panicum decumbens* ROEMER & SCHULTES, *Systema Vegetabilium*, II, 1817, p. 429.

*Paspalum vaginiflorum* STEUDEL, *Synopsis Plantarum Glumacearum*, I, 1854, p. 19.

*Dimorphostachys pedunculata* FOURNIER, *Mexicanas Plantas*, II, 1886, p. 15.

Near Nueva Gerona, February 2, 1904, *A. H. Curtiss*, No. 327.

General Distribution: Cuba, Isle of Pines, Jamaica, Porto Rico, Trinidad, Guiana.

86. ***Paspalum plicatulum* Michaux.**

*Paspalum plicatulum* MICHAUX, Flora Boreali-Americana, I, 1803, p. 45.

"Isle of Pines, *Palmer & Riley* 947, *Taylor* 38, . . . *Curtiss* in 1904" (Hitchcock). General Distribution: In dry sandy soil, Georgia and Florida to Texas, and south through the West Indies and tropical America.

87. ***Paspalum pulchellum* Kunth.**

*Reimaria elegans* FLUEGGE, Graminum Monographiæ, 1810, p. 216. Not *Paspalum elegans* Kunth, 1833.

*Paspalum pulchellum* KUNTH, Mémoires de la Société d'Histoire Naturelle de Paris, II, 1815, p. 68.

"Isle of Pines, *Curtiss* in 1904 in Herb. N. Y. Bot. Gard." (Hitchcock). General Distribution: Cuba and the Isle of Pines.

88. ***Paspalum Rottboellioides* Wright.**

*Paspalum rottboellioides* WRIGHT, Anales del Academia de Ciencias Médicas, Físicas y Naturales de la Habana, VIII, 1871, p. 204.

Near Nueva Gerona, February 28, 1904, *A. H. Curtiss*, No. 375; in 1901, *A. A. Taylor* (Hitchcock). General Distribution: In sandy savannas, Cuba, and in the Isle of Pines.

89. ***Paspalum virgatum* Linnæus.**

*Paspalum virgatum* LINNÆUS, Systema Naturæ, Ed. X, II, 1759, p. 855.

*Paspalum leuchocheilum* WRIGHT, *op. cit.*, p. 203.

Near Nueva Gerona, May 15, 1904, *A. H. Curtiss*, No. 501; in an open spot in the river-bank forest at Los Indios, May 20, 1910, *O. E. Jennings*, No. 448. General Distribution: From southern Mexico to Costa Rica, in the West Indies, and in tropical South America.

90. ***Paspalum virgatum* var. *Schreberianum* Fluegge.**

*Paspalum virgatum* var. *Schreberianum* FLUEGGE, Graminum Monographiæ, 1816, p. 190.

Reported by Hitchcock, on the basis of one of the *A. H. Curtiss* specimens from Nueva Gerona, collected in 1904, and now in the herbarium of the New York Botanical Garden. The variety differs from the species in having a "scarcely pilose rachis and oblong-obovate, acute, glabrous spikelets."—Hitchcock.

91. **Axonopus compressus** (Swartz) Beauvois. CARPET GRASS.

*Milium compressum* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 24.

*Paspalum compressum* NEES, in Martius, Flora Brasiliensis, II, 1829, p. 23.

*Anastrophus platycaulis* NASH, in Small, Flora of the Southeastern U. S., 1903, p. 79.

*Axonopus compressus* BEAUVOIS, Essai d'une nouvelle Agrostographie, 1812, p. 12. (For several other synonyms see Nash, in North American Flora, XVII, 1912, p. 162.)

Near Nueva Gerona, May 24, 1904, *A. H. Curtiss*, No. 511; Same locality, January 21, 1904, *A. H. Curtiss*, No. 306, sent out as "*Anastrophus tristachyus* (Lam.)." General Distribution: From Virginia to Florida and Texas, West Indies, and the tropics and subtropics generally.

92. **Leptocoryphium lanatum** (Humboldt, Bonpland, & Kunth) Nees.

*Leptocoryphium lanatum* NEES, Agrostologia Brasiliensis, 1829, p. 84.

*Paspalum lanatum* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, I, 1815, p. 94.

*Milium lanatum* ROEMER & SCHULTES, Systema Vegetabilium, II, 1817, p. 322.

*Anthænantia lanata* BENTHAM, Journal Linnean Society, XIX, 1881, p. 39.

Near Nueva Gerona, March 6 and 20, 1904, *A. H. Curtiss*, No. 393; *Palmer & Riley*, Nos. 440, 972, in 1900 (Hitchcock); as a weed in a grapefruit grove north of Nueva Gerona, May 14, 1910, *O. E. Jennings*, No. 245a; in savanna at Los Indios, May 19, 1910, *O. E. Jennings*, No. 434. General Distribution: Southern Mexico to Costa Rica, Cuba, Isle of Pines, Trinidad, and northern South America.

93. **Syntherisma digitata** (Swartz) Hitchcock.

*Milium digitatum* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 24.

*Digitaria setosa* DESVAUX, in Hamilton, Prodrum Plantarum Indiæ Occidentalis, 1825, p. 6.

*Syntherisma setosa* NASH, Bulletin Torrey Botanical Club, XXV, 1898, p. 300.

*Syntherisma digitata* HITCHCOCK, Contributions U. S. National Herbarium, XII, 1908, p. 142.

Reported by Hitchcock on the basis of the collection made by Curtiss in 1904, specimens in herbarium of the New York Botanical Garden. General Distribution: Florida, Bermuda, Bahamas, and southward through the West Indies and continental tropical America.



94. **Syntherisma sanguinalis** (Linnæus) Dulac. CRAB GRASS.

*Panicum sanguinale* LINNÆUS, Species Plantarum, 1753, p. 57.

*Digitaria sanguinalis* SCOPOLI, Flora Carniolica, I, Ed. II, 1772, p. 52.

*Syntherisma præcox* WALTER, Flora Caroliniana, 1788, p. 76.

*Asperella digitaria* LAMARCK, Illustrations des Genres, I, 1791, p. 167.

Reported by Hitchcock on the basis of the Curtiss specimen, collected near Nueva Gerona, in 1904, now in the herbarium of the New York Botanical Garden. General Distribution: Widely distributed as a weed of cultivated and waste grounds throughout the temperate and warmer regions of the globe.

95. **Valota insularis** (Linnæus) Chase. SOUR GRASS.

*Andropogon insulare* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1304.

*Panicum leucophæum* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, I, 1816, p. 87.

*Panicum Duchaisingii* STEUDEL, Synopsis Plantarum Glumacearum, I, 1854, p. 93.

*Tricholæna insularis* GRISEBACH, Flora of the British West Indian Islands, 1864, p. 557.

Open spot in river-bank forest at Los Indios, May 20, 1910, *O. E. Jennings*, No. 441. General Distribution: From Florida and Texas south through the tropics of America to Patagonia.

96. **Mesosetum Rottboellioides** Humboldt, Bonpland, & Kunth.

*Panicum Rottboellioides* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, I, 1816, p. 96.

*Mesosetum cayennense* STEUDEL, Synopsis Plantarum Glumacearum, I, 1854, p. 118.

*Mesosetum Rottboellioides* HITCHCOCK, Contributions U. S. National Herbarium, XII, 1909, p. 211.

Near Nueva Gerona, March 10, 1904, *A. H. Curtiss*, No. 396; in 1900, *Palmer & Riley*, Nos. 889, 896, and *A. A. Taylor*, No. 31, in 1901 (Hitchcock). General Distribution: Cuba, the Isle of Pines, and South America.

97. **Sacciolepis myuros** (Lamarck) Chase.

*Panicum Myuros* LAMARCK, Illustrations des Genres, I, 1791, p. 172.

*Sacciolepis Myuros* CHASE, Proceedings of the Biological Society of Washington, XXI, 1908, p. 7.

Reported by Hitchcock on the basis of the A. H. Curtiss specimen, collected near Nueva Gerona, in 1904, No. 428. General Distribution: West Indies, Mexico, to northern South America.

98. **Sacciolepis vilvoides** (Trinius) Chase.

*Panicum vilvoides* TRINIUS, De Graminibus Paniceis, 1826, p. 171.

*Hymenachne fluviatilis* NEES, Agrostologia Brasiliensis, 1829, p. 273.

*Sacciolepis vilvoides* CHASE, Proceedings of the Biological Society of Washington, XXI, 1908, p. 7.

Reported by Hitchcock, on the basis of specimens collected by A. H. Curtiss, near Nueva Gerona, January 19, 1904, No. 304. General Distribution: Western Cuba, Isle of Pines, Guiana, and Brazil.

99. **Echinochloa colonum** (Linnæus) Link. JUNGLE RICE.

*Panicum colonum* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 870.

*Echinochloa colonum* LINK, Enumeratio Plantarum Horti Regii Botanici Bero-linensis, II, 1833, p. 209.

Near Nueva Gerona, March 6, 1904, A. H. Curtiss, No. 427. General Distribution: Warmer regions the world over. Northward in America to Virginia and Kansas.

100. **Echinochloa Crus-galli** (Linnæus) Beauvois. BARN-YARD GRASS.

*Panicum Crus-galli* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 56.

*Echinochloa Crus-galli* BEAUVOIS, Essai d'une nouvelle Agrostographie, 1812, p. 53.

Reported by Hitchcock, based on collection of A. H. Curtiss near Nueva Gerona, 1904, and now in the herbarium of the New York Botanical Garden. General Distribution: A common weed of cultivated and waste lands throughout the warmer and temperate regions of the globe.

101. **Lasiacis divaricata** (Linnæus) Hitchcock.

*Panicum divaricatum* LINNÆUS, Systema Naturæ, II, 1759, p. 871.

*Panicum bambusoides* HAMILTON, Prodrum Plantarum Indiæ Occidentalis, 1826, p. 10.

*Panicum Chauvinii* STEUDEL, Synopsis Plantarum Glumacearum, I, 1854, p. 68.

*Lasiacis divaricata* HITCHCOCK, Contributions U. S. National Herbarium, XV, 1910, p. 16.

Low land at Pedernales Point, February 16, 1899, C. F. Millsbaugh, No. 1422 (Millsbaugh); in 1900, Palmer & Riley, No. 1001, and Curtiss, in 1904 (Hitchcock). General Distribution: Southern Florida, through the West Indies, and from Mexico to South America.

102. **Panicum acuminatum** Swartz.

*Panicum acuminatum* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 23.

*Panicum comophyllum* NASH, Bulletin of the Torrey Botanical Club, XXX, 1903, p. 380.

Near Nueva Gerona, January 21 and February 4, 1904, *A. H. Curtiss*, Nos. 307 and 328; along bank of arroyo south of Sante Fé, May 25, 1910, *O. E. Jennings*, No. 543; *Palmer & Riley*, 989, 1083; *Taylor*, 3873 (Hitchcock & Chase). General Distribution: Cuba, Isle of Pines, Jamaica, Hispaniola, Porto Rico, and Colombia.

103. ***Panicum adpersum* Trinius.**

*Panicum adpersum* TRINIUS, De Graminibus Paniceis, 1826, p. 146.

"Isle of Pines, *Curtiss*, in 1904." Hitchcock, "Grasses of Cuba," Contributions of the U. S. National Herbarium, XII, 1909, p. 217. General Distribution: The Bahamas and West Indies generally.

104. ***Panicum cayennense* Lamarck.**

*Panicum cayennense* LAMARCK, Illustrations des Genres, I, 1791, p. 173.

*Panicum floribundum* A. RICHARD, in Lamarck, Encyclopédie Méthodique, Botanique, IV, 1798, p. 742.

Near Nueva Gerona, January 1, 1904, *A. H. Curtiss*, No. 267; in 1900, *Palmer & Riley*, No. 1086; and in 1901, *A. A. Taylor*, No. 34 (Hitchcock). General Distribution: Open grounds and pine woods, Cuba, Isle of Pines, and from Costa Rica to Brazil.

105. ***Panicum diffusum* Swartz.**

*Panicum diffusum* SWARTZ, Prodrômus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 23.

*Panicum guadelupense* SPRENGEL, in Steudel, Nomenclator Botanicus, II, Ed. II, 1841, p. 257.

Near Nueva Gerona, March 4, and May 12, 1904, *A. H. Curtiss*, No. 384, 494. General Distribution: On banks, cliffs, and dry savannas, quite widely distributed in the Bahamas and West Indies.

106. ***Panicum chrysopsidifolium* Nash.**

*Panicum chrysopsidifolium* NASH, in Small, Flora of the Southeastern U. S., 1903, p. 100.

"Isle of Pines, *Palmer & Riley* 982" (Hitchcock). General Distribution: Cuba, Isle of Pines, Jamaica, Porto Rico, and Hispaniola.

107. ***Panicum exiguiflorum* Grisebach.**

*Panicum minutiflorum* A. RICHARD, in Sagra, Historia Fisica Politica y Natural de la Isla de Cuba, XI, 1853, p. 305. Not Rasp. 1825.

*Panicum exiguiflorum* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 234.

*Panicum tricolor* HACKEL, Oesterreichische Botanische Zeitschrift, LI, 1901, p. 370.

"Isle of Pines, *Taylor 35, Curtiss in 1904*" (Hitchcock). General Distribution: Savannas and moist sandy woods, Bahamas, Cuba, and the Isle of Pines.

108. ***Panicum fusiforme* Hitchcock.**

*Panicum fusiforme* HITCHCOCK, Contributions U. S. National Herbarium, XII, 1909, p. 222.

*Panicum neuranthum ramosum* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 232. Not *ramosum* L., 1767.

Near Nueva Gerona, March 13, 1904, *A. H. Curtiss, No. 406*. General Distribution: Open moist savannas and sandy pine woods, Florida, Cuba, Isle of Pines, Jamaica, and British Honduras.

109. ***Panicum geminatum* Forskål.**

*Panicum geminatum* FORSKÅL, Flora Ægyptiaco-Arabica, 1775, p. 18.

*Panicum paspalodes* PERSOON, Synopsis Plantarum, I, 1805, p. 81.

*Panicum bryzoides* LAMARCK, Illustrations des Genres, I, 1791, p. 170. Not Linnæus, 1771.

"Isle of Pines, *Curtiss in 1904 in Herb. N. Y. Bot. Gard.*" (Hitchcock). General Distribution: Moist ground, swamps, ditches, etc., in the tropics of both hemispheres, and reaching north in America as far as the Bahamas, southern Florida, Texas, and Lower California.

110. ***Panicum laxum* Swartz.**

*Panicum laxum* SWARTZ, Prodrromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 23.

*Panicum agrostidiforme* LAMARCK, Illustrations des Genres, I, 1791, p. 172.

*Panicum tenuiculmum* MEYER, Primitiæ Floræ Essequiboensis, 1818, p. 58.

*Panicum polygonatum* SCHRADER, in Schultes, Mantissa ad Systema Vegetabilium, II, 1824, p. 256.

Near Nueva Gerona, April and May, 1904, *A. H. Curtiss, No. 464*; "Isle of Pines, *Palmer & Riley 1069, Taylor 37*" (Hitchcock). General Distribution: From the West Indies and northwestern Mexico south to Paraguay.

111. ***Panicum polycaulon* Nash.**

*Panicum polycaulon* NASH, Bulletin Torrey Botanical Club, XXIV, 1897, p. 200.

*Panicum dichotomum* var. *glabrescens* GRISEBACH, Flora of the British West Indian Islands, 1864, p. 553.

"Isle of Pines, *Palmer & Riley 990*" (Hitchcock). General Distribution: Moist open woods and savannas, Florida, and the Greater Antilles.

112. ***Panicum Sloanei* Grisebach.**

*Panicum Sloanei* GRISEBACH, Flora of the British West Indian Islands, 1864, p. 551.

"Isle of Pines, *Taylor 22*" (Hitchcock). General Distribution: The West Indies and American continental tropics.

Hitchcock & Chase (Contributions U. S. National Herbarium, XVII, 1915, p. 538) indicate that this species should be included in the genus *Lasiacis*.

113. ***Panicum stenodes* Grisebach.**

*Panicum stenodes* GRISEBACH, Flora of the British West Indian Islands, 1864, p. 547.

"Isle of Pines, *Curtiss* in 1904, in Herb. N. Y. Bot. Gard." (Hitchcock). General Distribution: Borders of ponds, wet savannas, etc., the Greater Antilles, Trinidad, and from Costa Rica to Brazil.

114. ***Panicum pilosum* Swartz.**

*Panicum pilosum* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 22.

*Panicum distichum* LAMARCK, Encyclopédie Méthodique, Botanique, IV, 1797, p. 731.

*Panicum pilisparsum* MEYER, Primitiæ Floræ Essequiboensis, 1818, p. 57.

Near Nueva Gerona, January 21, 1904, *A. H. Curtiss*, No. 305; grassy place along the Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 417; probably also belonging here, is a specimen collected in a pasture near Nueva Gerona, May 14, 1910, *O. E. Jennings*, No. 280. Hitchcock reports also *Taylor*, No. 36, in the Gray Herbarium. General Distribution: Mexico and the West Indies to Paraguay.

115. ***Panicum albomarginatum* Nash.**

*Panicum albomarginatum* NASH, Bulletin Torrey Botanical Club, XXIV, 1897, p. 40.

"Isle of Pines, *Taylor 32*" (Hitchcock). General Distribution: Southeastern U. S., Cuba, Isle of Pines, and Guatemala.

Note.—*Panicum pubescens* Lamarck was reported for the Isle of Pines by A. Richard, in Sagra, *Historia Fisica, Politica y Natural de la Isla de Cuba*, IX, 1850, p. 305. This report is probably based upon material belonging to one of the species enumerated above.

116. **Oplismenus hirtellus** (Linnæus) Roemer & Schultes.

*Panicum hirtellum* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 870.

*Panicum setarium* LAMARCK, Illustrations des Genres, I, 1791, p. 170.

*Oplismenus hirtellus* RÖMER & SCHULTES, Systema Vegetabilium, II, 1817, p. 481.

"Isle of Pines, *Curtiss* 268" (Hitchcock). General Distribution: Through Mexico and the West Indies to South America.

117. **Chætochloa imberbis** (Poir) Scribner.

PERENNIAL FOXTAIL-GRASS.

*Panicum imberbe* POIRET, Encyclopédie Méthodique, Supplementa, in Dictionnaire de Botanique, IV, 1817, p. 272.

*Chætochloa imberbis* SCRIBNER, Division Agrostology, U. S. Dept. Agriculture, Bulletin IV, 1897, p. 39.

"Isle of Pines, *Taylor* 45" (Hitchcock); in everglade meadow at the mouth of the Nuevas River, May 16, 1910. *O. E. Jennings*, No. 287. General Distribution: Rather widely distributed in moist or saline soil from Massachusetts to Kansas, south through the Bahamas, West Indies, and Mexico to South America.

118. **Chætochloa setosa** (Swartz) Scribner.

*Panicum setosum* SWARTZ, Prodrromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 22.

*Chætochloa setosa* SCRIBNER, Division Agrostology, U. S. Dept. Agriculture, Bull. IV, 1897, p. 39.

"Isle of Pines, *Palmer & Riley* 1000, in Herb. N. Y. Bot. Gard." (Hitchcock). General Distribution: From the southwestern U. S. to the West Indies and South America.

119. **Cenchrus echinatus** Linnæus.

*Cenchrus echinatus* LINNÆUS, Species Plantarum, 1753, p. 1050.

"Isle of Pines, *Taylor* 24" (Hitchcock). Cultivated ground, along a stream on Keenan's estate south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 161. General Distribution: North Carolina to Florida and Texas, south through continental tropical America, and from the Bahamas south through the West Indies.

120. **Cenchrus** sp.

Near Caleta Grande, May 22, 1910. *O. E. Jennings*, No. 500.

121. **Paratheria prostrata** Grisebach.

*Paratheria prostrata* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 236.

*Panicum leptochyrium* DOELL, in Martius, Flora Brasiliensis, II (2), 1877, p. 150.

Near Nueva Gerona, April 24, 1910, *A. H. Curtiss*, No. 461. General Distribution: Western Cuba and the Isle of Pines, Brazil.

122. **Stenotaphrum secundum** (Walter) Kuntze. SHORE GRASS.

*Ischæmum secundum* WALTER, Flora Caroliniana, 1788, p. 249.

*Stenotaphrum americanum* SCHRANK, Plantæ Rariores Horti Monacensis, 1810, p. 98, Pl. 98.

*Stenotaphrum secundum* KUNTZE, Revisio Generum Plantarum, II, 1891, p. 794.

"Isle of Pines, *Palmer & Riley* 1008, *Rowlee* 49, . . . *Curtiss* in 1904" Hitchcock. On coralline-limestone soil, between Bogarona and Caleta Grande, May 22, 1910, *O. E. Jennings*, No. 473. General Distribution: South Carolina to Texas, the Bermudas, Bahamas, West Indies, and the tropics and subtropics generally.

123. **Olyra latifolia** Linnæus.

*Olyra latifolia* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1261.

*Olyra paniculata* SWARTZ, Observationes Botanicae quibus Plantis Indiæ Occidentalis, 1791, p. 347.

Near Nueva Gerona, January 14, 1904, *A. H. Curtiss*, No. 293; grassy place along bank of Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 412; "*Palmer & Riley* 1058, 1066, *Taylor* 26, 27 in Gray Herbarium" Hitchcock. General Distribution: Widely distributed through the West Indies and from northern Mexico south through the American continental tropics, also tropics of Africa.

124. **Achlæna piptostachya** Grisebach.

*Achlæna piptostachya* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 229.

Near Nueva Gerona, December 17, 1903, *A. H. Curtiss*, No. 236; on banks of arroyo at Sante Fé, May 25, 1910. *O. E. Jennings*, No. 540; "*Palmer & Riley* 913" Hitchcock. General Distribution: Cuba and the Isle of Pines.

125. **Reynaudia filiformis** (Sprengel) Kunth.

*Polypogon cubensis* A. RICHARD, in Sagra, Historia Física, Política y Natural de la Isla de Cuba, XI, 1850, p. 313.

*Reynaudia filiformis* KUNTH, Révision des Graminées, 1829, p. 195, pl. 9.

Near Nueva Gerona, February 26, 1904, *A. H. Curtiss*, No. 371; in white sand, in the pine barrens, Los Indios, May 17, 1910, *O. E. Jennings*, No. 339, and in field at Los Indios, No. 424. General Distribution: Cuba and the Isle of Pines.

126. *Aristida refracta* Grisebach.

*Aristida refracta* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 228.

*Aristida gyrans* CHAPMAN, Botanical Gazette, III, 1878, p. 18.

"Isle of Pines, *Palmer & Riley* 995, *Taylor* 20" Hitchcock.  
General Distribution: Southern Florida, Cuba, and the Isle of Pines.

127. *Sporobolus cubensis* Hitchcock.

*Sporobolus cubensis* HITCHCOCK, Contributions U. S. National Herbarium, XII, 1909, p. 237.

Near Nueva Gerona, March 6, 1904, *A. H. Curtiss*, No. 392 (type collection); on savannæ south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 162; on sandy soil in pine woods, McKinley, May 16, 1910, *O. E. Jennings*, No. 295. General Distribution: Cuba, the Isle of Pines, and Porto Rico.

128. *Sporobolus indicus* (Linnæus) Robert Brown.

*Agrostis indica* LINNÆUS, Species Plantarum, Ed. I, 1753, p. 63.

*Sporobolus indicus* ROBERT BROWN, Prodrromus Floræ Novæ-Hollandiæ et Insulæ Van Diemen, 1810, p. 170.

Near Nueva Gerona, January 31, 1904, *A. H. Curtiss*, No. 323; common in fields and lower places in savanna near Bibijagua, May 7, 1910, *O. E. Jennings*, No. 106; Bank of stream at Keenan's estate, south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 177; "*Palmer & Riley* 1121, *Taylor* 48" Hitchcock. General Distribution: Native to the warmer parts of the Old World and now naturalized in the southern United States, West Indies, and tropical continental America.

129. *Sporobolus virginicus* (Linnæus) Kunth.

*Sporobolus virginicus* KUNTH, Révision des Graminées, I, 1829, p. 67.

*Agrostis virginica* LINNÆUS, Species Plantarum I, 1753, p. 67.

*Sporobolus pungens* (SCHREBER) KUNTH, Révision des Graminées, I, 1829, p. 68.

"Isle of Pines, *Palmer & Riley* 995, 1122" Hitchcock. General Distribution: Mostly on sandy shores, Virginia to Florida and Texas, Lower California, from the Bermudas and Bahamas south through the West Indies, and in the tropics generally.

130. *Chloris paraguayensis* Steudel.

*Andropogon barbatum* LINNÆUS, Mantissa Plantarum, II, 1771, p. 302. Not Linnæus, 1759.



*Chloris barbata* SWARTZ, Flora Indiæ Occidentalis, I, 1797, p. 200. Not *C. barbata* Nash, 1898.

*Chloris paraguayensis* STEUDEL, Synopsis Plantarum Glumacearum, I, 1854, p. 204.

"In the herbarium of the New York Botanical Garden: Isle of Pines, *Curtiss* in 1904" Hitchcock. General Distribution: From the Bahamas south through the West Indies, and from Mexico south through tropical continental America.

### 131. *Chloris petræa* Swartz.

*Chloris petræa* SWARTZ, Prodomus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 25.

*Eustachys petræa* DESVAUX, Nouvelle Bulletin de la Société Philomathique, II, 1810, p. 189.

"Isle of Pines, *Palmer & Riley* 969" Hitchcock. In cultivated field at McKinley, May 16, 1910, *O. E. Jennings*, No. 302; "in the herbarium of the New York Botanical Garden: Isle of Pines, *Curtiss* in 1904" Hitchcock. General Distribution: In dry sandy soil, mostly near the coast, from North Carolina to Florida, Texas, Mexico, and Costa Rica, and from the Bermudas and Bahamas through the Greater Antilles.

### 132. *Eleusine indica* (Linnæus) Gaertner.

*Cynosurus indicus* LINNÆUS, Species Plantarum, 1753, p. 72.

*Eleusine indica* GÆRTNER, De Fructibus et Seminibus Plantarum, I, 1788, p. 7, t. 1.

"Isle of Pines, *Curtiss* in 1904, in Herb. N. Y. Bot. Gard." Hitchcock. General Distribution: Warmer regions of the world, extending north in America to Massachusetts, northern Indiana, and Kansas.

### 133. *Leptochloa filiformis* (Lamarck) Beauvois.

*Festuca filiformis* LAMARCK, Illustrations des Genres, I, 1791, p. 191.

*Eleusine mucronata* MICHAUX, Flora Boreali-Americana, I, 1803, p. 65.

*Leptochloa filiformis* BEAUVOIS, Essai d'une nouvelle Agrostographie, 1812, p. 71.

*Leptochloa mucronata* KUNTH, Révision des Graminées, I, 1829, p. 91.

Near Nueva Gerona, May 21, 1904, *A. H. Curtiss*, No. 508. General Distribution: Virginia to Illinois and California and southward through the warmer and tropical regions of America; also in the tropics of the Old World.

134. *Eragrostis ciliaris* (Linnæus) Link.

*Poa ciliaris* LINNÆUS, Systema Naturæ, Ed. X, 1859, p. 875.

*Eragrostis ciliaris* LINK, Enumeratio Plantarum Horti Regii Botanici Berolinensis, I, 1827, p. 192.

In the herbarium of the New York Botanical Garden, "Isle of Pines, Curtiss in 1904" Hitchcock. General Distribution: Tropics and subtropics of both hemispheres, extending north in America to Georgia, Mississippi, and Mexico.

135. *Eragrostis cubensis* Hitchcock.

*Eragrostis cubensis* HITCHCOCK, Contributions U. S. National Herbarium, XII, 1909, pp. 243-244.

Near Nueva Gerona, March 20, 1904, *A. H. Curtiss*, No. 420. (The type is *Curtiss*, 420, U. S. National Herbarium, 522037.) General Distribution: Cuba and the Isle of Pines.

136. *Eragrostis Elliottii* Sereno Watson.

*Poa nitida* ELLIOTT, Sketch of the Botany of South Carolina and Georgia, I, 1816, p. 162. Not *Poa nitida* Lamarck, nor *Eragrostis nitida* Link, 1827.

*Eragrostis Elliottii* SERENO WATSON, Proceedings of the American Academy of Arts and Sciences, XXV, 1890, p. 140.

*Eragrostis macropoda* PILGER, in Urban, Symbolæ Antillanæ, IV, 1903, p. 106.

In everglade meadow at mouth of the Nuevas River, May 16, 1910, *O. E. Jennings*, No. 290; "Isle of Pines, Taylor 25," "Isle of Pines, Curtiss in 1904." General Distribution: South Carolina to Florida and Louisiana, Gulf coast of Mexico, Cuba, Isle of Pines, Hispaniola, and Porto Rico.

137. *Eragrostis hypnoides* (Lamarck) Britton, Sterns, & Poggenburg.

*Poa hypnoides* LAMARCK, Illustrations des Genres, I, 1791, p. 85.

*Poa reptans* MICHAUX, Flora Boreali-Americana, I, 1803, p. 69.

*Eragrostis reptans* NEES, Agrostologia Brasiliensis, 1829, p. 514.

*Eragrostis hypnoides* BRITTON, STERNS, & POGGENBURG, Preliminary Catalogue of the Anthophyta and Pteridophyta Reported as Growing Spontaneously within One Hundred Miles of New York City, 1888, p. 69.

Near Nueva Gerona, March 8, 1904, *A. H. Curtiss*, No. 391. General Distribution: Mostly on sandy or gravelly shores and banks, from Vermont and Ontario to the State of Washington, southward to the West Indies and South America.

138. *Distichlis spicata* (Linnæus) Greene. SALT GRASS.

*Uniola spicata* LINNÆUS, Species Plantarum, 1753, p. 71.

*Distichlis spicata* GREENE, Bulletin California Academy of Sciences, II, 1887, p. 415.

On sandy beach at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 79.  
General Distribution: Coastal salt marshes and saline soils, Nova Scotia to the West Indies and Mexico, and Pacific coast as far north as British Columbia.

Family CYPERACEÆ.

KEY TO THE SPECIES ENUMERATED.

Spikelets with one or more perfect flowers.

Tribe I. *Cypereæ*.—Spikelets with many flowers, the scales distichous, none or not more than two of the lower scales empty.

Style branches two (*Kyllingia*).....139. *Kyllingia brevifolia*.

Style branches three (*Cyperus*).

Rachis of the flattened spikelet persistent, scales deciduous.

140. *Cyperus elegans*.

Rachis deciduous above the two lower empty scales.

Spikelets with one achene; umbels simple.....141. *Cyperus Swartzii*.

Spikelets with 2-4 achenes; umbels composite...142. *Cyperus ligularis*.

Spikelets with 5-8 achenes; umbels simple.....143. *Cyperus brunneus*.

Spikelets many-flowered; umbel proliferous....145. *Cyperus pinetorum*.

Rachis breaking up into one-seeded joints; umbels composite.

144. *Cyperus VahlII*.

Tribe II. *Scirpeæ*.—Scales of the spikelet pluriseriate, 2-0 of the lower ones empty. (Scales distichous in *Abildgaardia*.)

Style distinctly bulbous at the base, the bulbous base either remaining as a tubercle or falling away with the style.

Scales of the spikelet pluriseriate.

Bristles arising at base of achene; spikelet one, terminal (*Eleocharis*).

Culms plainly nodose-septate.....146. *Eleocharis interstincta*.

Culms not nodose-septate.....147. *Eleocharis capitata*.

Bristles none at base of achene; the style deciduous with its bulbous base, hence no tubercle (*Fimbristylis*).

Leaves long; spikelets firm.....149. *Fimbristylis spadicea*.

Leaves short; spikelets soft.....148. *Fimbristylis ferruginea*.

Bristles none; tubercle persistent.

Spikelets several in a terminal umbel or, in depauperate forms, solitary.....151. *Stenophyllus capillaris*.

The solitary spikelet terminal.....150. *Stenophyllus paradoxus*.

Scales of the spikelet two-ranked.....152. *Abildgaardia monostachya*.

Style without distinctly bulbous base; petal-like scales and bristles arising at base of achene (*Fuirena*).

Spikes of the head 1-5; petal-like scales elliptic, stalked.

153. *Fuirena simplex*.

Spikes numerous in oblong panicles; scales not stalked.

154. *Fuirena umbellata*.

Tribe III. *Rynchosporæ*.—Spikelets mostly 1-2-flowered; three to many of the lower scales empty; styles 2-fid.

Spikes in terminal and axillary clusters; bristles commonly present (*Rynchospora*).

Style long, the branches much shorter than the undivided part.

Culms with one head. . . . . 156. *Rynchospora globosa*.

Heads globose, 1-25, laxly paniculate. . . . . 159. *Rynchospora cyperoides*.

Spikelets 2-6-fascicled, in lax corymbs. . . . . 161. *Rynchospora scutellata*.

Style branches as long or longer than the undivided part.

Perianth-bristles none. . . . . 162. *Rynchospora pusilla*.

Perianth-bristles present.

Bristles of the flower plumose. . . . . 157. *Rynchospora plumosa*.

Bristles scabrous in a forward direction.

Plant robust; achenes not transversely undulate.

158. *Rynchospora cephalotoides*.

Plant slender; achenes transversely undulate.

160. *Rynchospora cymosa*.

Culm with one globose head; stem leafy. . . . . 155. *Dichromena colorata*.

Tribe IV. *Schæneæ*.—Spikelets with 3-many lower empty scales; style 3-fid; no tubercle; no bristles. . . . . 163. *Mariscus jamaicensis*.

Flowers never perfect.

Tribe V. *Scleriæ*.—Flowers monœcious, the staminate and pistillate in the same or different spikes.

Fertile spikelets one-flowered, usually intermixed with clusters of few-flowered staminate spikelets; no bristles (*Scleria*).

Hypogynium present.

Margin of the hypogynium neither ciliate nor fimbriate.

Achene smooth.

Achene depressed-globose. . . . . 164. *Scleria pterota*.

Achene longer than thick.

Leaves 2-4 mm wide. . . . . 165. *Scleria Wrightiana*.

Leaves 8-15 mm wide. . . . . 166. *Scleria setuloso-ciliata*.

Achene papillose. . . . . 167. *Scleria ciliata*.

Achene reticulated; hypogynium supporting three deeply 3-lobed tubercles. . . . . 168. *Scleria Curtissii*.

Margin of the hypogynium ciliate or ciliolate. . . 169. *Scleria microcarpa*.

Hypogynium none or obsolete.

Spikelets in a single terminal cluster. . . . . 174. *Scleria gracilis*.

Spikelets in several clusters or spikes.

Annuals with fibrous roots; inflorescence glomerate-spicate.

170. *Scleria verticillata*.

Perennials with rootstocks.

Inflorescence glomerate-spicate; achene smooth.

171. *Scleria hirtella*.

Inflorescence not glomerate-spicate, panicle loose.

172. *Scleria lithosperma*.

Panicles long and many-flowered; upper spikelets pistillate, the lower staminate.

173. *Lagenocarpus guianensis*.

### 139. *Kyllingia brevifolia* Rottboell.

*Kyllingia brevifolia* ROTTBOELL, Descriptiones et Icones Plantarum Rariorum, 1773, p. 13, pl. 4, fig. 3.

*Kyllingia monocephala* THUNBERG, Flora Japonica, 1784, p. 35.

*Kyllingia pumila* A. RICHARD, In Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, XI, 1850, p. 288.

Near Nueva Gerona, January 9, 1904, *A. H. Curtiss*, No. 281; *Blain*, No. 168, northern part of the island (Millspaugh). General Distribution: Low grounds, etc., Georgia and Florida to Texas, the Bermudas, the West Indies, and the tropics generally.

### 140. *Cyperus elegans* Linnæus.

*Cyperus elegans* LINNÆUS, Species Plantarum, Ed. II, 1762, p. 68.

*Cyperus viscosus* SWARTZ, Prodrromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 20.

Near Nueva Gerona, June 12, 1912, *G. A. Link*. General Distribution: Southern Florida: widely reported from the West Indies, Central America, Argentina.

### 141. *Cyperus Swartzii* (Dietrich) Boeckeler.

*Kyllingia filiformis* SWARTZ, Prodrromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 20.

*Mariscus Swartzii* DIETRICH, in Linnæus, Species Plantarum, Ed. VI, 1833, p. 343.

*Mariscus filiformis* SPRENGEL, Systema Vegetabilium, I, 1825, p. 234.

*Cyperus Swartzii* BOECKELER, MS.

Near Nueva Gerona, March and April, 1904, *A. H. Curtiss*, No. 383. General Distribution: Cuba, Isle of Pines, Jamaica, and Hispaniola.

### 142. *Cyperus ligularis* Linnæus.

*Cyperus ligularis* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 867.

*Mariscus rufus* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, I, 1815, p. 216, t. 67.

*Mariscus ligularis* URBAN, Symbolæ Antillanæ, II, 1900, p. 165.

Along bank of stream south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 160. General Distribution: In wet sandy or swampy soil, from Florida and the Bahamas, quite generally distributed through the West Indies and continental tropical America, as far south as Brazil. Also in tropics of Old World.

143. *Cyperus brunneus* Swartz.

*Cyperus brunneus* SWARTZ, *Flora Indiæ Occidentalis*, I, 1797, p. 116.

*Mariscus bruneus* C. B. CLARKE, in Urban, *Symbolæ Antillanæ*, II, 1900, p. 51.

"West shores of the Isle of Pines, Cuba (1427)" Millspaugh, *Field Columbian Museum, Bot. Ser.*, II, 1900, p. 28; near Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings, Nos. 492 and 505*. General Distribution: From Florida through the West Indies and Central America.

144. *Cyperus Vahlîi* Steudel.

*Diclidium Vahlîi* NEES, in Martius, *Flora Brasiliensis*, II, (I), 1843, p. 53.

*Cyperus Vahlîi* STEUDEL, *Synopsis Plantarum Glumacearum*, 1855, p. 48.

*Cyperus flexuosus* GRISEBACH, *Catalogus Plantarum Cubensium*, 1866, p. 238.

*Torulinium Vahlîi* C. B. CLARKE, in Urban, *Symbolæ Antillanæ*, II, 1900, p. 56.

At outlet of magnesia springs at Keenan's estate, south of Nueva Gerona, May 9, 1910, *O. E. Jennings, No. 686*. General Distribution: Cuba, Isle of Pines, Jamaica, Hispaniola, Antigua, and Guadeloupe, Mexico, and Brazil.

145. *Cyperus pinetorum* Britton.

*Cyperus pinetorum* BRITTON, *Studies of West Indian Plants, Bulletin of the Torrey Botanical Club*, XLIII, 1916, p. 462.

"White-sand pine-barrens. Type from the vicinity of Los Indios (*Britton & Wilson 14166*)" Britton, *l. c.*

146. *Eleocharis interstincta* (Vahl) R. Brown.

*Scirpus plantagineus* Swartz, *Flora Indiæ Occidentalis*, I, 1797, p. 123, excluding synonyms.

*Scirpus interstinctus* VAHL, *Enumeratio Plantarum*, II, 1806, p. 251.

*Eleocharis interstincta* R. BROWN, *Prodromus Floræ Novæ-Hollandiæ et Insulæ Van Diemen*, 1810, p. 224.

Near Nueva Gerona, May 14, 1904, *A. H. Curtiss, No. 498*; northern part of the island, *Blain, No. 113* Millspaugh. In small stream on Keenan's estate, Nueva Gerona, May 9, 1910, *O. E. Jennings, No. 174*. General Distribution: From Massachusetts to Michigan, south to the West Indies, and through continental America to South America.

147. *Eleocharis capitata* (Linnæus) R. Brown.

*Scirpus capitatus* LINNÆUS, *Herbarium, in part*.

*Scirpus caribæus* ROTTBOELL, *Descriptiones et Icones Plantarum Rariorum*, 1773, p. 46, t. 15, fig. 3.

*Eleocharis capitata* R. BROWN, Prodrromus Floræ Novæ-Hollandiæ et Insulæ Van Diemen, 1810, p. 225.

On wet bank along arroyo one mile east of Nueva Gerona, May 7, 1910, *O. E. Jennings*, No. 61; wet bank of stream at Keenan's estate south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 195. General Distribution: Widely distributed in the tropics and subtropics.

148. ***Fimbristylis ferruginea*** (Linnæus) Vahl.

*Scirpus ferrugineus* LINNÆUS, Species Plantarum, Ed. II, 1762, p. 74.

*Fimbristylis ferruginea* VAHL, Enumeratio Plantarum, II, 1806, p. 291.

*Iriha ferruginea* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 752.

Near Nueva Gerona, January 31, 1904, *A. H. Curtiss*, No. 322, swamp north of Nueva Gerona, May 8, 1910, *O. E. Jennings*, No. 139; ditch along roadside, Los Indios, May 17, 1910, *O. E. Jennings*, No. 626; near McKinley, May 16, 1910, *O. E. Jennings*, No. 689. General Distribution: Widely distributed in the warmer parts of the globe. In North America extending north as far as the Bahamas.

149. ***Fimbristylis spadicea*** (Linnæus) Vahl.

*Scirpus spadiceus* LINNÆUS, Species Plantarum, Ed. II, 1762, p. 74.

*Fimbristylis spadicea* VAHL, Enumeratio Plantarum, II, 1806, p. 294.

*Iriha spadicea* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 752.

On sandy beach at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 81; sandy shore of Nuevas River, May 16, 1910, *O. E. Jennings*, No. 304; ditch along roadside, Los Indios, May 17, 1910, *O. E. Jennings*, No. 627; near Los Indios, November 4, 1912, *G. A. Link*. General Distribution: Usually near the coast, Virginia to Florida, Bermudas, south through the West Indies, and in continental warmer to tropical America.

150. ***Stenophyllus paradoxus*** (Sprengel) Standley.

*Schænus paradoxus* SPRENGEL, Systema Vegetabilium, I, 1825, p. 190.

*Bulbostylis paradoxa* KUNTH, Enumeratio Plantarum, II, 1837, p. 206.

*Oncostylis paradoxa* NEES, in Martius, Flora Brasiliensis, II, 1843, p. 81.

*Isolepis paradoxa* STEUDEL, Synopsis Plantarum Glumacearum, II, 1855, p. 100.

*Scirpus paradoxus* BOECKELER, Linnæa, XXXVI, 1869-70, p. 739.

*Stenophyllus paradoxus* STANDLEY, Contributions from the U. S. National Herbarium, XVIII, 1916, p. 88.

Near Nueva Gerona, May 27, 1904, *A. H. Curtiss*, No. 516. General Distribution: The Isle of Pines and "Tropical South America, frequent" Clarke, *Cyperaceæ of Costa Rica*, Contributions from the U. S. National Museum, X, 1908, p. 459.

151. *Stenophyllus capillaris* (Linnæus) Britton.

*Scirpus capillaris* LINNÆUS, Species Plantarum, 1753, p. 49.

*Bulbostylis capillaris* CLARKE, in Hooker, Flora of British India, VI, 1893, p. 652.

*Stenophyllus capillaris* BRITTON, Bulletin of the Torrey Botanical Club, XXI, 1894, p. 30.

Reported by Britton, in his *Studies of West Indian Plants*, VIII, Bulletin of the Torrey Botanical Club, XLIII, 1916, pp. 447, 448, as follows: "Sandy and rocky soil, Provinces of Oriente and Pinar del Rio and on the Isle of Pines, Cuba, pinelands at high elevations in Santo Domingo, Jamaica (not recently collected), continental North America, temperate South America."

152. *Abildgaardia monostachya* (Linnæus) Vahl.

*Cyperus monostachyus* LINNÆUS, Mantissa Plantarum, 1771, p. 180.

*Abildgaardia monostachya* VAHL, Enumeratio Plantarum, II, 1806, p. 296.

*Fimbristylis monostachya* HASSKARL, Plantæ Javanicæ Rariores, 1848, p. 61.

*Iriha monostachya* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 751.

*Scirpus monostachya* O. KUNTZE, *op. cit.*, III, (2), 1898, p. 337.

Near Nueva Gerona, May 7, 1904, *A. H. Curtiss*, No. 483. General Distribution: Widely distributed throughout the tropics of both hemispheres. In America it extends northwards through the West Indies and the Bahamas.

153. *Fuirena simplex* Vahl.

*Fuirena simplex* VAHL, Eclogæ Americanæ, II, 1798, p. 8.

*Fuirena obtusifolia* VAHL, *l. c.*

*Fuirena Schiedeana* C. WRIGHT, in Sauvalle, Anales del Academia de Ciencias Médicas, Físicas y Naturales de la Habana, VIII, 1871, p. 177, n. 2645.

Near Nueva Gerona, December 17, 1903, *A. H. Curtiss*, No. 237; bank of stream at Keenan's estate, Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 176; in low recently cleared land north of Nueva Gerona, May, 1910, *O. E. Jennings*, Nos. 141a and 151. General Distribution: From Nebraska to Texas and Mexico, Isle of Pines and Cuba.

154. *Fuirena umbellata* Rottboell.

*Fuirena umbellata* ROTTBOELL, Descriptiones et Icones Plantarum Rariorum, 1773, p. 70, pl. 19, *i. e.*, pl. 18, altera fig. 3.

*Fuirena paniculata* LINNÆUS, F., Supplementum Plantarum, 1781, p. 105.

*Fuirena camptotricha* C. WRIGHT, in Sauvalle, Anales del Academia de Ciencias Medicas, Físicas y Naturales de la Habana, VIII, 1871, p. 177, n. 2645.

Near Nueva Gerona, January 17 and April 5, 1904, *A. H. Curtiss*,



No. 299; moist bank of stream south of Nueva Gerona, May 9, 1910, O. E. Jennings, Nos. 178 and 692a. General Distribution: In tropics and subtropics in both hemispheres. Well distributed in the West Indies.

155. **Dichromena colorata** (Linnæus) Hitchcock.

*Schænus coloratus* LINNÆUS, Species Plantarum, 1753, p. 43.

*Schænus stellatus* LAMARCK, Encyclopédie Méthodique, Botanique, I, 1784, p. 741.

*Dichromena leucocephala* MICHAUX, Flora Boreali-Americana, I, 1803, p. 37.

*Rhynchospora stellata* GRISEBACH, Systematische Untersuchungen über die Vegetation der Karaiben, Abhandlungen Kgl. Gesellschaft der Wissenschaften, Göttingen, 1857, p. 123.

In low soil recently cleared, north of Nueva Gerona, May 8, 1910, O. E. Jennings, No. 140. General Distribution: Pine-lands, moist sandy soil, etc., from New Jersey to Florida and Texas, from the Bermudas south through most of the West Indies, and from southern Mexico to Brazil.

156. **Rhynchospora globosa** Roemer & Schultes.

*Rhynchospora globosa* ROEMER & SCHULTES, Systema Vegetabilium, II, 1817, p. 89.

*Schænus globosus* POIRET, Encyclopédie Méthodique, Supplementa, in Dictionnaire de Botanique, V, 1817, p. 617.

*Rhynchospora globosa* BRITTON, Transactions New York Academy of Sciences, XI, 1892, p. 83.

In white sand in the pine-barrens at Los Indios, May 17, 1910, O. E. Jennings, No. 340; near Nueva Gerona, March 13, 1904, A. H. Curtiss, No. 405; in pasture near Nueva Gerona, May 6, 1910, O. E. Jennings, No. 691. General Distribution: Cuba and the Isle of Pines, and from Mexico to Paraguay.

157. **Rhynchospora plumosa** Elliott.

*Rhynchospora plumosa* ELLIOTT, Sketch of the Botany of South Carolina and Georgia, I, 1816, p. 58.

*Rhynchospora pennisetata* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 244.

*Rhynchospora semiplumosa* CHAPMAN, Flora of the Southern United States, 1860, p. 524.

Near Nueva Gerona, March 11 and April 21, 1904, A. H. Curtiss, Nos. 399 and 453. General Distribution: Pine-lands from South Carolina to Florida and Louisiana, Cuba, and the Isle of Pines.

158. **Rhynchospora cephalotoides** Grisebach.

*Rhynchospora cephalotoides* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 242.

Near Nueva Gerona, February 13, 1904, *A. H. Curtiss*, No. 341; marshy place along river south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 201; clayey side of arroyo, Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 206; wet arroyo bank, Los Indios, May 18, 1910, *O. E. Jennings*, No. 690; grassy place along Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 421. General Distribution: Cuba and the Isle of Pines.

159. ***Rynchospora cyperoides* (Swartz) Martius.**

*Schænus cyperoides* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 19.

*Rynchospora cyperoides* MARTIUS, Denkschriften Akademie der Wissenschaften München, VI, 1816-17, p. 149.

*Rhynchospora polycephala* WYDLER, in Kunth, Enumeratio Plantarum, II, 1837, p. 291.

Near Nueva Gerona, January 17, 1904, *A. H. Curtiss*, No. 297. General Distribution: Bahamas, Cuba, Isle of Pines, Jamaica; Hispaniola, Porto Rico, St. Kitts, Guadeloupe, Martinique, Trinidad, and from Mexico to Montevideo; Africa.

160. ***Rynchospora cymosa* (Willdenow) Elliott.**

*Schænus cymosus* WILLDENOW, Species Plantarum, I, 1798, p. 265.

*Rynchospora cymosa* ELLIOTT, Sketch of the Botany of South Carolina and Georgia, I, 1816, p. 58.

Near Nueva Gerona, April 17, 1904, *A. H. Curtiss*, No. 447. General Distribution: From New Jersey to Missouri and south through the West Indies and continental America to southern Brazil.

161. ***Rynchospora scutellata* Grisebach.**

*Rhynchospora scutellata* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 246.

Northern part of the island, *Blain*, No. 43 (Millspaugh). General Distribution: Western Cuba and the Isle of Pines.

162. ***Rynchospora pusilla* Chapman.**

*Rynchospora pusilla* CHAPMAN, in M. A. Curtis, American Journal of Science, Series II, VII, 1849, p. 409.

*Rynchospora pusilla* Charles Wright, in Sauvalle, Anales del Academia de Ciencias Médicas, Físicas y Naturales de la Habana, VIII, 1872, p. 88.

Reported in Britton, *Studies of West Indian Plants*, VIII, Bulletin of the Torrey Botanical Club, XLVIII, 1916, p. 443, as

follows: "Southeastern United States, Santa Clara, Pinar del Rio, and Isle of Pines, Cuba."

163. **Mariscus jamaicensis** (Crantz) Britton.

*Cladium jamaicense* CRANTZ, Institutiones Rei Herbariæ, I, 1766, p. 362.

*Cladium effusum* TORREY, Annals of the Lyceum of Natural History of New York, III, 1856, p. 374.

*Mariscus jamaicensis* BRITTON, in Britton & Brown, Illustrated Flora, Ed. II, I, 1913, p. 348.

Marshy soil at edge of pond two miles east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 49. General Distribution: In swamps, from Virginia to Florida and Texas, and rather widely distributed in the West Indies.

*Note*.—The treatment of *Scleria* has been based on the article by Britton, "The Genus *Scleria* Berg in Cuba." Bull. Torrey Bot. Club, XLII, 1915, pp. 487-494.

164. **Scleria pterota** Presl.

*Scleria pterota* PRESL, in Oken, Isis, XXI, 1828, p. 268.

*Scleria pratensis* NEES, Martius, Flora Brasiliensis, II, (I), 1843, p. 179.

*Scleria Ottonis* BOECKELER, Linnæa, XXXVIII, 1874, p. 490.

Reported by Britton (*op. cit.*, p. 490) from Cuba, Isle of Pines, Haiti, St. Thomas, Barbadoes, Jamaica, and continental tropical America.

165. **Scleria Wrightiana** Boeckeler.

*Scleria elata* C. WRIGHT, in Sauvalle, Anales del Academia de Ciencias Médicas, Físicas y Naturales de la Habana, VIII, 1872, p. 153. Not Thwaites.

*Scleria Wrightiana* BOECKELER, Flora, 65, 1882, p. 79.

Near Nueva Gerona, December 17, 1903, *A. H. Curtiss*, No. 235. General Distribution: "Pine-lands and savannas, Pinar del Rio and Isle of Pines. Endemic."—Britton, *op. cit.*, p. 490.

166. **Scleria setuloso-ciliata** Boeckeler.

*Scleria setuloso ciliata* BOECKELER, Flora, LXV, 1882, p. 30.

Reported by Britton (*l. c.*): "Wet situations, Matanzas, Havana, Isle of Pines; Guatemala."

167. **Scleria ciliata** Michaux.

*Scleria ciliata* MICHAX, Flora Boreali-Americana, II, 1803, p. 167.

*Scleria Elliottii* CHAPMAN, Flora of the Southern U. S., 1860, p. 531.

Reported by Britton (*l. c.*): "Barrens and pine-lands, Santa Clara,

Matanzas, Pinar del Rio; Isle of Pines; southeastern United States; Santo Domingo."

168. *Scleria Curtissii* Britton.

? *Scleria pauciflora effusa* CLARKE in Urban, *Symbolæ Antillanæ*, II, 1900, p. 143.  
*Scleria Curtissii* BRITTON, Small, *Flora of the Southeastern United States*, 1903, pp. 200 and 1398.

Reported by Britton (*l. c.*): "Savannas, Pinar del Rio and Isle of Pines; Florida."

169. *Scleria microcarpa* Nees.

*Scleria microcarpa* NEES, *Linnæa*, IX, 1834, p. 302.

*Scleria foliosa* C. Wright, Sauvalle, *Anales del Academia de Ciencias Médicas, Físicas y Naturales de la Habana*, VIII, 1872, p. 154. Not A. Richard.

*Scleria microcarpa foliosa* CLARKE in Urban, *Symbolæ Antillanæ*, II, 1900, p. 149.

"River banks, Pinar del Rio and Isle of Pines; Porto Rico, Guadeloupe, Jamaica, Trinidad, continental tropical America." Britton, *op. cit.*, p. 491.

170. *Scleria verticillata* Muhlenberg.

*Scleria verticillata* MUHLENBERG, Willdenow, *Species Plantarum*, IV, 1805, p. 317.

"Pine-lands, Pinar del Rio, Isle of Pines; eastern United States; New Providence, Bahamas." Britton, *op. cit.*, p. 493.

171. *Scleria hirtella* Swartz.

*Scleria nutans* KUNTH, *Enumeratio Plantarum Omnium*, II, 1837, p. 352.

*Scleria hirtella* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 19.

"Moist grounds, Oriente, Santa Clara, Pinar del Rio, Isle of Pines; southern United States, Haiti, Porto Rico, Jamaica, Trinidad, continental tropical America, tropical Africa." Britton, *op. cit.*, p. 493.

172. *Scleria lithosperma* (Linnæus) Swartz.

*Scleria lithospermus* LINNÆUS, *Species Plantarum*, 1753, p. 51.

*Scleria lithosperma* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 18.

*Scleria filiformis* SWARTZ, *op. cit.*, p. 19.

*Scleria lithosperma filiformis* BRITTON, *Annals New York Academy of Sciences*, III, 1885, p. 231.

Near Nueva Gerona, May 8, 1904, *A. II. Curtiss*, No. 486. General Distribution: "Woodlands and thickets, all provinces Cuba; Florida, Bahamas, West Indies, tropical continental America, Old World tropics." Britton, *op. cit.*, p. 493.

173. *Scleria gracilis* Elliott.

*Scleria gracilis* ELLIOTT, Sketch of the Botany of South Carolina and Georgia, II, 1824, p. 571.

Reported in Britton, *Studies of West Indian Plants*, VIII, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 443, as follows: "Southeastern United States, Pinar del Rio, and Isle of Pines, Cuba."

174. *Lagenocarpus guianensis* Nees.

*Lagenocarpus guianensis* NEES, Linnæa, IX, 1834, p. 304.

*Scleria guianensis* STEUDEL, Synopsis plantarum Glumacearum, 1855, p. 177.

On the white sand of the pine-barrens at Los Indios, May 17, 1910, *O. E. Jennings*, No. 327. General Distribution: Bahamas, Isle of Pines, Trinidad, Guiana, and Brazil. (Clarke.)

A slender stiffly erect light green sedge reaching the height of five feet or more, with slender brownish inflorescences of a foot or more in length. The plants arise from tuberous-thickened portions of a scaly rhizome which creeps along, just beneath the surface of the sand, the tuberous thickenings being two or three inches apart along the rhizome.

## Family PALMÆ.

## KEY TO THE SPECIES ENUMERATED.

Leaves fan-shaped.

Petioles smooth.

Leaves large, usually five or six feet across, the petiole extending about half-way up the blade.....180. *Sabal parviflora*.

Leaves smaller or else the petiole not extending far up the blade.

Leaves small, about one to two feet across, stiff; trunk very slender and pole-like; habitat inland.....178. *Coccothrinax Miraguano*.

Leaves medium-sized, rather thin, the cross-veinlets prominent; trunk moderately thick; habitat coastal.....176. *Thrinax Wendlandiana*.

Leaves fairly large, up to five or six feet across; stiff; cross-veinlets not prominent.....175. *Colpothrinax Wrightii*.

Petioles armed.

Leaves large; petioles 2 cm. in width (or more); cross-veinlets distinct; flowers white-tomentose.....179. *Copernicia Curtissii*.

Leaves of moderate size; petioles about 1 cm. in width; cross-veinlets indistinct; flowers glabrous.....177. *Acælorraphe Wrightii*.

Leaves pinnate.

Tall stately trees with whitish massive stems, usually enlarged near the middle and terminating in long green cylinders formed by the closely packed leaf sheaths; fruit bluish, about 1-1.5 cm. long.....182. *Roystonea regia*.

Tall stately trees with the base usually enlarged; petioles clasping the stem but not forming a prominent cylinder; fruit large (the ordinary cocoanut).

183. *Cocos nucifera*.

Small or medium-sized trees with slender stems and irregularly pinnate leaves; flowers situated in pockets in the thickened branches of the spike; fruits about 1 cm. long.....181. *Calyptrionoma dulcis*.

175. **Colpothrinax Wrightii** H. Wendland.

*Colpothrinax Wrightii* H. WENDLAND, in Kerchove, Les Palmiers, 1878, p. 241.

Near Nueva Gerona, February 23, 1904, *A. H. Curtiss*, No. 364.  
General Distribution: Cuba, and the Isle of Pines.

176. **Thrinax Wendlandiana** Beccari.

*Thrinax Wendlandiana* BECCARI, in Webbia, II, 1908, p. 265.

Along rocky seaward face of the ridge at Bibijagua, where with *Plumiera emarginata*, it forms a large part of the taller vegetation just above the reach of the spray, May 7, 1910, *O. E. Jennings*, No. 112; at the edge of the bluff of coralline limestone along the coast at Caleta Grande, where it forms quite a thicket, May 22, 1910, *O. E. Jennings*, No. 512. General Distribution: Isle of Pines. West Indies (Kew Index).

177. **Acælorraphe Wrightii** (Grisebach & Wendland) Beccari.

SAW PALMETTO.

*Copernicia Wrightii* GRISEBACH & WENDLAND, in Grisebach, Catalogus Plantarum Cubensium, 1866, p. 220.

*Paurotis androsana* O. F. COOK, Memoirs of the Torrey Botanical Club, XII, 1902, p. 22.

*Acælorraphe Wrightii* BECCARI, Webbia, II, 1907, p. 109.

*Paurotis Wrightii* BRITTON & SHAFER, North American Trees, 1908, p. 141 (in part), fig. 107.

Near Nueva Gerona, April 17, 1904, *A. H. Curtiss*, No. 449; in open savanna one mile east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 64; in sandy pine-barrens east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 361. General Distribution: Southern Florida, Bahamas, Cuba, and the Isle of Pines.

This is the common palmetto of the savannas of the northern part of the island, where it grows either singly or in clumps. The plants reach a height of fifteen feet, or occasionally more. The writer has followed Sargent, "Trees and Shrubs," II, 1913, p. 119, in the synonymy of this species. Sargent distinguishes between this species and *Acælorraphe arborescens* of Southern Florida, the latter species not having the petioles strongly toothed throughout their whole length as in *A. Wrightii*, and the fruits having a diameter of 8-9 mm. instead of 5-7 mm. as in *A. Wrightii*.

178. **Coccothrinax Miraguano** (Martius) Beccari. STAR PALM.

*Thrinax Miraguano* MARTIUS, *Historia Naturalis Palmarum*, III, 1850, p. 320.  
*Coccothrinax Miraguano* BECCARI, *Webbia*, II, 1908, p. 295.

Near Nueva Gerona, May and April, 1904, *A. H. Curtiss*, No. 423; February–March, 1910, *Dr. Jared F. Shafer*; in savanna about two miles east of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 156; near Nueva Gerona, May 14, 1910, *O. E. Jennings*, No. 623. General Distribution: Cuba and the Isle of Pines.

The Star Palm is an odd plant. Its trunk is straight, smooth, reaching perhaps a height of thirty feet, but very slender, usually not over two or three inches in diameter. The leaves are borne in a close cluster at the apex, very soon dropping when dead, rarely reaching a diameter of two feet, and being borne on smooth slender petioles. The palm is fairly common on the “Mal Pais” gravel of the savannas in the northern part of the island, reaching also the sandy pine-barrens around Los Indios. Some fine specimens were seen on the upper slopes (mica-schist) of the Cañada Mts. See Plate VII.

179. **Copernicia Curtissii** Beccari.

*Copernicia Curtissii* BECCARI, in *Webbia*, II, 1908, p. 176.

Near Nueva Gerona, April 5, 1904, *A. H. Curtiss*, No. 435; on the open savanna near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 7. See Plate VIII. General Distribution: Isle of Pines.

This is one of the characteristic palms of the open savannas growing together with the Palmetto, *Acaelorrhaphe Wrightii*.

180. **Sabal parviflora** Beccari. CABBAGE PALM.

*Sabal parviflora* BECCARI, in *Webbia*, II, 1908, p. 43.

Near Nueva Gerona, January and April, 1904, *A. H. Curtiss*, No. 484; growing among palmettoes on the savanna about one and one-half miles east of Nueva Gerona, May 7, 1910, *O. E. Jennings*, No. 70. General Distribution: Cuba and the Isle of Pines.

This is the large-leaved “cabbage palm” of the Isle of Pines. It is quite largely used for purposes of thatching, and trees with a full crop of leaves are difficult to find. It occurs not only upon the savanna but also upon the slopes of the crystalline-limestone hills and mountains in the northeastern part of the island.

181. *Calyptronoma dulcis* (Wright) Wendland.

*Geonoma dulcis* WRIGHT, in Grisebach, Catalogus Plantarum Cubensium, 1866, p. 222.

*Calyptronoma dulcis* H. WENDLAND, in Kerchove, Les Palmiers, 1878, p. 241.

Near Nueva Gerona, May 7, 1904, *A. H. Curtiss*, No. 485; at base of Caballos Mts., near old marble quarry, May 9, 1910, *O. E. Jennings*, No. 159. General Distribution: Western Cuba and the Isle of Pines.

182. *Roystonea regia* (Humboldt, Bonpland, & Kunth) O. F. Cook.  
ROYAL PALM.

*Oreodoxa regia* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, I, 1815, p. 305.

*Roystonea regia* O. F. COOK, Science, Series II, XII, 1900, p. 479.

Near Nueva Gerona, April 1, 1904, *A. H. Curtiss*, No. 432; Keenan's estate, south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 181. General Distribution: Southern Florida, the West Indies, and Central America.

The Royal palm is a beautiful object, its tall white trunk usually standing sharply outlined against the other colors of the landscape. The trees occur in the moister spots along the streams and in the lower spots on the savanna. They commonly form clumps or small groves about the bases of the Casas and Caballos Mts., the roots here evidently reaching the moisture which drains away from the mountains. See Plate IX.

183. *Cocos nucifera* Linnæus.

*Cocos nucifera* LINNÆUS, Species Plantarum, 1753, p. 1188.

The coconut palm is commonly cultivated in the Isle of Pines. Along the "South Coast" at Caleta Grande, as well as along the coast near Bibijagua, specimens were seen which, from their location, would indicate that they had not been planted there. The coconut palm, now widely distributed through the tropics, probably had its origin in the tropics of America. See Cook, "History of the Coconut Palm in America," Contributions from the United States National Herbarium, XIV, 1910, pp. 271-342.

*Note.*—*Blain*, Nos. 75 & 94 were reported by Millspaugh (Field Columbian Museum, Bot. Series, I, 1900, p. 426) as *Sabal Blackburnianum* Glaziou, and *Blain*, No. 170, as *Geonoma Swartzii* Grise-



bach & Wendland. Millspaugh also reports "Fine groves of large, straight-trunked trees at Pedernales Point, Isle of Pines" for the species *Thrinax argentea* (Jacquin) Loddige, *op. cit.*, II, 1900, p. 30.

I have seen none of the *Blain* specimens, but it is quite probable that they are to be referred to some of the more recently described species enumerated above.

### Family ARACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Leaf-blade ovate-oblong, with cordate base and acute apex, 1.5-3.5 dm. long.

184. *Philodendron Krebsii*.

Mature leaf-blades pinnatifid to one-fourth the transverse diameter, deeply cordate.

185. *Philodendron lacerum*.

#### 184. *Philodendron Krebsii* Schott.

*Philodendron Krebsii* SCHOTT, Bonplandia, 1859, p. 164.

*Philodendron Wrightii* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 219.

Clambering over the rocks on the highest point of Caballos Mts., May 13, 1910, *O. E. Jennings*, No. 236. General Distribution: Cuba, Isle of Pines, Porto Rico, Hispaniola, and St. Thomas.

My collection embraced only sterile specimens, but the leaf- and stem-characters agree so closely with those given for *Philodendron Krebsii* that I have no hesitation in referring the specimens to that species.

The petiole is little or not at all sheathing at the base, and is subterete, slightly flattened on the upper side, reaching a length of 8-10 cm. The lamina is 10-18 cm. long, the upper two-thirds being oblong, about 3-4 cm. wide, with an abrupt acumination, the basal one-third of the lamina being rounded, rather deeply cordate, 6-8 cm. wide, the basal three or four pairs of the primary veins being slightly stronger than the secondary veins.

#### 185. *Philodendron lacerum* (Jacquin) Schott.

*Arum lacerum* JACQUIN, Plantarum Rariorum Horti Cæsarei Schœnbrunnensis Descriptiones, etc., IV, 1804, pl. 468.

*Caladium lacerum* WILLDENOW, Species Plantarum, IV, 1805, p. 491.

*Philodendron incisco-crenatum* KUNTH, Enumeratio Plantarum Omnium, III, 1844, p. 449.

*Philodendrum lacerum* SCHOTT, Meletemata Botanica, I, 1832, p. 19.

On trees and rocks at the top of Caballos Mts., east of Nueva Gerona, May 13, 1910, *O. E. Jennings*, No. 235. General Distribution: Cuba, Isle of Pines, and Jamaica.

## Family XYRIDACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Leaves reaching a length of 10–20 cm. and a width of 8–12 mm.; spikes about 1.5 cm. long.....186. *Xyris ambigua*.

Leaves 8–10 cm. long by 1–1.5 mm. broad; spikes 7–9 mm. long.

187. *Xyris longibracteata*.

186. *Xyris ambigua* Beyrich.

*Xyris ambigua* BEYRICH, in Kunth, Enumeratio Plantarum Omnium, IV, 1843, p. 13.

On white sand in the pine-barrens at Los Indios, May 18, 1910, O. E. Jennings, No. 649. General Distribution: North Carolina to Florida and Texas, and the Isle of Pines.

187. *Xyris longibracteata* Britton & Wilson.

*Xyris longibracteata* BRITTON & WILSON, in Britton, Studies of West Indian Plants, VIII, Bulletin of the Torrey Botanical Club, XLIII, 1916, pp. 462, 463.

"White sand, vicinity of Los Indios, Isle of Pines (Britton, Britton & Wilson 14215)." Britton, *l. c.*

## Family ERIOCAULACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Small, densely-tufted branching plants, up to 3 cm. high, with leaves less than 1 cm. long and peduncles usually not over 2 cm. long.

189. *Pæpalanthus alsinoides*, variety *minimus*.

Larger, with few or no branches, rosulate tufted leaves usually 3–5 cm. long, and peduncles 2–3 cm. or more in length.....188. *Pæpalanthus seslerioides*.

Leaves rosulate-tufted, about 2–3 cm. long; peduncles 5–10 cm. long.

190. *Pæpalanthus androsaceus*.

188. *Pæpalanthus seslerioides* Grisebach.

*Pæpalanthus seslerioides* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 224. (Wright, No. 3234.)

Growing in the white sand of the pine-barrens near Los Indios, May 17, 1910, O. E. Jennings, No. 338. Reported heretofore only from Cuba.

This plant agrees very closely with the description of the Cuban plant, although the leaves are shorter, about 3–5 cm. instead of 8 cm. and the peduncles are shorter, being at the longest 13 cm. instead of 30 cm. This may possibly be found to be a variety of *P. seslerioides*, but a larger series of specimens are needed for study before such a decision can be made.

189. *Pæpalanthus alsinoides* var. *minimus* var. nov. (Plate XVII, figures *E-H*.)

Plant perennial (?), stem cæspitose-branched up to 3 cm. high, leaves densely tufted towards the top of the stems and branches, linear from a dilated, subamplexicaul, ciliate base, rather thick, rigid, finally somewhat obtuse, 6–8 mm. long, peduncles solitary in the axils of upper leaves, rigid, 3-costate, soon glabrate, 1.5–2 cm. long, sheaths about 3 mm. long, the lamina about 4 mm. long, linear-acuminate, the heads broadly obconic, about 2–4 mm. in diameter, hairs of the flowers acute, nearly hyaline, outwardly smooth, nodose at the septa, the interior surface of the wall scarcely at all granulose.

Planta perennis (?), caule cæspitoso-ramoso usque ad 3 cm. altitudine, foliis præsertim in apice dense confertis, e basi dilatata subamplexicauli ciliata linearibus, crassiusculo-rigidis, demum obtusiusculis, 6–8 mm. longis, medio vix 1 mm. latis; pedunculis in axillis foliorum superiorum solitariis, rigidulis, 3-costatis, mox glaberrimis, 1.5–2 cm. longis; vaginis circiter 3 mm. longis, laminis circiter 4 mm. longis, lineari-acuminatis; capitulis lato-obconicis, circiter 2–4 mm. diametro, pilis florum acutis, pæne hyaline, extus lævibus, ad septa nodulosis, intus vix granulosis.

*Type:* On gravelly soil in the pine-barrens one mile north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 387.

This plant is evidently to be regarded as a derivative of the Cuban *Pæpalanthus alsinoides*. It was found growing on the coarse, glistening, white quartzose gravel in the pine-barrens north of Los Indios, and it was associated with a number of plants with decided inclinations towards a habitat of acid soil: *Pinguicula filifolia*, *Kalmia* sp., *Xyris ambigua*.

The variety differs from the typical species in that it has leaves only half as long as the latter, the peduncles only about one-third as long, and the hairs of the flowers scarcely or not at all granulose on the inside surface of the cell-wall. In most of the other characters the variety agrees well with the species. The flowers were too far past maturity to be studied satisfactorily, but were seen to be about 1.8 mm. long, the three outer segments 1 mm. long, obcuneate, the truncate apex piliferous and erose, the inner segments as long, united into a slender tube with the small lobes and, after maturity, strongly infolded.

190. *Pæpalanthus androsaceus* Grisebach.

*Pæpalanthus androsaceus* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 225.

Northern part of the island, *Blain*, No. 151, Millspaugh, Field Columbian Museum, Botany, I, 1900, p. 426. General Distribution: Western Cuba and the Isle of Pines.

## Family BROMELIACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Terrestrial plants in appearance and habit of growth resembling the pineapple; leaves rigid, armed with sharp marginal spines. . . . . 191. *Bromelia Pinguin*.

Epiphytic (or on rocks, etc.); leaf margins not armed with spines.

Leaves very wide (up to 10 or 15 cm. wide) with a widely rounded mucronate tip and finely serrate margins. . . . . 192. *Hohenbergia pendulifera*.

Leaves narrower, at apex not widely rounded, marginally not serrate.

Grayish-green, linear-leaved, "moss-like" plants hanging from branches of trees. . . . . 199. *Tillandsia usneoides*.

More or less erect plants growing on limbs of trees or from crevices of cliffs, not pendent.

Flowers few (1-4) on a slender scape-like stem about 1-2 dm. high; leaves setaceous-filiform from short dilated sheathing bases.

198. *Tillandsia recurvata*.

Flowers mostly more than four and stem not scape-like nor filiform.

Leaves up to 2 or 3 dm. long, linear-subulate and abruptly contracted from a very short dilated base. . . 195. *Tillandsia tenuifolia*.

Leaves wider and with a longer dilated base.

Basal leaves shorter than the stems; stems considerably branched; bracts not closely imbricated.

Upper leaves of the stem merely clasping scales.

194. *Tillandsia utriculata*.

Upper leaves of stem with long acuminate points beyond the clasping base. . . . . 193. *Catopsis nutans*.

Basal leaves usually longer than the stems, or at least very little shorter; bracts often closely imbricated.

Leaves with bladder-like dilations of the base, widely spreading and recurved or twisted; bracts rather narrowly ovate, 1.5-2 cm. long, looser, not lustrous.

197. *Tillandsia Balbisiana*.

Leaves dilated but not bladdery at base, erect or somewhat spreading.

Leaves rather rigid and involute; bracts broadly ovate, 2-3 cm. long, closely imbricated, 2-ranked, keeled, lustrous. . . . . 196. *Tillandsia fasciculata*.

Leaves not rigid nor much involute; bracts lance-oblong, 1.5-2 cm. long, not very closely imbricated, not lustrous, not markedly 2-ranked. . . . . 200. *Tillandsia sublaxa*.

191. *Bromelia Pinguin* Linnæus.

*Bromelia Pinguin* LINNÆUS, Species Plantarum, 1753, p. 285; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 591.

Near Nueva Gerona, March 5, 1904, *A. H. Curtiss*, No. 387; near old marble quarry, east base of Caballos Mts., May 9, 1910, *O. E. Jennings*, No. 183. General Distribution: Rather widely distributed in the Greater Antilles, St. Thomas, St. Croix, Antigua, Martinique, St. Vincent, and from Central America to Venezuela.

192. *Hohenbergia penduliflora* (A. Richard) Mez.

*Pitcairnia penduliflora* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, XI, 1850, p. 262.

*Hohenbergia penduliflora* MEZ, in DeCandolle, Monographiæ Phanerogamarum, IX, 1896, p. 135.

On trees along an arroyo south of Sante Fé, May 25, 1910, *O. E. Jennings*, No. 531. General Distribution: Cuba and the Isle of Pines.

193. *Catopsis nutans* (Swartz) Grisebach.

*Tillandsia nutans* SWARTZ, Prodrromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 56.

*Catopsis nutans* GRISEBACH, Flora of the British West Indian Islands, 1864, p. 599.

*Catopsis nitida* BAKER, Handbook of the Bromeliaceæ, 1889, p. 154. Not Grisebach.

On trees on upper slope of Caballos Mts., May 13, 1910, *O. E. Jennings*, No. 229. General Distribution: Southern Florida, and widely distributed through the West Indies and Central America.

194. *Tillandsia utriculata* Linnæus.

*Tillandsia utriculata* LINNÆUS, Species Plantarum, 1753, p. 286.

*Tillandsia ramosa* SWEET, Hortus Britannicus, Ed. I, 1827, p. 425.

*Tillandsia Sintenisii* BAKER, in Journal of Botany, XXVI, 1888, p. 12.

Near Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 529. General Distribution: Southern Florida, the Bahamas, West Indies, Mexico, Venezuela, and Guiana.

195. *Tillandsia tenuifolia* Linnæus.

*Tillandsia tenuifolia* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 410.

*Tillandsia setacea* SWARTZ, Flora Indiæ Occidentalis, I, 1797, p. 593; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 595.

Near Nueva Gerona, February 17, 1904, *A. H. Curtiss*, No. 355; on tree along an arroyo near Sante Fé, May 25, 1910, *O. E. Jennings*,

No. 555. General Distribution: Southern Florida, Cuba, the Isle of Pines, Jamaica, Porto Rico, Hispaniola, Costa Rica, Venezuela, and Brazil.

196. *Tillandsia fasciculata* Swartz.

*Tillandsia fasciculata* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 56; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 595.

*Vriesea glaucophylla* HOOKER, in Curtis's Botanical Magazine, Pl. 4415.

*Tillandsia anceps* BAKER, Journal of Botany, XXV, 1887, p. 239. Not Loddiges.

Near Nueva Gerona, February 17, 1904, *A. H. Curtiss*, No. 353; on marble cliffs, Caballos Mts., May 9, 1910, *O. E. Jennings*, No. 193; on trees at top of Caballos Mts., May 13, 1910, *O. E. Jennings*, No. 233. General Distribution: Southern Florida, the Bahamas, West Indies, and from Mexico to tropical South America.

197. *Tillandsia Balbisiana* Schultes.

*Tillandsia Balbisiana* SCHULTES, Systema Vegetabilium, VII, (2), 1830, p. 1212; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 597.

Near Nueva Gerona, February 17, 1904, *A. H. Curtiss*, No. 354; on brush on savanna, southwest of Bibijagua, May 7, 1910, *O. E. Jennings*, No. 92; on Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 629. General Distribution: Southern Florida, Cuba, the Isle of Pines, and Jamaica.

198. *Tillandsia recurvata* Linnæus.

*Renelamia recurvata* LINNÆUS, Species Plantarum, 1753, p. 287.

*Tillandsia recurvata* LINNÆUS, Species Plantarum, Ed. II, I, 1762, p. 410; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 598.

On crevices in face of cliff at marble quarry, east base of Caballos Mts., May 9, 1910, *O. E. Jennings*, No. 194. General Distribution: Southern Florida to Texas and Mexico, and southwards through the West Indies and tropical continental America.

199. *Tillandsia usneoides* Linnæus. SPANISH MOSS.

*Tillandsia usneoides* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 411; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 598.

*Renealmia usneoides* LINNÆUS, Species Plantarum, 1753, p. 287.

*Dendropogon usneoides* RAFINESQUE, Neogenyton, or Indication of 66 New Genera of Plants of North America, 1825, p. 3.

On *Brya Ebenus*, about 3 miles north of McKinley, May 16, 1910, *O. E. Jennings*, No. 301; on trees along the Nuevas River, May 16,

1910, *O. E. Jennings*, No. 292. General Distribution: From Virginia to Florida and Texas, West Indies, and continental tropical America.

Very little of the Spanish Moss was seen in the Isle of Pines.

200. *Tillandsia sublaxa* Baker.

*Tillandsia sublaxa* BAKER, Journal of Botany, 1887, p. 307; Handbook of the Bromeliaceæ, 1889, p. 188.

On trees on top of Caballos Mts., May 13, 1910, *O. E. Jennings*, No. 234. General Distribution: Jamaica, Hispaniola, Porto Rico, Isle of Pines.

Family COMMELINACEÆ.

201. *Commelina hamipila* Wright.

*Commelina hamipila* WRIGHT, in Sauvalle, Flora Cubana, Anales del Academia de Ciencias Médicas, Físicas y Naturales de la Habana, V, 1868, no. 157.

Near Nueva Gerona, March 13, 1904, *A. H. Curtiss*, No. 407; in swampy place near Bibijagua, May 7, 1910, *O. E. Jennings*, No. 98; in grassy place near the Majagua River north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 410. General Distribution: Cuba and the Isle of Pines.

Family SMILACEÆ.

KEY TO THE SPECIES ENUMERATED.

Petioles articulated at the apex; leaves usually spiny-toothed on the nerves beneath.

202. *Smilax havanensis*.

Petioles articulated at the middle or below; leaves not spiny.

203. *Smilax domingensis*.

202. *Smilax havanensis* variety *ovata* (Duhamel) A. DeCandolle.

*Smilax havensis* JACQUIN, Enumeratio Plantarum quas in Insulis Caribæis Detexit, 1760, p. 33.

*Smilax ovata* DUHAMEL, Traité des Arbres et Arbustes que se cultivent en France en Pleine Terre, I, Ed. II, 1801, p. 242.

*Smilax havanensis* var. *ovata* A. DECANDOLLE, Monographiæ Phanerogamarum, I, 1878, p. 122.

Northern part of the island, *Blain*, No. 39, 95, Millspaugh. General Distribution: Florida, Cuba, the Isle of Pines, and Santo Domingo.

203. *Smilax domingensis* Willdenow.

*Smilax domingensis* WILLDENOW, Species Plantarum, IV, (2), 1806, p. 783.

*Smilax Berteri* SPRENGEL, Systema Vegetabilium, II, 1825, p. 102.

*Smilax pseudo-china* A. RICHARD, in Sagra, Historia Física, Política y Natural de la Isla de Cuba, XI, 1850, p. 271. Not Linnæus.

On the peninsula north of Caleta Grande, May 22, 1910, *O. E. Jennings*, No. 605. General Distribution: Cuba, Jamaica, the Isle of Pines, Hispaniola, and Porto Rico.

### Family HÆMODORACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Inflorescence heavily yellowish tomentose-pubescent. . . . . 204. *Gyrotheca tinctoria*.

Inflorescence not conspicuously tomentose-pubescent.

Inner perianth-parts obovate, about 11–12 mm. long and half as wide, the exterior yellow-spotted at the base. . . . . 206. *Xiphidium xanthorrhizon*.

Inner perianth-parts lance-oblong, somewhat shorter; outer ones not yellow-spotted at base. . . . . 205. *Xiphidium floribundum*.

#### 204. *Gyrotheca tinctoria* Salisbury.

*Gyrotheca tinctoria* SALISBURY, Transaction of the Horticultural Society of London, I, 1812, p. 327.

*Lachnanthes tinctoria* ELLIOTT, A Sketch of the Botany of South Carolina and Georgia, I, 1816, p. 47.

Near Nueva Gerona, June 3, 1912, *G. A. Link*. General Distribution: Mostly in pine-barrens and savannas, Massachusetts to New Jersey and Florida, Cuba, and the Isle of Pines.

#### 205. *Xiphidium floribundum* Swartz.

*Xiphidium floribundum* SWARTZ, Prodrromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 17.

Northern part of the island, *Blain*, No. 45. "In Cuba this species grows only in shady situations in glens, never on the open savannas, here, however, it seeks the open plains far from shade.—Blain" (Millspaugh, Field Columbian Museum, Botanical Series, I, 1900, p. 426). General Distribution: Reported in Cuba and a number of the other West Indian Islands, and from Mexico to Brazil.

#### 206. *Xiphidium xanthorrhizon* Wright.

*Xiphidium xanthorrhizon* WRIGHT, in Grisebach, Catalogus Plantarum Cubensium, 1866, p. 252.

On the pine-barrens at Los Indios, May 17, 1910, *O. E. Jennings*, No. 315; on almost bare quartz gravel two miles east of Los Indios, May 17, 1910, *O. E. Jennings*, No. 668. General Distribution: Western Cuba and the Isle of Pines.



Family AMARYLLIDACEÆ.

KEY TO THE SPECIES ENUMERATED.

Leaves thick, fleshy, armed with terminal and marginal spines and forming a rosette (Century Plants).....210. *Agave papyrocarpa*.

Leaves not as above.

Flowers yellowish and with lobes of the perianth not more than 1.8 cm. long.

Perianth-tube very slender, and prolonged 2-3 cm. beyond the ovary.

211. *Curculigo scorzoneraefolia*.

Perianth-tube short and scarcely or not at all prolonged beyond the ovary.

212. *Hypoxis decumbens*.

Flowers white or rose-colored and much larger.

Flowers showy, white, with a long slender tube and perianth-parts narrow and 5-8 cm. long.

Flowers 2-4.....209. *Crinum americanum*.

Flowers 4-12.....208. *Crinum erubescens*.

Flowers rose-colored, with a very short tube and with perianth-parts 1 cm. wide and 3.5 cm. long.....207. *Atamosco rosea*.

207. **Atamosco rosea** Greene.

*Atamosco rosea* (Lindley) GREENE, Pittonia, III, 1897, p. 188.

*Zephyranthes rosea* LINDLEY, in Edwards, Botanical Register, 1824, Pl. 821.

Near Nueva Gerona, April 20, 1904, *A. H. Curtiss*, *West Indian Plants*, No. 452. General Distribution: Cuba and the Isle of Pines.

208. **Crinum erubescens** Solander.

*Crinum erubescens* SOLANDER, in Aiton, Hortus Kewensis, I, 1789, p. 413.

Northern part of the island, *Blain*, No. 46, Millspaugh. General Distribution: Cuba, Jamaica, Isle of Pines, and Guiana.

209. **Crinum americanum** Linnæus.

*Crinum americanum* LINNÆUS, Species Plantarum, 1753, p. 292.

In scrubby thicket southwest of Bibijagua, May 7, 1910, *O. E. Jennings*, No. 95; everglade meadow at mouth of Nuevas River, May 16, 1910, *O. E. Jennings*, No. 289. General Distribution: From Georgia and Florida to Louisiana and Texas, and in Cuba and the Isle of Pines.

All of the *Crinums* in the Isle of Pines may possibly belong to one species.

210. **Agave papyrocarpa** Trelease,

*Agave papyrocarpa* TRELEASE, Memoirs National Academy of Sciences, XI, 1913, p. 44, Pls. 95, 96.

Top of Caballos Mts., east of Nueva Gerona, May 12, 1910, *O. E.*

*Jennings*, No. 662; near Nueva Gerona, February 9, 1904, *A. H. Curtiss*, *West Indian Plants*, No. 335; Wm. Trelease, No. 20, March, 1907. General Distribution: Isle of Pines, Curtiss, No. 335, being the type.

See Britton, *Journal of the New York Botanical Garden*, XVIII, 1916, p. 67, where, with reference to this species, it is noted that the steep cliffs of the Casas and Caballos mountains are "often thickly clothed by the maguey or century plant of the Isle of Pines (*Agave papyrocarpa*)."

#### 211. *Curculigo scorzoneraefolia* (Lamarck) Baker.

*Hypoxis scorzoneraefolia* LAMARCK, *Encyclopédie Méthodique, Botanique*, III, 1789, p. 183.

*Curculigo scorzoneraefolia* BAKER, *Synopsis Hypoxidaceæ*, *Journal of the Linnean Society*, XVII, 1880, p. 124.

Pine-barrens east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 364; on "Mal Pais" gravel soil south of Sante Fé, May 25, 1910, associated with *Hypoxis decumbens* L., which it fairly closely resembles in general appearance. Northern part of the island, *Blain*, No. 34, Millspaugh. General Distribution: Cuba, Isle of Pines, Haiti, Jamaica, St. Vincent, Brazil, and Peru.

#### 212. *Hypoxis decumbens* Linnæus.

*Hypoxis decumbens* LINNÆUS, *Systema Naturæ*, Ed. X, 1759, p. 986.

Gravelly soil on savanna near Sante Fé, May 25, 1910, *O. E. Jennings*, No. 550: Probably also belonging here is *Blain*, No. 33, reported as *H. juncea*. General Distribution: Tropical America from Mexico and Cuba to South America.

This was identified as *H. juncea* Smith, but as the writer understands that species it is far different from the plant found in the Isle of Pines. *H. juncea*, in the form in which it occurs in our Southern States, has far more filiform-linear leaves. The plants from the Isle of Pines have the free portion of the perianth-parts about 1 cm. long, the corms semiglobose and often 1.5 cm. thick, and the inner perianth segments only about three-fourths as wide and three-fourths as long as the outer ones.

Growing together with this species in the dry open fields just south of Sante Fé, and apparently related to it, were similar but considerably smaller plants, the leaves being usually less than 3 mm.

wide, and the peduncles bearing but one flower each. These appear to belong to a good variety and, from such descriptions as could be found, it is evidently the same as described by Roemer and Schultes as *Hypoxis mexicana*.

*Note.*—Since writing the above, Dr. N. L. Britton has assured the writer that specimen No. 550 in the New York Botanical Garden is clearly *Hypoxis juncea*. Dr. Britton doubts the occurrence of more than one species of *Hypoxis* on the island.

213. *Hypoxis decumbens* variety *mexicana* (Roemer & Schultes)  
comb. nov.

*Hypoxis mexicana* ROEMER & SCHULTES, Systema Vegetabilium, VII, 1835, p. 761.

Gravelly soil in open field just south of Sante Fé, May 25, 1910,  
*O. E. Jennings, No. 551.*

Family DIOSCOREACEÆ.

KEY TO THE SPECIES ENUMERATED.

Leaves cordate-ovate to cordate-deltoid, acuminate; staminate racemes long, slender.

3 fertile and 3 sterile stamens.....214. *Dioscorea polygonoides*.

All 6 stamens fertile.....215. *Dioscorea trifida*.

Leaves cordate-hastate with widely rounded basal lobes and the apex suddenly apiculate; staminate flowers distinctly glomerate-subsessile.

216. *Rajania hastata*.

214. *Dioscorea polygonoides* Humboldt & Bonpland.

*Dioscorea polygonoides* HUMBOLDT & BONPLAND, in Willdenow, Species Plantarum, IV, 1806, p. 795.

*Dioscorea multifida* PRESL, Botanische Bemerkungen, 1844, p. 116; GRISEBACH, Flora of the British West Indian Islands, 1864, p. 588.

*Dioscorea Kegeliana* GRISEBACH, Flora of the British West Indian Islands, 1864, p. 588.

*Dioscorea alata* BELLO, Anales de la Sociedad Española de Historia Natural, XII, 1883, p. 863. Not Linnæus.

Near Nueva Gerona, *A. H. Curtiss, No. 506 ♀, no date*. General Distribution: From Cuba through the West Indies to Trinidad and in continental tropical America.

215. *Dioscorea trifida* Linnæus, fil.

*Dioscorea trifida* LINNÆUS, FIL., Supplementum Plantarum, 1781, p. 427.

Northern part of the island, *Blain, No. 98*, Millspaugh. General Distribution: Isle of Pines, Jamaica, Guadeloupe, Martinique, St.

Vincent, Trinidad, and South America. Often escaping from cultivation in the tropics.

216. **Rajania hastata** Linnæus.

*Rajania hastata* LINNÆUS, Species Plantarum, 1753, p. 1032.

Near Nueva Gerona, May 20, 1904, *A. H. Curtiss, No. 506*. General Distribution: Santo Domingo, Cuba, and the Isle of Pines.

Family MUSACEÆ.

217. **Musa sapientum** Linnæus. COMMON BANANA.

*Musa sapientum* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1303.

*Musa paradisiaca* subsp. *sapientum* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 692.

Near Nueva Gerona, May 23, 1904, *A. H. Curtiss, No. 510*. General Distribution: Naturalized in tropical America from the East Indies.

Family ZINGIBERACEÆ.

KEY TO THE SPECIES ENUMERATED

Flowers large and showy, 4-6 cm. long.....218. *Alpinia speciosa*.  
Flowers not so showy, about 2 cm. long.....219. *Zingiber Zingiber*.

218. **Alpinia speciosa** (Wendland) K. Schumann.

*Zerumbet speciosum* WENDLAND, Sertum Hannoverianum, Fasc. IV, 1798, p. 3, t. 19.

*Renealmia nutans* ANDREWS, The Botanist's Repository for New and Rare Plants, V, about 1802-1803, Pl. 360.

*Alpinia nutans* ROSCOE, in Smith, Exotic Botany, II, 1805, p. 93, Pl. 106.

*Alpinia speciosa* K. SCHUMANN, Flora Kaiser Wilhelmsland, 1887, p. 29.

Low place along the Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings, No. 405* (naturalized); near Nueva Gerona, early summer, 1912, and near Los Indios, November 4, 1912, *G. A. Link*. General Distribution: Native to China, but cultivated extensively in India and the Malay region, and rather widely naturalized in the West Indies.

219. **Zingiber Zingiber** (Linnæus) Karsten.

*Amomum Zingiber* LINNÆUS, Species Plantarum, 1753, p. 1.

*Zingiber officinale* ROSCOE, Transactions of the Linnean Society, VIII, 1807, p. 348.

*Zingiber Zingiber* KARSTEN, Deutsche Flora, 1880, p. 471.

Northern part of the island, *Blain, No. 105*, Millspaugh. General Distribution: Cultivated and often escaping throughout tropical

regions of both hemispheres. In America extending as far north as the Bahamas and Bermudas.

## Family ORCHIDACEÆ.

### KEY TO THE SPECIES ENUMERATED.

Terrestrial plants, growing in soil.

Flowers brick-red, with a spur about as long as the ovary.

222. *Stenorrhynchos squamulosus*.

Flowers with brownish perianth, lip purplish, with no spur.

232. *Tetramicra Eulophiæ*.

Bracts and sepals greenish-yellow, petals and lip lemon-yellow; no spur.

233. *Cyrtopodium Andersonii*.

Climbing plants with rather fleshy fruit.

Bracts large, foliaceous; leaves longer than the internodes; pods 12-18 cm.

long.....221. *Vanilla inodora*.

Bracts small, not foliaceous; leaves not longer than internodes; pods 15-25 cm.

long.....220. *Vanilla planifolia*.

Plants growing on trees, rocks, stones, etc., not in soil.

Without pseudo-bulbs.

Flowers with a short spur, white or pale rose, variegated with purple; lip about 1 cm long; stem erect and quite slender; plants growing on trees.

234. *Ionopsis utricularioides*.

Flowers with no spur.

Leaves about 2-6 cm. long, lingulate-oblong or oblong-elliptic; stems erect, 5-14 cm. long, from a creeping rhizome; flowers green, 6-7 mm.

long.....230. *Epidendrum rigidum*.

Leaves longer, from 6-20 cm. long.

Stems erect, 20-30 cm. long; flowers pale yellow, sepals and petals 12-14 mm. long; leaves oblong or lance-oblong, 6-14 cm. long.

224. *Epidendrum pallidiflorum*.

Flowers greenish-white to cream-colored, 4-5 cm. long; no spur; stem erect, 10-35 cm. high; leaves up to 14-15 cm. long.

229. *Epidendrum nocturnum*.

Flowers light-brown, greenish-brown, or tawny-yellow, 6-8 mm. long; plant 30-90 cm. high; leaves 5-18 cm. long with a sheathing base;

no spur.....228. *Epidendrum anceps*.

With pseudo-bulbs.

Flowers lilac, 2.5-3.5 cm long; lip free from the column; pseudo-bulbs 2.5-5 cm. long, ellipsoidal to globose; the two leaves oblong-ligulate, 6-20 cm.

long.....231. *Broughtonia domingensis*.

Flowers not lilac.

Leaves rather large and comparatively lax, lance-oblong, 20-30 cm. long, 3-5 cm. wide; pseudo-bulbs lance-ovoid to cylindrical; sepals

and petals pale green with one or two purple spots at base, lip purple; column about half connate.....227. *Epidendrum cochleatum*.

Leaves rather stiff and coriaceous.

Column free from the middle; petals and sepals yellow, freely spotted with brown, lip yellow; pseudo-bulbs ovate or suborbicular, 2-3 cm. long, strongly flattened, 5-7 mm. thick; leaves oblong-ligulate, 6-12 cm. long.....223. *Epidendrum Boothianum*.

Column free to the base; pseudo-bulbs not so strongly flattened.

Flowers with yellow sepals and petals (often tinged brownish), lip creamy-yellow, with a crimson spot and purplish lines below; pseudo-bulbs numerous, narrowly ovoid, the one (or two) leaves linear-ligulate, 12-30 cm. long.

225. *Epidendrum obcordatum*.

Flowers purplish-brown, the lip white with numerous radiating purple lines towards the base; pseudo-bulbs numerous, ovoid, somewhat compressed; the two (one-three) leaves narrowly oblong-ligulate, 5-9 cm. long....226. *Epidendrum brevifolium*.

## 220. *Vanilla planifolia* Andrews (?).

*Vanilla planifolia* ANDREWS, Botanist's Repository, VIII, 1808, Pl. 538.

On ridge at Bibijagua, February-March, 1910, *Jared F. Shafer*.  
General Distribution: Southeastern Mexico to Costa Rica. Cultivated to some extent and naturalized in some of the West Indies: Jamaica, Guadeloupe, Martinique, and the Isle of Pines.

## 221. *Vanilla inodora* Scheide.

*Vanilla inodora* SCHEIDE, Linnæa, IV, 1829, p. 474.

*Vanilla anaromatica* GRISEBACH, Flora of the British West Indies, 1864, p. 638.

Reported by Millspaugh (Field Columbian Museum, Botanical Series I, 1900, p. 426), *Blain*, No. 123. General Distribution: Widely distributed in the West Indies, also reported for Mexico, Nicaragua, and Guiana. Possibly this and the preceding are based upon the same species.

## 222. *Stenorrhynchos squamulosus* (Humboldt, Bonpland, & Kunth) Fawcett & Rendle.

*Neottia orchiodides* SIMS, Botanical Magazine, 1807, Pl. 1036, not Swartz.

*Neottia squamulosa* HUMBOLDT, BONPLAND, & KUNTH, Nova genera et species plantarum, I, 1815, p. 332, t. 71.

*Stenorrhynchus orchiodides* L. C. RICHARD, De Orchideis Europeis Adnotationes, 1817, p. 37.

*Stenorrhynchos squamulosus* FAWCETT & RENDLE, Flora of Jamaica, I, 1910, p. 24.

Dry savanna among "sandpaper oaks" (*Curatella americana*), about a mile east of Nueva Gerona, May 13, 1910, *O. E. Jennings*, No. 238. General Distribution: Cuba, Isle of Pines, and Colombia.

The flowers, as noted in the field, were flesh-pink and rather sweet-scented.

223. **Epidendrum Boothianum** Lindley.

*Epidendrum Boothianum* LINDLEY, Botanical Register, XXIV, 1838, no. 7.

*Epidendrum bidentatum* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 262, not Lindley.

Collected in March, 1904, near Columbia, by Dr. Jared F. Shafer, and since grown in his conservatory in Pittsburgh. In fine flower, July 17, 1916, at which time specimens were dried for the herbarium of the Carnegie Museum. General Distribution: Cuba and the Isle of Pines, also southern Florida and the Keys.

An attractive plant with yellow, brown-spotted, widely spreading sepals and petals, and a yellow lip, and succeeding very well in the conservatory.

224. **Epidendrum pallidiflorum** Hooker.

*Epidendrum pallidiflorum* HOOKER, Botanical Magazine, 1830, Pl. 2980.

Northern part of the island, *J. Blain*, Nos. 82, 122; reported by Millspaugh, Field Columbian Museum, Botanical Ser., I, 1900, p. 426. General Distribution: Isle of Pines, Porto Rico, Guadeloupe, Dominica, Martinique, and St. Vincent.

225. **Epidendrum obcordatum** sp. nov. (PLATE XVIII.)

Epiphytic: the pseudo-bulbs aggregated, numerous, narrowly ovoid, nearly or completely terete, at the apex rather strongly attenuate, with one or rarely two leaves, 3.5–5 cm. long, leaf rather thickly coriaceous, linear-ligulate, somewhat obtuse, narrowed at the base, shortly conduplicate, 12–30 cm. long, 12–25 mm. wide, the margin entire, peduncle slender, flexuous, in the upper half often quite abundantly producing short branches, laxly many-flowered, 3.5–6 dm. long, pedicels slender, with the ovary 14–19 mm. long, the bracts triangular, acute, 1–4 mm. long, sepals oblanceolate-oblong, rather obtuse, 9–11 mm. long, 3–4 mm. wide, 7-nerved, petals linear-spatulate, 9–10 mm. long, 2.5–3 mm. wide, somewhat obtuse, 5-nerved, lip 9–11 mm. long, deeply three-lobed, the lateral lobes erect, 6 mm. long, 2 mm. wide, obtuse, the middle lobe rounded, 5 mm. wide, strongly constricted at the base, the lower part of the disk thickly bicostate, the apex distinctly emarginate, the sinuses between the terminal and lateral lobes about 1 mm. wide and somewhat obtuse; column free to the base, about 4 mm. long, furnished along the front

side with membranaceous wings which have a small tooth at the apex and are decurrent downwards to the base.

*Planta epiphytica*: pseudobulbis aggregatis, numerosis, anguste ovoideis, teretiusculis, apice longiuscule attenuatis, monophyllis (vel diphyllis), 3.5–5 cm. longis, folio crassiuscule coriaceo, lineariligulato, apice obtusiusculo, basi satis angustato, breviuscule conduplicato, 12–30 cm. longo, 12–25 mm. lato, margine integerrimo, pedunculo communi satis gracili, flexuoso, superne usque ad medium sæpius satis ramoso ramis breviusculis, laxe multifloro, 3.5–6 dm. longo, pedicellis filiformibus, cum ovario 14–19 mm. longis, bracteis triangularibus, acutis, 1–4 mm. longis, sepalis oblanceolato-oblongis, obtusiusculis, 9–11 mm. longis, 3–4 mm. latis, 7-nervulosis, petalis linearispathulatis, 9–10 mm. longis, 2.5–3 mm. latis, obtusiusculis, 5-nervulosis; labello 9–11 mm. longo, profunde trilobato, lobis later-alibus erectis, 6 mm. longis, 2 mm. latis, obtusis, mediano obcordato, 5 mm. lato, basi valde constricto, disco inferne crasse bicostato, apice distincte emarginato, sinubus inter lobos circa 1 mm. latis obtusiusculisque; columna usque ad basin libera, circa 4 mm. longa, antice alis membranaceis apice paulo unidentatis inferne usque ad basin decurrentibus aucta.

The general color of the fresh flowers was yellowish with a purple tinge: the sepals and petals were yellow, often shading to brownish; the lip was a creamy yellow, usually with more or less of a crimson spot and rather prominently marked, especially towards the base, with purple lines.

The general habitat of the species is the forks of trees. The plant apparently flowers most profusely at a height of about ten or fifteen feet above the ground. The species is not confined, however, to such habitats, but it occurs on palm trunks, posts, etc., where it may receive little or no shade.

*Type*.—Near Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 651 (Herbarium, Carnegie Museum). Other specimens of the same species are in the Carnegie Museum, and were collected as follows: On trees near mouth of Nuevas River, May 16, 1910, *O. E. Jennings*, No. 300; between Bogarona and Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 515.

This species differs from *E. fucatum* Lindley in that the middle lobe of the lip is emarginate, whereas it is entire and often somewhat



acute in *E. fucatum*. The flowers are apparently somewhat smaller than those of *E. fucatum*. *E. tampense* Lindley is also very closely related to *E. obcordatum*, but the flowers of *E. tampense* are much larger than those of the Isle of Pines species.

226. ***Epidendrum brevifolium*** sp. nov. (PLATES X AND XIX.)

Epiphytes. Pseudo-bulbs aggregated, about 20-30 in number, ovoid, somewhat compressed, at the apex 2- (1-3)-leaved, 3-5 cm. long, leaves coriaceous, erect-spreading, narrowly oblong-ligulate, somewhat obtuse, conduplicate at the base, 5-9 cm. long, 1.2-2 cm. wide, peduncle simple or laxly sparsely branched, 3-4 dm. long, above laxly few-flowered, much longer than the leaves, pedicels slender, with the ovary 2-2.5 cm. long, bracts broadly triangular, acute or somewhat obtuse, the lower up to 10 mm. long, sheathing, the upper about 3-4 mm. long, flowers spreading, with spreading segments; sepals narrowly obovate, 2-2.5 cm. long, 6-8 mm. wide, acute to somewhat obtuse, 7-nerved, petals narrowly oblong spatulate, somewhat obtuse, 2-2.5 cm. long, 5-7 mm. wide, the lip short-clawed, 25-30 mm. long, about 20 mm. wide, deeply three-lobed, the lateral lobes 12-15 mm. long, oblong, subfalcate, obtuse, erect, the apex somewhat recurved, the middle lobe shortly clawed, broadly rounded. at the base broadly cuneate, at the apex deeply emarginate, the margin crisped, the disk bicarinate below with fleshy ridges, column triquetrous, 10-12 mm. long, canaliculate along the front side, the apex with membranaceous, incurved, rounded auricles. Flowers purplish brown, the lip white, towards the base with numerous radiating purple lines.

Planta epiphytica: pseudobulbis aggregatis, numerosis, circiter 20-30, ovoideis, paulo compressis, apice 2- (1-3)-phyllis, 3-5 cm. longis; foliis coriaceis, erecto-patentibus, coriaceis, anguste oblongo-ligulatis, obtusiusculis, basi conduplicatis, 5-9 cm. longis, 1.2-2 cm. latis; pedunculo simplici vel laxe pauciramoso, 3-4 dm. longo, superne laxe paucifloro, foliis multo longiore; pedicellis gracilibus, cum ovario 2-2.5 cm. longis; bracteis late triangularibus, acutis vel obtusiusculis, inferioribus usque 10 mm. longis, superioribus circiter 3-4 mm. longis; floribus patulis, segmentis patulis; sepalis anguste obovatis, 2-2.5 cm. longis, 6-8 mm. latis, acutis vel obtusiusculis, 7-nervulosis; petalis anguste oblongo-spathulatis, obtusiusculis, 2-2.5 cm. longis, 5-7 mm. latis; labello brevissime unguiculato, 25-30 mm. longo, circiter 20 mm.

lato, profunde trilobato, lobis lateralibus 12–15 mm. longis, oblongis, subfalcatis, obtusis, erectis, apice leviter recurvis, intermedio breviuscule unguiculato, late rotundato, basi late cuneato, apice profundiuscule emarginato, margine crispo, disco inferne bicarinato, carinis carnosus; columna triquetra, 10–12 mm. longa, antice canaliculata, apice auriculis membranaceis incurvis rotundatis. Flores purpureo-fusci; labello albo, inferne lineis numerosis radiantibus purpureis ornato.

This species differs from *Epidendrum plicatum* Lindley in that the former has a deeply emarginate lip, the sinus being 6–8 mm. deep and cutting the median lobe about one-third across. *E. brevifolium* is most nearly related to *Epidendrum phæniceum* Lindley but differs from the latter particularly in the much shorter leaves, which in *E. phæniceum* are 25–30 cm. long. *E. brevifolium* has also fewer flowers, longer pedicels, the base of the median lobe of the lip not truncate but broadly regularly narrowed, while the color of the lip is *white* marked below with purple lines, not purplish-violet nor crimson as described for *E. phæniceum*. The flowers had no odor.

Abundant on palm trunks in the Los Indios pine-barrens.

*Type*.—Pine-barrens near Los Indios, on palmetto trunk, May 17, 1910, O. E. Jennings, No. 314 (Herbarium, Carnegie Museum). Of the same species is also a specimen collected on an old tree near Los Indios, May 17, 1910, O. E. Jennings, No. 312.

## 227. *Epidendrum cochleatum* Linnæus.

*Epidendrum cochleatum* LINNÆUS, Species Plantarum, II, Ed. II, 1763, p. 1351.

Top of Mt. Colombo, May 12, 1910, G. A. Link (O. E. Jennings, No. 210). General Distribution: From the Bahamas and southern Florida through the Greater Antilles, and from Mexico to Venezuela.

## 228. *Epidendrum anceps* Jacquin.

*Epidendrum anceps* JACQUIN, Selectarium Stirpium Americanarum Historia, 1763, p. 224, t. 138.

*Epidendrum secundum* SWARTZ, Observationes Botanicae Quibus Plantæ Indiæ Occidentalis, etc. 1791, p. 325, excluding synonyms (not Jacquin).

*Epidendrum fuscatum* SMITH, Spicilegium Botanicum, 1791, p. 21, t. 23.

*Epidendrum amphistomum* A. RICHARD, in Sagra, Historia Física, Política y Natural de la Isla de Cuba, XI, 1850, p. 20, Pl. 81.

On trees at top of Caballos Mts., May 13, 1910, O. E. Jennings, No. 228. General Distribution: From Florida through the West

Indies and from Mexico through tropical continental America to Guiana and Brazil.

229. **Epidendrum nocturnum** Jacquin.

*Epidendrum nocturnum* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 29.

On trees along arroyo south of Sante Fé, May 24, 1910., *O. E. Jennings*, No. 558. General Distribution: From the Bahamas and Florida south through the West Indies, and from Mexico south to central South America.

230. **Epidendrum rigidum** Jacquin.

*Epidendrum rigidum* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 29.

On old tree, near Los Indios, May 17, 1910, *O. E. Jennings*, No. 310. General Distribution: From Florida south through the West Indies, and from Mexico through continental America to Brazil and Bolivia.

231. **Broughtonia domingensis** (Lindley) Rolfe.

*Cattleya domingensis* LINDLEY, Genera and Species of Orchidaceous Plants, 1831, p. 118.

*Laliopsis domingensis* LINDLEY, Paxton's Flower Garden, III, 1853, p. 156, t. 105.

*Bletia domingensis* REICHENBACH, FIL., in Walpers, Annales Botanices Systematicæ, VI, 1862, p. 432.

On fence-post between Columbia and Nueva Gerona, May 4, 1910, *D. A. Atkinson and G. A. Link*; on trees at top of Caballos Mts., May 13, 1910, *O. E. Jennings*, No. 230; near Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 650. General Distribution: Bahamas (Cogniaux, in Urban's *Symbolæ Antillanæ*), Cuba, Isle of Pines, Hispaniola, and Jamaica.

232. **Tetramicra Eulophiæ** Reichenbach, fil.

*Tetramicra Eulophiæ* REICHENBACH, FIL., in Walpers, Annales Botanices Systematicæ, VI, 1862, p. 439.

*Bletia Eulophiæ* REICHENBACH, FIL., *l. c.*

Near Nueva Gerona, April 11, 1904, *A. H. Curtiss*, No. 442; on "Mal Pais" gravel (iron-ore) on knoll with *Tabebuia lepidophylla*, near Sante Fé, May 25, 1910, *O. E. Jennings*, No. 552; near Los Indios, May 19, 1910, *O. E. Jennings*, No. 644. General Distribution: Western Cuba and the Isle of Pines.

The following field-notes relating to the color of the flowers will be of interest in view of the paucity of such data in the current descriptions of the plant: sepals and petals pale green, streaked with brownish purple, lip whitish, streaked with crimson, but on under side with brownish blotches.

233. **Cyrtopodium Andersonii** (Lambert) Robert Brown.

*Cymbidium Andersonii* LAMBERT, in Andrews, Botanist's Repository, X, 1811, t. 651.

*Cyrtopodium Andersonii* ROBERT BROWN, in Aiton, Hortus Kewensis, Ed. II, V, 1818, p. 216; GRISEBACH, Flora of the British West Indian Islands, 1865, p. 630.

"Pedernales Point, Isle of Pines, (1426)" (Millspaugh). General Distribution: Cuba, Isle of Pines, St. Vincent, Trinidad, and South America.

234. **Ionopsis utricularioides** (Swartz) Lindley.

*Epidendrum utricularioides* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 122.

*Dendrobium utricularioides* SWARTZ, Nova Acta Regiæ Societatis Scientiarum Upsaliensis, VI, 1799, p. 83.

*Ionopsis tenera* LINDLEY, Botanical Register, XXII, 1836, t. 1904.

*Ionopsis Gardneri* LINDLEY, Annals and Magazine of Natural History, Ser. III, I, 1858, p. 322.

*Epidendrum calcaratum* SESSÉ & MOÇINO, Flora Mexicana, Ed. II, 1894, p. 201.

On palm in swamp at Los Indios, May 19, 1910, *O. E. Jennings*, No. 432; in low pasture near Los Indios, on trees, May 20, 1910, *O. E. Jennings*, No. 446. General Distribution: Florida, the West Indies, and from Mexico to Brazil and Peru.

Flowers white or slightly pink, marked particularly towards the base with lilac-purple lines, the center of the flower often yellow. The yellow center, so conspicuous in the fresh specimens collected in the Isle of Pines, is not mentioned in the various descriptions of this species, so far as known to the writer.

Family PIPERACEÆ.

KEY TO THE SPECIES ENUMERATED.

Leaf-blade glabrous above, puberulent beneath. . . . . 235. *Piper tuberculatum*.

Leaf-blade scabrous above, appressed-villous below. . . . . 236. *Piper angustifolium*.

235. **Piper tuberculatum** Jacquin.

*Piper tuberculatum* JACQUIN, Icones Plantarum Rariorum, II, 1786, p. 2, t. 210.

*Artanthe tuberculata* MIQUEL, Systema Piperacearum, 1844, p. 497; GRISEBACH, Flora of the British West Indian Islands, 1859, p. 171.

Northern part of the island, *Blain*, Nos. 17, 20, 40, 181. (Mills-paugh). General Distribution: Cuba, Isle of Pines, Jamaica, and in continental tropical America.

In view of the close relationship of the species, and the fact that Blain's collections and those of the writer were made in the same locality, the writer is inclined to believe that Blain's specimens belong to the following species:

236. ***Piper angustifolium* var. *Ossanum* DeCandolle.**

*Piper angustifolium* var. *Ossanum* DECANDOLLE, Prodrum Systematis Naturalis Regni Vegetabilis, XVI, (1), 1869, p. 286.

Collected but once, in thicket at side of a pool near the base of Caballos Mts., east of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 168. General Distribution: Cuba, the Isle of Pines, and Mexico.

Although first identified with *Piper elongatum* the specimen is certainly not of that species. The specimen has rather densely villous branches, the leaves are rather densely and more or less appressed-villous below, eventually smoothish but minutely *scabrous* above, there are four stamens, the bracts being villous above, and the ovary is sub-tetragonal, almost three-angled, and at first hirtellous on the top. The leaves reach a length of about 16 cm. and a width of 5 cm., and when mature become sub-lustrous above.

After an examination of specimens in the herbarium, it becomes plainly evident that many of the narrower-leaved specimens from Cuba and Mexico belonging to this species have been erroneously labeled "*Piper aduncum* L."

Family MYRICACEÆ.

237. ***Myrica cerifera* Linnæus. WAX MYRTLE.**

*Myrica cerifera* LINNÆUS, Species Plantarum, 1753, p. 1024.

*Myrica microcarpa* GRISEBACH, Flora of the British West Indian Islands, 1859, p. 177.

*Myrica cerifera* var. *angustifolia* C. DECANDOLLE, Prodrum Systematis Naturalis Regni Vegetabilis, XVI, (2), 1864, p. 149.

*Morella cerifera* SMALL, Flora of the Southeastern U. S., 1903, p. 337.

Shrub about five feet in height, in swamp at western base of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 268. General Distribution: Maryland and Arkansas to Florida and Texas, the Bermudas, Bahamas, Cuba, Hispaniola, Porto Rico, Guadeloupe, and the Isle of Pines.

The writer adopted Urban's treatment of the Antillean wax myrtles. No essential differences are evident between the specimen from the Isle of Pines and a Porto Rican specimen cited by Urban, *Sintenis*, No. 5959! See Urban, *Symbolæ Antillanæ*, IV, 1905, p. 193.

### Family BATIDACEÆ.

#### 238. *Batis maritima* Linnæus.

*Batis maritima* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1380.

*Dondia linearis* MILLSPAUGH, Field Columbian Museum, Botanical Series, II, 1900, p. 35.—See Urban, *Symbolæ Antillanæ*, IV, 1905, p. 227.

Forms almost the entire ground-cover in spots in the mangrove forest along the lower part of the Nuevas River, May 16, 1910, *O. E. Jennings*, No. 294. General Distribution: Along the seashores of the West Indies and eastern tropical North America as far north as Texas, Florida, and the Bahamas, also California and the Hawaiian Islands.

### Family MORACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Leaves large, peltate, palmately lobed, whitish-tomentose beneath.

239. *Cecropia peltata*.

Leaves not peltate, blades entire, not tomentose.

Leaves subcordate to cordate at base.

Leaves 10 cm. or more long; fruit pubescent and 1.5 cm. or more in diameter.

240. *Ficus mitrophora*.

Leaves about 3-6 cm. long; fruit glabrous and hardly 1 cm. in diameter.

241. *Ficus populnea* var. *lentiginosa*.

Leaves obtuse to narrowed at base.

Leaves acuminate at the base, about 4-8 cm. long. . . . . 242. *Ficus nitida*.

Leaves obtuse at base, about 6-12 cm. long. . . . . 243. *Ficus aurea*.

#### 239. *Cecropia peltata* Linnæus.

*Cecropia peltata* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1286.

*Ambaiba peltata* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 623.

In open spot in jungle near Los Indios, May 20, 1910, *O. E. Jennings*, No. 443. A. Richard (Sagra, "Historia Fisica Politica y Natural de la Isla de Cuba," XI, 1850, p. 222) reports this species for the Isle of Pines on the basis of the Lanier Collection, 1831. General throughout the West Indies, and in Venezuela and Guiana.

240. **Ficus mitrophora** Warburg.

*Ficus mitrophora* WARBURG, in Urban, *Symbolæ Antillanæ*, III, 1903, p. 457-458.

Near old marble quarry at east base of Caballos Mts., May 9, 1910, *O. E. Jennings*, No. 191; tree about 7 m. high, along east base of Caballos Mts., May 9, 1910, *O. E. Jennings*, No. 192. General Distribution: Isle of Pines, Cuba (*Britton, Britton, & Shafer*, No. 456), and, according to Warburg, Haiti and San Domingo.

Reported heretofore only from Haiti and Santo Domingo, Warburg, *l. c.*, this species has apparently been confused with *Ficus Combsii* Warburg, as to Cuban specimens. *Ficus mitrophora* differs from *F. Combsii* in having longer and appressed-pilose stipules, and the bracts at the base of the figs larger and minutely pilose, also the petioles not at all or very little pruinose.

241. **Ficus populnea** var. **lentiginosa** subvar. **subcordata** Warburg.

*Ficus populnea* var. *lentiginosa* subvar. *subcordata* WARBURG, in Urban, *Symbolæ Antillanæ*, III, 1903, pp. 476-477.

In pasture near base of Casas Mts. Appearances indicated that this was one of the "strangling figs" which had formerly clasped a tree, since dead and almost entirely decayed. May 12, 1910, *O. E. Jennings*, No. 278.

This specimen probably represents still another and probably undescribed form of the polymorphous *Ficus populnea*. Among the many varieties and subvarieties described by Warburg, *op. cit.*, pp. 471-479, the specimen from the Isle of Pines can be best referred to subvariety *subcordata*, as indicated, but there is considerable difference between this specimen and the No. 6090, *Sintenis*, from Porto Rico, which Warburg cites as of this subvariety. The Isle of Pines specimen has much smaller leaves, the largest being only about 6.5 cm. long by 3.5 cm. wide, the petioles are shorter, and the base is more decidedly cordate.

242. **Ficus nitida** Thunberg.

*Ficus nitida* THUNBERG, *Dissertat. Ficus*, 1786, p. 10.

*Ficus pertusa* WILLDENOW, *Species Plantarum*, IV, 2, 1806, p. 1144.

Large spreading tree, probably planted, about one-half mile north of Sante Fé, May 25, 1910, *O. E. Jennings*, No. 566. (See Plate XI.) General Distribution: Southeastern Asia but quite commonly cultivated as a shade tree in Cuba and the Isle of Pines, in the latter place

bearing the name of "Spanish Laurel." There is a fine row of these trees to be seen along the side of the plaza in the old town of Sante Fé.

243. **Ficus aurea** Nuttall.

*Ficus aurea* NUTTALL, Sylva, II, 1854, p. 4.

Growing as a parasite on a deciduous tree, probably *Bombax emarginata*, near the old marble quarry, at the eastern base of the Caballos Mts., May 9, 1910, O. E. Jennings, No. 152. (Plate XII.) Near Nueva Gerona, May 10, 1910, O. E. Jennings, No. 655. General Distribution: Florida, Bahamas, Cuba, Isle of Pines, Grand Cayman, Haiti, and Jamaica (Fawcett and Rendle, Flora of Jamaica, III, 1914, p. 49).

*Note.*—The Bread-fruit, *Artocarpus incisa* Forster, has been collected in the Isle of Pines (Jared F. Shafer, March, 1910), but is probably not naturalized there.

Family POLYGONACEÆ.

KEY TO THE SPECIES IN THE ISLE OF PINES.

A smooth herb, 0.5–1.5 m. high, with slender-pointed lanceolate leaves.

244. *Polygonum glabrum*.

A climber, shrubby below, the peduncle ending in a branched tendril.

245. *Antigonum leptopus*.

Shrubs or trees.

Leaves large, roundish to reniform.....246. *Coccolobis uvifera*.

Leaves oval to elliptic or somewhat oval-orbicular.

Leaf-apex obtuse to retuse, the base narrowed to the petiole; fruiting pedicels not over 1.5 mm. long.....247. *Coccolobis retusa*.

Leaf-apex acute to obtuse, the base usually obtuse; fruiting pedicels 2.5–4 mm. long.....248. *Coccolobis laurifolia*.

244. **Polygonum glabrum** Willdenow.

*Polygonum glabrum* WILLDENOW, Species Plantarum, II, 1799, p. 447.

*Polygonum truncatum* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, XI, 1850, p. 182.

*Polygonum portoricense* BERTERO, MS., ex Endlicher, Genera Plantarum, Supplement IV, part 2, 1847, p. 47.

*Polygonum densiflorum* var. *imberbe* MEISSNER, DeCandolle, Prodrromus Systematis Naturalis Regni Vegetabilis XIV, I, 1856, p. 121.

Northern part of the island, *Blain*, No. 109. Reported by Millspaugh (Field Columbian Museum, Publication 48, Botanical Series, I, 1900, p. 427). General Distribution: From Missouri to the Gulf States, and in the tropics generally.



245. *Antigonum leptopus* Hooker & Arnott.

*Antigonum leptopus* HOOKER & ARNOTT, Capt. Beechey's Voyage, Botanical Appendix, 1840, p. 308, Pl. 69.

Near Nueva Gerona, March and April, 1904, *A. H. Curtiss*, No. 411; near Nueva Gerona, June 3, 1912, *G. A. Link*. General Distribution: Native to Mexico, but commonly escaping from cultivation in the Bahamas and West Indies.

246. *Coccolobis uvifera* (Linnæus) Jacquin. SEA GRAPE.

*Polygonum uvifera* LINNÆUS, Species Plantarum, I, Ed. 1, 1753, p. 365.

*Coccoloba leoganensis* JACQUIN, Enumeratio Plantarum, 1760, p. 19.

*Uvifera leoganensis* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 623.

Low bushy tree at border of strand at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 87; no locality given, February–March, 1910, *Jared F. Shafer*; near Nueva Gerona, May, 1912, *G. A. Link*. General Distribution: Southern Florida, the Bahamas, Bermuda, and south through Central and South America, always within reach of salt water.

247. *Coccolobis retusa* Grisebach.

*Coccoloba retusa* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 61.

*Coccoloba leoganensis* var. *parvifolia* GRISEBACH, l. c.

*Uvifera retusa* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 562.

Northern part of the island, *Blain*, No. 185, reported by Millspaugh, *Plantæ Insulæ Ananasensis*, Field Columbian Museum, Botanical Series I, No. 6, 1900, p. 427. General Distribution: Western Cuba, Santo Domingo (?), and the Isle of Pines.

248. *Coccolobis laurifolia* Jacquin.

*Coccoloba laurifolia* JACQUIN, Plantarum Rariorum Horti Cæsarei Schœnbrunensis Descriptiones, etc. III, 1798, p. 9, t. 267.

*Coccoloba floridana* MEISSNER in DeCandolle, Prodrômus Systematis Naturalis Regni Vegetabilis, XVI, 1857, p. 165.

*Uvifera laurifolia* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 561.

South of Sante Fé, May 25, 1910, *O. E. Jennings*, No. 656. General Distribution: Florida, Bahamas, most of the West Indian islands, Venezuela.

The writer has not seen the Blain specimen reported by Millspaugh as *C. retusa*, but there is a strong possibility that the specimen here referred to (*Jennings*, No. 656) is the same species. Specimens such as the Porto Rican *Sintenis*, No. 3945, referred by Lindau (*Symbolæ*

Antillanæ, I, 1899, p. 227) to *C. laurifolia*, represent a form having a large leaf with an obtuse base and a strong wide petiole, very much in contrast to the specimens from the Isle of Pines. The latter specimens have leaves up to about 7 cm. long and 2.5 cm. wide, acute or even acuminate at the base, while the petiole is comparatively slender. Florida plants referable to Lindau's *C. Curtissii* are, in fact, very closely related to the specimens from the Isle of Pines, as to leaf characters.

### Family AMARANTACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Leaves alternate.

A climbing shrub with herbaceous branches, and spikes of flowers arranged in slender panicles; axils not spinose. . . . . 249. *Chamissoa altissima*.

Non-climbing, and with flowers spicate, mostly terminal; axils bispinose.

250. *Amaranthus spinosus*.

Leaves opposite.

Leaves obovate-roundish; flowers in very long slender spikes.

251. *Centrostachys indica*.

Leaves narrower; flowers not in particularly slender spikes.

Plant glabrous.

Leaves narrowly oblong-lanceolate, not fleshy. . . . . 255. *Iresine keyensis*.

Leaves sessile, linear, fleshy; sea-shore plant.

254. *Philoxerus vermicularis*.

Plants more or less pubescent, at least in the inflorescence.

Leaves long-stalked, oblanceolate to elliptical.

253. *Alternanthera paronichioides*.

Leaves woolly, oblong-elliptical, narrowed to a semi-clasping base.

252. *Gomphrena dispersa*.

249. ***Chamissoa altissima*** (Jacquin) Humboldt, Bonpland, & Kunth.

*Achyranthes altissima* JACQUIN, Enumeratio Plantarum, 1760, p. 17.

*Celosia paniculata* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 298 (non Linnæus, 1753).

*Kokera paniculata* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 542.

*Chamissoa altissima* HUMBOLDT, BONPLAND, & KUNTZ, Nova Genera et Species Plantarum, II, 1817, p. 197, t. 125.

Near Nueva Gerona, January 4, 1904, *A. H. Curtiss*, No. 269; Pedernales Point, February 16, 1899, *C. F. Millsbaugh*, No. 1420 (Field Columb. Mus., Bot. II, 1900, pp. 39-40). General Distribution: West Indies, generally, and continental tropical America.

250. ***Amaranthus spinosus*** Linnæus.

*Amaranthus spinosus* LINNÆUS, Species Plantarum, 1753, p. 991.

"An old garden spot at Pedernales Point, Isle of Pines, (1425)

spines few and poorly developed" (Millsbaugh). General Distribution: From Massachusetts to Kansas and south through the Bermudas, Bahamas, West Indies, and continental America. Also in warmer parts of the Old World. Often a troublesome weed.

251. **Centrostachys indica** (Linnæus) Standley.

*Achyranthes aspera* var. *indica* LINNÆUS, Species Plantarum, I, Ed. 1, 1753, p. 204.

*Achyranthes indica* MILLER, Gardener's Dictionary, Ed. 8, 1768, No. 2.

*Achyranthes obtusifolia* LAMARCK, Encyclopédie Méthodique, Botanique, I, 1783, p. 545.

*Achyranthes aspera* MOQUIN, in DeCandolle, Prodrômus Systematis Naturalis Regni Vegetabilis, XIII, (III), 1849, p. 314.

*Achyranthes aspera* var. *obtusifolia* GRISEBACH, Flora of the British West Indian Islands, 1864, p. 62.

*Centrostachys indica* STANDLEY, Journal of the Washington Academy of Sciences, V, 1915, p. 75.

Near Nueva Gerona, March 22, 1904, *A. H. Curtiss*, No. 424; near magnesian spring, Sante Fé, May 26, 1910, *O. E. Jennings*, No. 576. General Distribution: Southern Florida and generally, through the tropics as a weed.

252. **Gomphrena dispersa** Standley.

*Gomphrena decumbens* MOQUIN-TANDON, in DeCandolle, Prodrômus Systematis Naturalis Regni Vegetabilis, XIII (2), 1849, p. 410. Not Jacquin.

*Gomphrena dispersa* STANDLEY, Contributions, U. S. National Herbarium, XVIII, 1916, p. 91.

Near Nueva Gerona, March 13, 1904, *A. H. Curtiss*, No. 410; *A. A. Taylor*, No. 88, in 1901, *Palmer & Riley*, No. 1117, in 1900, on sandy beach at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 75; near Nueva Gerona, May, 1912, *G. A. Link*. General Distribution: A common weed of the Greater Antilles, Florida, and from Mexico to Costa Rica.

253. **Alternanthera paronychioides** A. St. Hilaire.

*Alternanthera polygonoides* R. BROWN, Prodrômus Floræ Novæ-Hollandiæ et Insulæ Van Diemen, I, 1810, p. 417.

*Alternanthera paronychioides* A. ST. HILAIRE, Voyage au Brésil, II, 1833, p. 439.

*Alternanthera ficoides* GRISEBACH, Flora of the British West Indian Islands, 1859, p. 67.

Near Nueva Gerona, March 17, 1904, *A. H. Curtiss*, No. 418. General Distribution: North Carolina to Texas, Florida, Bahamas, West Indies, and tropical continental America.

254. *Philoxerus vermicularis* (Linnæus) Beauvois.

*Gomphrena vermicularis* LINNÆUS, Species Plantarum, I, ed. 1, 1753, p. 224.

*Illecebrum vermiculatum* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 300.

*Iresine vermicularis* MOQUIN, in DeCandolle, Prodrômus Systematis Naturalis Regni Vegetabilis, XIII, (II), 1849, p. 340.

*Lithophila vermiculare* ULINE, Field Columbian Museum, Botanical Series, II, 1900, p. 39.

Sandy beach at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 76; northern part of the island, *Blain*, No. 76 (Millspaugh, Field Columb. Mus., Bot. I, 1900, p. 427). General Distribution: Along sea-shores, Florida to Texas, Bahamas, West Indies, and in tropical continental America, Western Africa.

255. *Iresine keyensis* Millspaugh.

*Iresine keyensis* MILLSPAUGH, Field Columbian Museum, Botanical Series, II, 1906, pp. 148-149.

On strand at Caleta Grande, South Coast, May 22, 1910, *O. E. Jennings*, No. 496. General Distribution: Bahama Islands and the Isle of Pines.

## Family NYCTAGINACEÆ.

Herbs with widely branched panicles; petioles mostly at least half as long as leaf-blade. . . . . 256. *Bærhaavia paniculata*.

Trees, with compact cymes; petioles quite short. . . . . 257. *Pisonia rotundata*.

256. *Bærhaavia paniculata* L. C. Richard.

*Bærhaavia paniculata* L. C. RICHARD, Actes de la Société d'Histoire Naturelle de Paris, I, 1792, p. 105.

*Bærhaavia diffusa* SWARTZ, Observationes Botanicae Quibus Plantæ Indiæ Occidentalis, etc. 1791, p. 10. Not Linnæus.

"In old garden spot at Pedernales Point, Isle of Pines (1134)" Millspaugh; near Nueva Gerona, February 19, 1904, *A. H. Curtiss*, No. 359. General Distribution: Tropical continental America and the West Indies. Probably a number of reported localities in this range belong to other species.

257. *Pisonia rotundata* Grisebach.

*Pisonia rotundata* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 283.

Near Nueva Gerona, April 28, 1904, *A. H. Curtiss*, No. 470; northern part of the island, *Blain*, No. 8. (Millspaugh). General Distribution: Western Cuba and the Isle of Pines.

Family PHYTOLACCACEÆ.

KEY TO THE SPECIES HEREIN ENUMERATED.

Petioles usually pubescent, leaves usually not more than 10 cm. long, mostly much shorter; perianth parts 4.....258. *Rivina humilis*.

Petioles glabrous, leaves up to 15 cm. long; perianth parts 5.

259. *Phytolacca icosandra*.

258. *Rivina humilis* Linnæus. BLOODBERRY.

*Rivina humilis* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 121.

*Rivina lævis* LINNÆUS, Mantissa Plantarum, I, 1767, p. 41.

*Rivina puberula* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, II, 1817, p. 184.

*Rivina viridiflora* BELLO, Anales de la Sociedad Española de Historia Natural XII, 1883, p. 105.

In thicket at west base of Casas Mts., May 5, 1910, *O. E. Jennings*, No. 637. General Distribution: From Florida and the Bahamas southwards through the American tropics and subtropics.

259. *Phytolacca icosandra* Linnæus. POKE WEED.

*Phytolacca icosandra* LINNÆUS, Species Plantarum, I, 1753, p. 631, and Systema Naturæ, II, Ed. X, 1759, p. 1040.

*Phytolacca mexicana* GAERTNER, De Fructibus et Seminibus Plantarum, I, 1788, p. 337, t. 77, f. 8.

*Phytolacca nova-hispania* MILLSAUGH, Field Columbian Museum, Botanical Series, II, 1900, p. 41.

On soil derived from coral rock, near Caleta Grande, May 22, 1910, *O. E. Jennings*, Nos. 423 and 483; edges of an old cultivated field at Pedernales Point, February 16, 1899, *C. F. Millsaugh*, No. 1413, Cf. l. c. General Distribution: Cuba, Isle of Pines, Haiti, Jamaica, St. Thomas, and from Mexico to northern South America. Often a weed.

Dr. N. L. Britton writes that he regards this species as the same as *Phytolacca decandra*, the only difference being that of the number of stamens.

Family AIZOACEÆ.

260. *Sesuvium portulacastrum* Linnæus.

*Portulaca portulacastrum* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 446.

*Sesuvium portulacastrum* LINNÆUS, Systema Naturæ, Ed. X, II, 1759, p. 1058.

*Trianthema polyandrum* BLUME, Bijdragen tot de Flora van Nederlandsch Indië, 1826, p. 1137.

*Halimus portulacastrum* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 263.

On the beach at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 109. General Distribution: Along sea-shores from North Carolina southwards and generally throughout the tropics.

## Family CARYOPHYLLACEÆ.

## KEY TO SPECIES HEREIN ENUMERATED.

- Stem and branches slender, weak; leaves orbicular. . . . . 261. *Drymaria cordata*.  
 Stem and main branches shorter, usually about 10 cm. long, more rigid; leaves  
 narrowly oblanceolate or lance-linear. . . . . 262. *Drymaria ortegioides*.

261. *Drymaria cordata* (Linnæus) Willdenow.

## WEST INDIAN CHICKWEED.

*Holosteum cordatum* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 88.

*Drymaria cordata* WILLDENOW, ex Roemer & Schultes, Systema Vegetabilium, V, 1819, p. 406.

*Drymaria ramosissima* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 50.

Near Nueva Gerona, January 12, 1904, *A. H. Curtiss*, No. 288.  
 General Distribution: West Indies and throughout the tropics generally.

262. *Drymaria ortegioides* Grisebach.

*Drymaria ortegioides* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 21.

Near Nueva Gerona, February 19 and March 11, 1904, *A. H. Curtiss*, No. 397; near Nueva Gerona, February 19, and March 11, 1904, *O. E. Jennings*, No. 397; in open fields at Los Indios, May 19, 1904, *O. E. Jennings*, No. 427. General Distribution: Western Cuba and the Isle of Pines.

## Family NYMPHÆACEÆ.

## KEY TO THE SPECIES ENUMERATED.

- Flowers white. . . . . 263. *Castalia ampla*.  
 Flowers yellow. . . . . 264. *Nymphæa advena*.

263. *Castalia ampla* Salisbury. WATER LILY.

*Castalia ampla* SALISBURY, Paradisus Londinensis, I, 1805, t. 14, 73.

*Nymphæa ampla* DECANDOLLE, Regni Vegetabilis Systema Naturæ, II, 1821, p. 54.

*Leuconymphæa ampla* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 11.

In pond southwest of Nueva Gerona, May 7, 1910, *O. E. Jennings*, No. 96; near Nueva Gerona, December 12, 1903, *A. H. Curtiss*, No. 223.  
 General Distribution: From Cuba and Texas south through the West Indies and continental tropical America.

264. *Nymphæa advena* var. *erythræa* Miller & Standley.

*Nymphæa advena* var. *erythræa* MILLER & STANDLEY, Contributions U. S. National Herbarium, XVI, Part III, 1912, p. 91.

In pools in jungle along Los Indios River, at Los Indios, May 20,

1910, *O. E. Jennings*, No. 449. General Distribution: Heretofore known only from the Miami River in southern Florida.

The specimens show the straight-sided,  $\Delta$ -shaped sinus, at the base of the leaf, and the bright red stigmatic surface which characterize the variety and distinguish it, also, from the common *Nymphaea americana* (Provancher) Miller & Standley of the eastern United States.

#### Family MENISPERMACEÆ.

##### 265. *Cissampelos tomentosa* DeCandolle.

*Cissampelos tomentosa* DECANDOLLE, Regni Vegetabilis Systema Naturæ, I, 1818, p. 535.

Near Nueva Gerona, January 2, 1904, *A. H. Curtiss*, No. 283; clambering over bushes, near Sante Fé, May 25, 1910, *O. E. Jennings*, No. 567.

This is the more tomentose plant which, by many botanists, is regarded as merely a form of *Cissampelos Pareira* Linnæus, distributed widely through the West Indies and the tropics generally. *Blain's* No. 52, from the northern part of the Isle of Pines, is reported by Millspaugh (Field Columb. Museum, Bot., I, 1900, p. 427) as *C. Pareira*.

#### Family ANNONACEÆ.

##### KEY TO THE SPECIES ENUMERATED.

Leaves leathery, lanceolate-acuminate; carpels free in fruit.

266. *Xylopia grandiflora*.

Leaves not markedly leathery, wider or not much acuminate; carpels united into one fruit.

Leaves oblong-elliptic, very shortly acuminate, up to 10-18 cm. long.

267. *Annona palustris*.

Leaves oblong-lanceolate to narrowly elliptic, obtuse, on flowering branches about 5-8 cm. long.....268. *Annona squamosa*.

##### 266. *Xylopia grandiflora* St. Hilaire. BITTERWOOD.

*Xylopia grandiflora* ST. HILAIRE, Flora Brasiliæ Meridionalis, I, 1825, p. 40, Pl. 8.

*Xylopia cubensis* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, p. 16, t. 36.

Near Nueva Gerona, December 31, 1903, *A. H. Curtiss*, No. 261; in swampy place along river south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 204; small tree with yellowish-white flowers, along arroyo near Sante Fé, May 24, 1910, *O. E. Jennings*, No. 554; moist woods south of Sante Fé, May 25, 1910, *O. E. Jennings*, No.

622; also 1831, *A. H. Lanier*. (A. Richard, in Sagra, *l. c.*) General Distribution: Cuba, Isle of Pines, Trinidad, Panama, and tropical South America.

The fruits of this fine looking tree are gathered in an unripe condition and used as a condiment for seasoning foods, particularly meats. Further south the fruits are said to be used medicinally as tonics for the digestive organs.

267. ***Annona palustris* Linnæus.** ALLIGATOR APPLE.

*Annona palustris* LINNÆUS, Species Plantarum, II, Ed. I, 1762, p. 757.

Near Nueva Gerona, May 15, 1904, *A. H. Curtiss*, No. 502; small tree in fresh water jungle at Los Indios, May 20, 1910, *O. E. Jennings*, No. 437. Flowers yellowish, with purple at base inside.

268. ***Annona squamosa* Linnæus.** SWEET SOP.

*Annona squamosa* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 537.

Tree about 15 feet high, with spreading crown, at east base of Caballos Mts., May 9, 1910, *O. E. Jennings*, No. 189; near Nueva Gerona, June 10, 1912, *G. A. Link*. (Fruits nearly mature.)

The fruit of this species is by some people esteemed as highly as is the Cherimoya (*Annona cherimola* Miller). It is said to be of best quality when grown on uplands.

The leaves in our specimens are acute at the base and the immature fruits are highly glaucous.

Family LAURACEÆ.

KEY TO THE SPECIES ENUMERATED.

- Perianth-segments persistent in fruit; leaves not very lustrous above nor prominently coarsely reticulated on both sides.....269. *Phæbe elongata*.  
Perianth-segments not persistent in fruit; leaves plainly lustrous above and prominently coarsely reticulate on both sides.....270. *Nectandra coriacea*.

269. ***Phæbe elongata* (Vahl) Nees.** LAUREL.

*Laurus elongata* VAHL, in Herbarium Willdenow, no. 7780, fig. 2, according to Nees.

*Phæbe elongata* NEES, Systema Laurinearum, 1836, p. 116.

*Phæbe antillana* var. *genuina* MEISSNER, in DeCandolle, Prodromus Systematis Naturalis Regni Vegetabilis, XV, Part I, 1864, p. 31.

Near Nueva Gerona, January 22, 1904, *A. H. Curtiss*, No. 309; at marble quarry, east base of Caballos Mts., May 9, 1910, *O. E. Jennings*, No. 672. General Distribution: Quite widely distributed through the West Indies.



270. *Nectandra coriacea* (Swartz) Grisebach. LAUREL.

*Laurus coriacea* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 65.

*Nectandra Willdenowiana* NEES, Systema Laurinearum, 1836, p. 321 (non 290).

*Nectandra sanguinea* GRISEBACH, Flora of the British West Indian Islands, 1860, p. 281.

Near Nueva Gerona, June 4, 1904, *A. H. Curtiss*, No. 526; near Los Indios, along the river, May 18, 1910, *O. E. Jennings*, No. 653. General Distribution: Southern Florida, the Bahamas, throughout the West Indies, and in Yucatan. In Jamaica (Fawcett & Rendle, *Flora of Jamaica*, III, 1914, p. 217) this species is variously called sweetwood, cap-berry sweetwood, small-leaved sweetwood. Mez (Urban's "Symbolæ Antillanæ," IV, 1905, p. 249) gives, as common names, avispollo and laurel.

Millsbaugh in his "Plantæ Insulæ Ananasensis" (Field Columb. Mus., Bot., I, 1900, p. 427) reports for the island: *Nectandra patens* (Swartz) Grisebach, and *Nectandra exaltata* Grisebach. These reports are founded upon *Blain*, No. 90 (Sante Fé, June) and *Blain*, No. 116.

Authors writing subsequently have not credited *Nectandra patens* to localities other than Jamaica, Porto Rico, Haiti, and Martinique (see Fawcett & Rendle, and Mez, in the works cited above).

## Family PAPAVERACEÆ.

271. *Argemone mexicana* var. *ochroleuca* (Sweet) Lindley.

## PRICKLY POPPY. MEXICAN THISTLE.

*Argemone ochroleuca* SWEET, British Flower Garden, III, 1828, Pl. 242.

*Argemone mexicana* var. *ochroleuca* LINDLEY, Botanical Register, 1830, p. 1343.

*Argemone mexicana* var. . . . . TORREY & GRAY, Flora of North America, I, 1838, p. 61.

Weed in field on Keenan's estate south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 190; near Nueva Gerona, June 12, 1912, *G. A. Link*. General Distribution: From the United States south, through the West Indies and Mexico, to the southern part of South America, also escaped in Australia and in Europe.

## Family CAPPARIDACEÆ.

## KEY TO THE SPECIES HEREIN ENUMERATED.

Leaves digitately compound with 5-7 leaflets. . . . . 272. *Cleome spinosa*.  
Leaves simple.

Herbaceous plant, woody at base; leaves linear-lanceolate.

273. *Cleome procumbens*.

Shrub or tree, 3-15 m. high; leaves elliptic or oblong-elliptic.

274. *Capparis jamaicensis*.

### 272. *Cleome spinosa* Jacquin.

*Cleome spinosa* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 26.

*Cleome pungens* WILLDENOW, Enumeratio Plantarum Horti Botanici Berolinensis, II, 1809, p. 689.

Outskirts of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 642. General Distribution: Widely distributed in the West Indies and tropical and subtropical continental America.

### 273. *Cleome procumbens* Jacquin.

*Cleome procumbens* JACQUIN, Selectarium Stirpium Americanarum Historia, 1788, p. 189, Pl. 120.

Northern part of the island, *Blain*, No. 49. Reported by Millspaugh in "Plantæ Insulæ Ananasensis" (Field Columb. Mus., Bot., I, 1900, p. 427). General Distribution: Cuba, Isle of Pines, and Haiti.

### 274. *Capparis jamaicensis* Jacquin.

*Capparis jamaicensis* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 23.

*Capparis Breynia* SWARTZ, Observationes Botanicae, 1791, p. 210 (non Jacquin).

*Capparis nitida* SESSÉ & MOÇINO, Flora Mexicana, Ed. II, 1894, p. 129 (not Ruiz & Pavon).

Tree about 7 m. high, in mangrove swamp along east bank of lower Nuevas River, May 16, 1910, *O. E. Jennings*, No. 291. General Distribution: From southern Florida and the Bahamas south through the West Indies. Called in Jamaica "Black Willow" or "Zebra Wood," and in Porto Rico said to go by the name of "Burro" or "Palo de burro prieto."

The flowers of the specimens collected had four purple petals. The filaments were purple and the stamens yellow.

### Family CRUCIFERÆ.

### 275. *Cakile lanceolata* (Willdenow) O. E. Schultz.

*Raphanus lanceolatus* WILLDENOW, Species Plantarum, III, 1801, p. 562.

*Cakile domingensis* TUSSAC, Flora Antillarum, I, 1808, p. 119.

*Cakile æqualis* L'HÉRITIER, in DeCandolle, Regni Vegetabilis Systema Naturale, II, 1821, p. 430.

*Cakile cubensis* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, V, 1821, p. 75.

*Cakile lanceolata* subsp. *domingensis* O. E. SCHULTZ, in Urban, Symbolæ Antillanæ, III, 1903, pp. 505-506.

On coral sand along strand at Caleta Grande, South Coast, May 22, 1910, *O. E. Jennings*, No. 504. General Distribution: Bermuda, the Bahamas, most of the West Indian islands, and Colombia.

### Family DROSERACEÆ.

#### 276. *Drosera capillaris* Poiret.

*Drosera capillaris* POIRET, Encyclopédie Méthodique Dictionnaire de Botanique, VI, 1804, p. 299.

*Drosera brevifolia* var. *major* HOOKER, Journal of Botany, I, 1834, p. 194.

Along moist bank of arroyo east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 372. General Distribution: Around ponds and similar habitats from South Carolina to Florida and Texas; Cuba; Isle of Pines; British Honduras; Trinidad; and British Guiana.

### Family ROSACEÆ.

#### KEY TO THE SPECIES HEREIN ENUMERATED.

- Leaves oval to obovate or orbicular, smooth; drupe obovoid with a sharply angled stone.....277. *Chrysobalanus pellocarpus*.  
 Leaves ovate-oblong, abruptly acuminate, pubescent, especially beneath; fruit oblong, without a sharply ridged stone.....278. *Hirtella mollicoma*.

#### 277. *Chrysobalanus pellocarpus* Meyer. COCO-PLUM.

*Chrysobalanus pellocarpus* MEYER, Primitiæ Floræ Essequiboensis, 1818, p. 193.

*Chrysobalanus icaco* var. *pellocarpa* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, II, 1825, p. 525.

*Chrysobalanus icaco* var. *minor* A. RICHARD, in Sagra, Historia Física, Política y Natural de la Isla de Cuba, X, 1845, p. 237.

Near Nueva Gerona, January 9 (fruit), February 27 (flowers), 1904, *A. H. Curtiss*, No. 280; along bank of arroyo near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 9. A shrub about ten feet high and bearing an abundance of fruit, which is sweet, and is prepared with sugar as a conserve in some of the West Indian islands. General Distribution: Low ground from southern Florida through the West Indies to northern South America.

This is probably the same as the specimen collected by A. H. Lanier in 1831 and described by A. Richard, in Sagra, "Historia Física, Política y Natural de la Isla de Cuba," X, 1845, p. 237, as

*Chrysobalanus icaco* var. *minor*. The variety was said to be known in the Isle of Pines as "*Ycaco negro*" and it was described by Richard as having smaller leaves and flowers, with the flowers in fewer numbers, so that the plants would answer very well to the description of Meyer's *Chrysobalanus pellocarpus*.

278. ***Hirtella mollicoma*** Humboldt, Bonpland, & Kunth.

*Hirtella mollicoma* HUMBOLDT, BONPLAND, & KUNTH, *Nova Genera et Species Plantarum*, VII, 1825, p. 263.

Near Nueva Gerona, December 30, 1903, *A. H. Curtiss*, No. 260 (distributed as *Hirtella glandulosa* Sprengel); along bank of Casas River, near Keenan's estate, south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 208; northern part of the island, *Blain*, No. 25. Reported by Millspaugh (*Field Columbian Mus., Bot.*, I, 1900, p. 427). General Distribution: Isle of Pines, Colombia.

*Note*.—A. Richard, in Sagra, *Historia Fisica, Politica y Natural de la Isla de Cuba*, X, 1845, p. 238, reports for the Isle of Pines, *Hirtella nitida* Willdenow, based on the collection of A. H. Lanier in 1831. However, Richard's description of Lanier's specimen fits the specimens collected by Curtiss and Jennings so closely that there can be little doubt that the three collections are the same species, *Hirtella mollicoma* Humboldt, Bonpland & Kunth.

Family MIMOSACEÆ.

KEY TO THE SPECIES ENUMERATED.

Low rather woody herbs; leaves with one to five pairs of pinnæ; sensitive plants.

Pinnæ in one or two pairs.....285. *Mimosa pudica*.

Pinnæ in three to five pairs.....286. *Neptunia plena*.

Shrubs or trees, often armed with thorns.

Valves of the flat and thin pod separating from the continuous margin; stipules about as large as the leaflets (*Lysiloma*).

Stipules obovate, obtuse; leaflets about 10-15 mm. long and two-thirds as wide.....283. *Lysiloma Sabicu*.

Stipules ovate, acuminate; leaflets about 6-10 mm. long and 2.5-3 mm. wide.....284. *Lysiloma bahamensis*.

Valves of the pod not separating from the margin; stipules inconspicuous (*Pithecolobium*).

Leaflets 3-6 cm. long.

Pinnæ 3-6 pairs, leaflets finely and softly pubescent beneath; pods 2 dm. or more long, only moderately curved...280. *Pithecolobium saman*.

Pinnæ mostly 2 pairs, leaflets sparsely pubescent with minute, straight,

closely appressed hairs; pods smaller and strongly curved or coiled.

282. *Pithecolobium obovale*.

Leaflets hardly exceeding 1 cm. in length.

Armed with stipular thorns; leaflets widely and obtusely obovate.

281. *Pithecolobium tortum*.

Unarmed; leaflets ovate-oblong. . . . . 279. *Pithecolobium arboreum*.

**279. *Pithecolobium arboreum* (Linnaeus) Urban. WILD TAMARIND.**

*Mimosa arborea* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 519.

*Acacia arborea* WILLDENOW, Species Plantarum, IV, (2), 1806, p. 1064.

*Pithecolobium filicifolium* GRISEBACH, Flora of the British West Indian Islands, 1860, p. 226-227.

*Acacia Berteriana* BELLO, Anales de la Sociedad Española de Historia Natural, 1881, p. 264.

*Pithecolobium arboreum* URBAN, Symbolæ Antillanæ, II, 1900, pp. 259-260.

Near Nueva Gerona, February 15 and April 17, 1904, *A. H. Curtiss*, No. 348; in dry gravelly land east of Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 11; on thin soil overlying coral-limestone, about three miles north of Caleta Grande, May 22, 1910, *O. E. Jennings*, No. 519; along bank of arroyo, Sante Fé, May 24, 1910, *O. E. Jennings*, No. 559. General Distribution: Cuba, Isle of Pines, Jamaica, Porto Rico, Haiti, Mexico, and Central America.

Together with *Thrinax Wendlandiana* and *Bucida Buceras*, this species forms, in large part, the sparse and low forest growth (chaparral) near Hato, in the interior part of the peninsula which runs out from the island to the southwest and is comprised in the term "south coast." In this particular locality the original forest had probably been removed and the chaparral can perhaps be regarded as an intermediate stage in the plant successions which would eventually result in the establishment of a denser forest of taller hardwood species.

The specimens from the Isle of Pines, almost without exception, have fewer pinnae (usually four pairs) and fewer leaflets to a pinna (usually less than twenty pairs) than are stated for the species in the older descriptions.

**280. *Pithecolobium Saman* (Jacquin) Benth. SAMAN.**

*Inga Saman* WILLDENOW, Species Plantarum, IV (2), 1806, p. 1024.

*Pithecolobium Saman* BENTHAM, London Journal of Botany, III, 1844, p. 216.

*Mimosa Saman* JACQUIN, Fragmenta Botanica, 1809, p. 15, Pl. 9.

*Calliandra Saman* GRISEBACH, Flora of the British West Indian Islands, 1860, p. 225.

Near Nueva Gerona, April 19 and May 30, 1904, *A. H. Curtiss*, No. 450. General Distribution: Native to America, from Nicaragua

to Brazil, and introduced into most of the West Indian islands, where it has sparingly escaped from cultivation. The tree is of considerable value as a shade tree and also for the pods, which furnish good food for cattle.

281. *Pithecolobium tortum* Martius.

*Pithecolobium tortum* MARTIUS, Herbarium, Flora Brasiliensis, 1837, p. 114.

*Pithecolobium Vincentis* BENTHAM, London Journal of Botany, III, 1844, p. 222.

Northern part of the island, *Blain*, No. 120. (Millspaugh); on gravelly soil east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 66. Near site formerly occupied by a homestead and probably planted. General Distribution: Western Cuba, Isle of Pines, St. Vincent, Martinique, and in Central and South America.

282. *Pithecolobium obovale* Wright.

*Pithecolobium obovale* WRIGHT, in Sauvalle, Anales de la Academia de Ciencias Médicas, Físicas y Naturales de la Habana, V, 1868, no. 36.

*Inga obovalis* A. RICHARD, in Sagra, Histoire Physique, Politique et Naturelle de l'Ile de Cuba, I, 1845, p. 472.

*Calliandra revoluta* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 83.

Near Nueva Gerona, February 7, 1904, *A. H. Curtiss*; along bank of Casas River, south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 209; near Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 694. General Distribution: Cuba and the Isle of Pines.

283. *Lysiloma Sabicu* Benth. SABICU.

*Lysiloma Sabicu* BENTHAM, Journal of Botany and Kew Garden Miscellany, VI, 1854, p. 236.

*Acacia latisiliqua* var. *paucifolia* DECANDOLLE, Prodrum Systematis Naturalis Regni Vegetabilis, II, 1825, p. 467.

*Acacia formosa* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, p. 205.

*Leucæna formosa* GRISEBACH, Catalogus Plantarum Cubensium, 1866, pp. 82 and 284.

*Lysiloma formosa* HITCHCOCK, Report Missouri Botanical Garden, 1893, p. 83.

Near Nueva Gerona, January 8 and April 13, 1904, *A. H. Curtiss*, No. 278; bushy tree about thirty feet high, at west base of Caballos Mts., May 10, 1910, *O. E. Jennings*, No. 186; near Los Indios, November 4, 1912, *G. A. Link*. General Distribution: Bahamas, Cuba, Isle of Pines, and Santo Domingo.

284. *Lysiloma bahamensis* Benth. SINGING BEANS.

\* *Lysiloma bahamensis* BENTHAM, Hooker's London Journal of Botany, III, 1844, p. 82.

*Acacia bahamensis* GRISEBACH, Flora of the British West Indian Islands, 1860, p. 221.

*Lysiloma latisiliqua* A. GRAY, in Sauvalle, Flora Cubana, 1869, p. 35.

Forming a rather prominent part of the woods (chaparral) near Hato, in the interior of the peninsula, north of Caleta Grande, May 22, 1910, *O. E. Jennings*, No. 628. General Distribution: Florida Keys, Bahamas, Cuba, Isle of Pines.

285. *Mimosa pudica* Linnæus. SENSITIVE PLANT.

*Mimosa pudica* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 518.

Near Nueva Gerona, April 27, 1904, *A. H. Curtiss*, No. 466; open field in jungle at Los Indios, May 20, 1910, *O. E. Jennings*, No. 440. General Distribution: Generally through the West Indies and continental tropical America, and also introduced into the tropics of the Old World.

In places on the Isle of Pines this plant becomes a very common weed, as at the Jucaro Landing, where the open field was practically covered with it, and where one's path could be traced for some time by the different appearance of the drooping leaves of the plants which had been disturbed.

286. *Neptunia plena* (Linnæus) Benth.

*Mimosa plena* LINNÆUS, Species Plantarum, 1753, p. 519.

*Desmanthus plenus* WILLDENOW, Species Plantarum, IV, (II), 1806, p. 1045.

*Neptunia plena* BENTHAM, in Hooker, Journal of Botany, IV, 1842, p. 355; GRISEBACH, Flora of the British West Indian Islands, 1860, p. 218.

*Desmanthus comosus* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, pp. 212, 213.

"Crescit in insula Pinorum." 1831. *A. H. Lanier*. (Richard, *l. c.*). General Distribution: From Cuba, the Isle of Pines, and Jamaica, southeast through the West Indies and into northern South America; also introduced into tropical Asia.

Family CÆSALPINIACEÆ.

KEY TO THE SPECIES ENUMERATED.

Leaves with one pair of leaflets, or with but one leaflet.

Leaflet single. . . . . 287. *Bauhinia Jenningsii*.

Leaflets united for two-thirds of their length; shrub or small tree.

288. *Bauhinia caribæa*.

Leaflets distinct to the base; herbs.

Leaflets with five or six prominent flabellate veins; branches and petioles glabrous.....293. *Chamæcrista diphylla*.

Leaflets with four or five less prominently flabellate veins; branches and petioles pubescent.....292. *Cassia rotundifolia*.

Leaves with more than one pair of leaflets.

Leaflets in two pairs; low plant, woody, at least at base...291. *Cassia hispidula*.

Leaflets in more than two pairs.

Leaves simply pinnate.

Leaflets obovate-elliptic, 5-10 cm. long; shrubs.....290. *Cassia alata*.

Leaflets lanceolate, about 2-4 cm. long; shrubs...289. *Cassia Sophera*.

Leaflets obliquely oblong to obcuneate, mostly 10 mm. long; low shrub.

294. *Chamæcrista lineata*.

Leaflets about 2.5-7 mm. long, 1-2.5 mm. wide, oblong.

Leaflets 3-nerved, or with more and shorter nerves at base; stem flexuose.....296. *Chamæcrista savannarum*.

Leaflets with one main nerve near the upper edge; stem not flexuose.

295. *Chamæcrista micrantha*.

Leaves bipinnate.

Tree, with spreading branches, numerous small leaflets, and large, woody, flattened pods.....297. *Delonix regia*.

Shrub or small tree, prickly; leaflets fewer, about seven to twelve pairs, and larger, about 1.5-2 cm. long.....298. *Poinciana pulcherrima*,

A straggling or sprawling shrub with hooked prickles, the larger pinnæ with about six or eight pairs of leaflets which are about 2.5-3.5 cm. long.....299. *Guilandina crista*.

### 287. *Bauhinia Jenningsii* P. Wilson.

*Bauhinia Jenningsii* P. WILSON, in Britton, Studies of West Indian Plants, Bulletin of the Torrey Botanical Club, XLIII, 1916, pp. 463, 464.

"Wooded limestone plain, Coe's Camp, Ensenada de Sigüanea (*Britton & Wilson 14851, type*); coastal plain, San Juan (*Britton & Wilson 15544*); coral soil, north of Caleta Grande (*O. E. Jennings, 480*)."  
(Britton, *l. c.*). The Britton & Wilson collections were made in the spring of 1916, the Jennings specimen was collected near Hato, May 22, 1910. To this species belongs also a specimen, *O. E. Jennings, No. 464*, collected from a slender shrub about six feet high, growing on coralline-limestone soil between Hato and Caleta Grande, May 22, 1910.

The published description of this species does not strictly apply in certain particulars to the specimens in the Herbarium of the Carnegie Museum. Many of the petioles of well-developed leaves are not over 10 mm. long, the base of the leaf is rather uniformly subcordate instead



of subtruncate or rounded, and the apex is in many of the leaves distinctly acuminate rather than acute.

288. **Bauhinia caribæa** sp. nov. (PLATE XX.)

A slender sparsely branched shrub up to five meters high; the leaves 3–6 cm. long, petioled, broadly suborbicular, at the base broadly and obtusely cordate, at the apex deeply and acutely cordate, the median nerve exerted in the sinus as a short point, leaves bifoliate, somewhat lustrous above, paler below; leaflets connate about two-thirds of their length, ascending, 3–4.5 cm. long, 15–28 mm. wide, below minutely and very shortly pilose, finally glabrescent above, rounded at the base, the apex broadly obtuse, the margin entire, the nerves 3 (or 4), the exterior curved, the interior nearly straight; petioles 8–12 cm. long, slender, densely and minutely short-pilose; racemes pseudo-terminal; pedicels densely and minutely appressed pilose, the bracts linear-lanceolate, 1–1.5 mm. long; flowers 15–25, zygomorphous; calyx spathaceous during flowering, reflexed and finally marcescent, minutely pilose, 5-dentate, about 15–20 mm. long; petals 5, subequal, 10–16 mm. long, 2–3.5 mm. wide, furnished with a claw about 4 mm. long, lanceolate, long acuminate, marginally undulate; stamens inserted in the throat, the lowest one fertile, 2–3 cm. long, arcuate; the sterile ones 9, more or less connate-spathaceous above the base, about 10–13 mm. long; the anther oblong, 2–2.5 mm. long, attached at the middle; ovary on a stipe 5–7 mm. long; the fruits (legumes) usually solitary in the raceme, linear-oblong, about 5–6 cm. long, 9–12 mm. wide, with a stipe 2–2.5 cm. long, minutely and densely hispidulous, the sides of the pod eventually glabrescent, the apex acute and mucronate with the persistent base of the style.

Frutex usque 5 m. altus, gracilis, sparse ramosus; foliis 3–6 cm. longis, petiolatis, late suborbicularibus, basi late obtusangule cordatis, apice valde acutangule cordatis, nervo medio in sinum breviter setaceo-producto, bifoliatis, supra nitidulis, subtus pallidioribus; foliolis circiter  $\frac{2}{3}$  connatis, adscendentibus, 3–4.5 cm. longis, 15–28 mm. latis, subtus minute et brevissime pilosis, supra demum glabrescentibus, basi rotundatis, apice late obtusis, margine integerrimis, nervis 3 (–4), nervis exterioribus curvatis, interioribus subrectis; petiolis 8–12 cm. longis, satis gracilibus, dense minute et brevissime pilosa; racemis pseudoterminalibus; pedicellis dense et minute appresso-pilosis; bracteis lineari-lanceolatis, 1–1.5 mm. longis; floribus

15-25, zygomorphis; calyce per anthesin spathaceo, reflexo et demum marcescente, minute piloso, 5-dentato, circiter 15-20 mm. longo; petalis 5, subequalibus, 10-16 mm. longis, 2-3.5 mm. latis, circiter 4 mm. longe unguiculatis, lanceolatis, longe acuminatis, margine undulatis; staminibus fauci insertis, infimo fertili, usque 2-3 cm. longo, arcuato, anantheris 9, supra basin plus minusve connato-spathaceis, circiter 10-13 mm. longis; anthera oblonga 2-2.5 mm. longa, in parte media affixa; ovario 5-7 mm. longe stipitato; stylo vix 1 mm. longo; fructibus (leguminibus) in racemo plerumque solitariis, lineari-oblongis, circiter 5-6 cm. longis, 9-12 mm. latis, 2-2.5 cm. longe stipitatis, minute et densissime hispidulis, lateribus demum glabrescentibus, apice acutis et basi styli persistente mucronatis.

*Type*.—In dense woods north of Caleta Grande, "South Coast." *O. E. Jennings*, No. 630. Now in the herbarium of the Carnegie Museum.

This species is most nearly related to *Bauhinia divaricata* Linnæus, but differs in that *B. divaricata* has the leaflets more or less acute and not united for more than half their length. The color of the petals in *B. caribæa* is apparently white, or very nearly so.

#### 289. *Cassia Sophera* Linnæus.

*Cassia Sophera* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 379.

Near Los Indios, November 4, 1912, *G. A. Link*. General Distribution: Tropics of the Old World, Cuba, Isle of Pines, and rather sparingly in other localities in the American tropics.

#### 290. *Cassia alata* Linnæus. TALANTALA.

*Cassia alata* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 378.

*Herpetica alata* RAFINESQUE, Sylva Telluriana, 1838, p. 123.

Near Nueva Gerona, December 18, 1903, and February 2, 1904, *A. H. Curtiss*, No. 240; near Nueva Gerona, June 10, 1912, *G. A. Link*. General Distribution: Probably indigenous to tropical America but now widely spread through the tropics of both hemispheres. It occurs in most of the West Indian islands.

#### 291. *Cassia hispidula* Vahl.

*Cassia hispidula* VAHL, Eclogæ Americanæ, III, p. 10.

*Cassia hispida* COLLADON, Histoire Naturelle et Médicale des Casses, 1816, p. 118.

Near Nueva Gerona, December 26, 1903, *A. H. Curtiss*, No. 255

(distributed as *Cassia Absus*); weed, dry pasture west of Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 31. General Distribution: Central America to northern Brazil, Isle of Pines, Cuba.

292. ***Cassia rotundifolia* Persoon.**

*Cassia rotundifolia* PERSOON, Synopsis Plantarum seu Enchiridium Botanicum, I, 1805, p. 456.

*Cassia bifoliolata* DECANDOLLE, in Colladon, Histoire Naturelle et Médicale des Casses, 1816, p. 120, Pl. 9, fig. B.

Near Nueva Gerona, December 27, 1903, *A. H. Curtiss*, No. 259. General Distribution: Mexico to Brazil, Isle of Pines, Cuba, and Jamaica.

293. ***Chamæcrista diphylla* (Linnæus) Greene.**

*Cassia diphylla* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 376.

*Chamæcrista diphylla* GREENE, Pittonia, IV, 1899, p. 28.

Near Nueva Gerona, December 15, 1903, *A. H. Curtiss*, No. 229; open spot in jungle at Los Indios, May 20, 1910, *O. E. Jennings*, No. 453; near Los Indios, November 12, 1912, *G. A. Link*. General Distribution: Widely spread through the tropics, although probably indigenous to America.

294. ***Chamæcrista lineata* (Swartz) Greene.**

*Cassia lineata* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 66.

*Chamæcrista lineata* GREENE, Pittonia, IV, 1899, p. 31.

On beach at Siguanea City, May 21, 1910, *O. E. Jennings*, No. 460; open places in the woods near Caleta Grande, May 22, 1910, *O. E. Jennings*, No. 521. A common low shrub in these spots. General Distribution: Jamaica, Isle of Pines.

295. ***Chamæcrista micrantha* Britton.**

*Chamæcrista micrantha* BRITTON, Studies of West Indian Plants, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 463.

In pine-barrens near Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 403; in grassy savanna, along arroyo, near Sante Fé, May 25, 1910, *O. E. Jennings*, No. 534; "Pine-lands and savannas, Pinar del Rio and Isle of Pines, Cuba. Type collected near San Pedro, Isle of Pines (*Britton & Wilson*, 14294). Referred by Grisebach to *Cassia pygmæa* DC., and taken up by Bentham under *Cassia procumbens* L., but the type of *C. procumbens* is the same as *C. nictitans* L." (*Britton, l. c.*).

The leaflets occur in 10–16 pairs, and are oblong, obliquely mucronate, about 3–4 mm. long, strongly pinnately veined from a midrib, which is located very close to the upper margin of the leaflet. The petiolar glands are sessile and are situated immediately below the lowest pair of leaflets, and the whole plant is pubescent with minute, curved hairs. The plants differ from *Chamæcrista nictitans* chiefly in the smaller leaflets and the more unsymmetrical position of the midrib. The leaflets in the Carnegie Museum specimens of this species are somewhat more numerous and of a somewhat larger maximum size than is given by Britton in his original description.

296. **Chamæcrista savannarum** Britton.

*Chamæcrista savannarum* BRITTON, Studies of West Indian Plants, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 463.

"Savannas and pine-lands, Pinar del Rio and Isle of Pines, Cuba. Type collected near Sigüanea, Isle of Pines (Britton & Wilson, 14379)" (Britton, *l. c.*). To this species probably belongs also No. 299, *O. E. Jennings*, Pine woods near McKinley, May 14, 1910.

297. **Delonix regia** (Bojer) Rafinesque. ROYAL POINCIANA. FLAME TREE. FLAMBOYANT.

*Poinciana regia* BOJER, Curtis's Botanical Magazine, 1829, Pl. 2884.

*Delonix regia* RAFINESQUE, Florula Telluriana, II, 1836, p. 92.

*Colvillea racemosa* BELLO, Anales de la Sociedad Española de Historia Natural, X, 1881, p. 257.

Near Nueva Gerona, May 21, 1904, *A. H. Curtiss*, No. 507; on Keenan's estate south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 181; without locality, February–March, 1910, *J. F. Shafer*. General Distribution: Native of Madagascar, but now extensively cultivated in the tropics as an ornamental tree, and almost naturalized in some of the West Indian islands.

298. **Poinciana pulcherrima** Linnæus.

*Poinciana pulcherrima* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 380.

*Cæsalpinia pulcherrima* SWARTZ, Observationes Botanicae, 1791, p. 166.

Without locality, February–March, 1910, *J. F. Shafer*. General Distribution: Widely distributed in the tropics, extending through the West Indies and reaching southern Florida and the Bahamas.

299. *Guilandina crista* (Linnæus) Small.

*Cæsalpinia crista* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 380, not of Ed. II, p. 544.

*Guilandina Bonduc* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 381.

*Guilandina Bonducella* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 545.

*Cæsalpinia Bonducella* FLEMING, Asiatic Researches, Calcutta, XI, 1810, p. 159.

*Guilandina Bonduc* var. *minus* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, II, 1825, p. 480.

*Guilandina crista* SMALL, Flora of the Southeastern U. S., 1903, p. 591.

Near Nueva Gerona, April 30, 1904, *A. H. Curtiss*, No. 472. "Crescit in locis maritimis insulæ Pinorum." 1831, *A. H. Lanier*, A. Richard, in Sagra, "Historia Fisica, Politica y Natural de la Isla de Cuba," X, 1845, p. 217. Richard's statement that the species grows in maritime situations on the Isle of Pines is probably true to the extent that the plant grows mainly on gravelly or sandy lands and it happens that these, in the Isle of Pines, are mainly near the sea. General Distribution: Widely distributed in the tropics, and extending north in North America to Bermuda and southern Florida.

Family FABACEÆ.

(*PAPILIONACEÆ*.)

KEY TO THE SPECIES ENUMERATED.

Annual herbs with glandular hairs and sharply serrate leaflets.

317. *Cicer arietinum*.

Leaflets not sharply serrate.

Leaflets five or more to a leaf.

Fair-sized shrubs or trees.

Leaflets retuse at apex; flowers purplish, in large branching panicles.

316. *Vouacapoua retusa*.

Leaflets with apex acuminate, not retuse.

Leaflets with about 10-12 main veins each side of mid-rib; pods with 4 wings. . . . . 315. *Piscidia piscipula*.

Leaflets with less than 10 main veins each side of mid-rib; pods not winged.

Pods somewhat woody, 10-20 cm. long; leaflets about 9-17 in number. . . . . 304. *Gliricidia sepium*.

Pods thin, 1-2-seeded, 5-7.5 cm. long; leaflets about 5-11 in number. . . . . 314. *Lonchocarpus latifolius*.

Herbs or low herbaceous shrubs.

Leaflets 5 (or 3), up to 2 cm. long. . . . . 302. *Indigofera lespedezioides*.

Leaflets more numerous and shorter.

Leaflets hairy, 5-10 mm. long; pods not constricted.

305. *Cracca cinerea*.

- Leaflets smooth or nearly so, rarely more than 5 or 6 mm. long; pods strongly constricted.
- Leaflets in 4-12 pairs; a slender erect herb; pods much more deeply constricted on the lower edge.
308. *Æschynomene tenuis*.
- Leaflets in 12-20 pairs; half-shrubby, 1-3 m. high; pods about equally constricted on both edges. 307. *Æschynomene sensitiva*.
- Leaflets less than five to a leaf.
- Leaflets one to a leaf (see also *Indigofera pascuorum* and *Galactia parvifolia*).
- Shrub or low bushy tree with one or more leaflets in the axil of a small spine. . . . . 306. *Brya Ebenus*.
- Herbs; unarmed.
- Stem conspicuously winged. . . . . 300. *Crotalaria pterocaula*.
- Stem not conspicuously winged.
- Twining vines; leaflets varying from three and ovate, to one and linear-oblong or lance-oblong. 320. *Bradburya virginiana*.
- Non-twining, more or less erect herbs.
- Leaves obcuneate-oblong, retuse; pod about 3 cm. long by 1.3 cm. wide. . . . . 301. *Crotalaria retusa*.
- Leaves linear-oblong, the leafless stem above them terminating in a slender, erect, laxly-flowered spike.
313. *Meibomia Cowellii*.
- Leaflets two to a leaf. . . . . 309. *Zornia diphylla*.
- Leaflets three to a leaf.
- Tree; terminal leaflet often 10 or 12 cm. wide and about the same length.
323. *Erythrina Berteroana*.
- Herbs, vines, or undershrubs.
- Erect, or not essentially twining plants.
- Leaflets up to about 2 cm. long and 3 mm. wide; slender peduncle ascending far above the leaves.
340. *Phaseolus lathyroides*.
- Leaflets much larger or else relatively much wider.
- Flowers large and showy, with standard up to 5 cm. long and 4 or 5 cm. wide. . . . . 319. *Clitoria guianensis*.
- Flowers much smaller.
- Leaflets narrowly oblong, more than five times as long as wide. . . . . 338. *Eriosema crinitum*.
- Leaflets relatively wider.
- Leaflets obtuse to retuse, softly tomentose, about 3-5 by 1.5-2 cm. . . . . 332. *Galactia Jussiaeana*.
- Leaflets velvety, acuminate, up to 3 by 7 or 8 cm. in dimensions; plants erect; pods not much constricted.
335. *Cajanus indicus*.
- Leaflets oval or oblong, rarely over 2 cm. long; plant creeping. . . . . 312. *Meibomia Scorpiurus*.
- Leaflets widely ovate, usually about 6 cm. long; stems

creeping, sending up erect leafless flowering branches to a height of 3-5 dm. (or more).

311. *Meibomia axillaris*.

Leaflets ovate, usually about 3-6 cm. long; stems creeping, sending up erect flowering branches which are leafy below.

310. *Meibomia supina*.

Characteristically vines or twining plants.

Leaflets rather small, not usually over 2 cm. in width, varying from oval or ovate to oblong or linear.

Standard spurred or gibbous above the base.

Upper leaves with linear or linear-oblong leaflets, the lower shorter and oblong to oval, rather obtuse, rounded or emarginate.

321. *Bradburya virginiana* var. *angustifolia*.

Leaflets all essentially alike, but on different plants varying from ovate to linear-oblong, obtuse to subacute.

Bracteoles ovate, as long as the calyx.

322. *Bradburya pubescens*.

Bracteoles ovate, shorter than the calyx.

320. *Bradburya virginiana*.

Standard not spurred nor gibbous above the base.

Terminal leaflet (when 3) long-stalked.

Inflorescence short with 1-3 flowers.

Calyx loosely pubescent; branches prostrate.

328. *Galactia parvifolia*.

Calyx densely villous; branches suberect.

329. *Galactia suberecta*.

Inflorescence longer and with several or many flowers.

330. *Galactia striata*.

Leaflets with stalks of about equal length.]

331. *Galactia Jenningsii*.

Leaflets mainly over 2 cm. in width.

Peduncles elongated, pendent, with one to several large (up to 15 cm. or more long) pods, which are covered with brownish bristly hairs.

325. *Mucuna altissima*.

Not as above.

Valves of pod 20-30 cm. long, with a prominent ridge near the upper margin.

333. *Canavalia ensiformis*.

Pods short, 1-2-seeded, seeds scarlet and black.

Flowers in short, rather dense, axillary racemes not over 2 cm. long.

336. *Dolicholus reticulatus*.

Flowers numerous in rather dense racemes up to 8 or 10 cm. long.

.....337. *Dolicholus precatorius*.

Pods longer; seeds not scarlet and black; leaflets ovate-oblong to ovate.

Pod 2-4 cm. long, the valves with a strong mid-rib.

318. *Clitoria rubiginosa*.

Pod 3-4 cm. long, strongly brownish bristly pubescent, terminal leaflet widely ovate and up to 10-15 cm. long.

327. *Calopogonium orthocarpum*.

Pod 10-15 cm. long by about 5-6 mm. wide, with a slender beak about 10 mm. long; flowers large, 2.5-3 cm. long.....320. *Bradburya virginiana*.

Pods about 4-5 cm. long, nearly terete, scarcely compressed between the seeds.....341. *Vigna repens*.

Pods 6-12 cm. long, somewhat compressed between the seeds, dark colored, slightly pubescent.

Flowers blue, about 1 cm. long.

326. *Calopogonium cæruleum*.

Flowers mostly rose-red, 2-2.5 cm. long.

339. *Phaseolus adenanthus*.

### 300. *Crotalaria pterocaula* Desvaux.

*Crotalaria pterocaula* DESVAUX, Journal de Botanique, II, 1814, p. 76.

In swampy place in thicket east of Nueva Gerona, May 6, 1910, O. E. Jennings, No. 52. General Distribution: Tropical South America, Cuba, Isle of Pines.

### 301. *Crotalaria retusa* Linnæus.

*Crotalaria retusa* LINNÆUS, Species Plantarum, II, Ed, I, 1753, p. 715.

A weed in fields at Bibijagua, May 7, 1910, O. E. Jennings, No. 108. General Distribution: Widely distributed in the tropics of the world, extending north in America as far as the Bahamas and southern Florida.

### 302. *Indigofera lespedezioides* Humboldt, Bonpland, & Kunth.

*Indigofera lespedezioides* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, VI, 1823, p. 457.

In open woods near Sante Fé, May 25, 1910, O. E. Jennings, No. 556. Flowers flesh pink. General distribution: Cuba, Isle of Pines, and from Mexico to tropical South America.

### 303. *Indigofera pascuorum* Benth.

*Indigofera pascuorum* BENTHAM, Annals and Magazine of Natural History, III, 1839, p. 431.

Northern part of the island, Blain, No. 23 (Millspaugh). General Distribution: Cuba, the Isle of Pines, and continental tropical America.



304. **Gliricidia sepium** (Jacquin) Steudel.

*Robinia sepium* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 28.

*Robinia maculata* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, VI, 1823, p. 393.

*Lonchocarpus maculatus* P. DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, II, 1825, p. 260.

*Gliricidia sepium* STEUDEL, Nomenclator Botanicus, I, Ed. II, 1841, p. 688.

*Gliricidia Lambii* FERNALD, Botanical Gazette, XX, 1895, p. 533.

Near Nueva Gerona, April 6 and May 30, 1904, *A. H. Curtiss*, No. 437. General Distribution: Cuba, the Isle of Pines, Haiti, Santo Domingo, Porto Rico, Jamaica, and from Mexico to northern South America.

305. **Cracca cinerea** (Linnæus) Morong.

*Galea cinerea* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1172.

*Tephrosia cinerea* PERSEON, Synopsis Plantarum, II, 1807, p. 328.

*Cracca villosa* var. *cinerea* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 173.

*Cracca cinerea* MORONG, Annals, New York Academy of Sciences, VII, 1892, p. 79.

Field at Bibijagua, May 7, 1910 (flowers blue) *O. E. Jennings*, No. 105; field, near Nueva Gerona, May 14, 1910, *O. E. Jennings*, No. 640. General Distribution: Bahamas, West Indies, and the American continental tropics.

Our specimens are smaller-leaved than specimens from various other localities, but the specimens from the Isle of Pines, in at least one instance, show traces of fire, the present shoots arising from the perennial more or less charred woody crown. This may perhaps account for a dwarfed condition of the specimens.

306. **Brya Ebenus** (Linnæus) DeCandolle.

GRANADILLO. AMERICAN EBONY.

*Aspalathus Ebenus* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1158.

*Amerimnon Ebenus* SWARTZ, Prodromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 104.

*Brya Ebenus* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, II, 1825, p. 421.

Near Nueva Gerona, January and March, 1904, *A. H. Curtiss*, No. 262; shrub about five feet high, in dry savannah east of Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 2; northern part of the island, *Blain*, No. 135 (Millspaugh). General Distribution: Dry gravelly savannas in the Bahamas, Cuba, Isle of Pines, and Jamaica.

On the dry "Mal Pais" gravelly soils of the northeastern part of

the island the Granadillo occurs in large numbers in thickets or as scattered plants. The plants grow to a height of from six or eight up to perhaps fifteen feet, with a rounded crown of stiff bushy branches. The wood is hard, heavy, and takes a beautiful polish, the light yellowish sapwood contrasting strikingly with the seal-brown heart-wood.

307. *Æschynomene sensitiva* Swartz.

*Æschynomene sensitiva* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 107.

*Æschynomene fistulosa* BELLO, Anales de la Sociedad Española de Historia Natural, X, 1881, p. 259.

Near Nueva Gerona, January 19, 1904, *A. H. Curtiss*, No. 300. General Distribution: Widely distributed through the West Indies and continental tropical America, also in the tropics of Africa.

308. *Æschynomene tenuis* Grisebach.

*Æschynomene tenuis* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 72.

Near Nueva Gerona, December 18, 1903, *A. H. Curtiss*, No. 241; in pasture on dry savanna land near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 19; same locality, May 14, 1910, *O. E. Jennings*, No. 248; near Nueva Gerona, June 10, 1912, *G. A. Link*; near Los Indios, November 4, 1912, *G. A. Link*; northern part of the island, *Blain*, No. 24 (Millspaugh). General Distribution: Western Cuba and the Isle of Pines.

309. *Zornia diphylla* (Linnæus) Persoon.

*Hedysarum diphyllum* LINNÆUS, Species Plantarum, II, Ed. I, 1753, p. 747.

*Zornia diphylla* PERSOON, Synopsis Plantarum, II, 1807, p. 318.

*Zornia reticulata* J. E. SMITH, Rees's New Encyclopedia, XXXIX, 1818, no. 2.

Near Nueva Gerona, February, 1904, *A. H. Curtiss*, No. 340; field near Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 635; northern part of the island, *Blain* No. 101 (Millspaugh). General Distribution: Widely distributed throughout the tropics of both hemispheres, occurring on most of the West Indian islands. In the Isle of Pines found mainly in pastured lands, repeatedly burned over, the plants coming up year after year from a woody partly subterranean base.

310. *Meibomia supina* (Swartz) Britton.

*Hedysarum supinum* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 106.

*Hedysarum incanum* SWARTZ, *op. cit.*, p. 107.

*Desmodium incanum* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, II, 1825, p. 332.

*Hedysarum portoricense* SPRENGEL, *Systema Vegetabilium*, III, 1826, p. 314.

*Meibomia supina* BRITTON, *Annals, New York Academy of Sciences*, VII, 1892, p. 83.

*Meibomia incana* COOK & COLLINS, *Contributions from the U. S. National Herbarium*, VIII, 1903, p. 189.

Near Nueva Gerona, January 31, 1904, *A. H. Curtiss*, No. 320; thin soil on coralline limestone, north of Caleta Grande, May 22, 1910, *O. E. Jennings*, Nos. 477 and 523; in dry savanna south of Sante Fé, May 25, 1910, *O. E. Jennings*, No. 548. General Distribution: From southern Florida and the Bahamas southwards through the West Indies, and widely distributed in the American continental tropics; Africa; Mauritius.

### 311. *Meibomia axillaris* var. *obtusifolia* O. Kuntze.

*Meibomia axillaris* var. *obtusifolia* O. KUNTZE, *Revisio Generum Plantarum*, I, 1891, p. 195.

*Desmodium axillare* var. *genuinum* URBAN, *Symbolæ Antillanæ*, II, 1900, p. 303.

*Desmodium axillare* var. *obtusifolia* URBAN, *Symbolæ Antillanæ*, IV, 1905, p. 291.

In Sante Fé, in the park near the magnesia springs, May 26, 1910, *O. E. Jennings*, No. 572. General Distribution: Rather widely distributed in the West Indies from Cuba south and southeast, and occurring in Central and South America.

### 312. *Meibomia Scorpiurus* (Swartz) Kuntze.

*Hedysarum Scorpiurus* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 107.

*Desmodium Scorpiurus* DESVAUX, *Journal de Botanique*, I, 1813, p. 122.

*Meibomia Scorpiurus* O. KUNTZE, *Revisio Generum Plantarum*, I, 1891, p. 198.

Near Nueva Gerona, February 22, 1904, *A. H. Curtiss*, No. 360; northern part of the island, *Blain*, No. 77 (Millspaugh). General Distribution: From Cuba southwards through the West Indies, and from Mexico to Peru.

### 313. *Meibomia Cowellii* Britton.

*Meibomia Cowellii* BRITTON, *Bulletin of the Torrey Botanical Club*, XLI, 1914, p. 19.

In thin pine woods near Sante Fé, May 26, 1910, *O. E. Jennings*, No. 563. General Distribution: Savannas and open pine woods in Pinar del Rio Province, Cuba, and the Isle of Pines.

314. *Lonchocarpus latifolius* (Willdenow) Humboldt, Bonpland, & Kunth.

*Amerimnum latifolium* WILLDENOW, Species Plantarum, III (2), 1803, p. 909.

*Dalbergia pentaphylla* POIRET, Lamarck's Encyclopédie Méthodique, Botanique, Supplement II, 1811, p. 445.

*Lonchocarpus pentaphyllus* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, VI, 1823, p. 383.

*Lonchocarpus latifolius* HUMBOLDT, BONPLAND, & KUNTH, *op. cit.*, p. 383.

*Cytisus membranaceus* SESSÉ & MOÇINO, Flora Mexicana, Ed. II, p. 174.

Near Nueva Gerona, April 24, 1904, *A. H. Curtiss*, No. 462; on river bank at Sante Fé, May 24, 1910 (in full flower), *O. E. Jennings*, No. 565. General Distribution: Generally distributed in the West Indies as far north as Cuba, and in continental America from Mexico to Guiana.

The specimens secured at Sante Fé were borne on a large spreading tree about forty feet high, with rather light green foliage somewhat resembling that of *Fraxinus americana*. The flowers borne in dense racemes about two or three inches in length, were light yellow in color and faintly but not very pleasantly scented.

*Note.*—*Lonchocarpus sericeus* Humboldt, Bonpland & Kunth, was reported as growing in Cuba and the Isle of Pines by Achille Richard, in Sagra, "Historia Fisica, Politica y Natural de la Isle de Cuba," X, 1845, p. 179. The Isle of Pines was included in this distribution on the basis of specimens collected there by Lanier in 1831.

The writer is not satisfied that *Lonchocarpus sericeus* is properly to be included in the list for the Isle of Pines. Richard's description for that species is mainly as follows: Branches, petioles, and peduncles densely tomentose-sericeous; leaflets 7–11, oval, acuminate, the base obtuse, above pubescent, below densely tomentose-sericeous; racemes terminal, numerous, as long as or longer than the leaves; petals externally sericeous; legumes short, 1–3-seeded, densely fulvous-velvety.

315. *Piscidia piscipula* (Linnæus) Sargent.

*Erythrina piscipula* LINNÆUS, Species Plantarum, II, Ed. I, 1753, p. 707.

*Piscidia erythrina* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1155.

*Ichthyomethia piscipula* HITCHCOCK, Garden and Forest, IV, 1891, p. 472.

*Piscidia piscipula* SARGENT, Garden and Forest, IV, 1891, p. 436.

Northern part of the island, *Blain*, No. 159 (Millspaugh). General Distribution: From Florida and the Bahamas south through the West Indies, and from Mexico to northern South America.

316. *Vouacapoua retusa* (Humboldt, Bonpland, & Kunth).

*Andira retusa* HUMBOLDT, BONPLAND, & KUNTH, *Nova Genera et Species Plantarum*, VI, 1823, p. 385.

Near Nueva Gerona, June 4, 1904, *A. H. Curtiss*, No. 525 (issued as *Vouacapoua americana* Aublet, from which it differs in the non-acuminate, retuse leaves); small spreading tree at west base of Caballos Mts., May 9, 1910, *O. E. Jennings*, No. 185. General Distribution: Northern South America and the Isle of Pines. Possibly to be regarded as a variety of the Jamaican species (*V. jamaicensis* = *Andira jamaicensis*) but differing quite strongly in the shape of the leaves.

317. *Cicer arietinum* Linnæus. CHICK-PEA.

*Cicer arietinum* LINNÆUS, *Species Plantarum*, II, Ed. I, 1753, p. 738.

Collected by Millspaugh (Field Columbian Museum, Botanical Series, II, 1900, p. 51), "running wild in a garden enclosure at Pedernales Point, Isle of Pines." *Millspaugh*, No. 1407. General Distribution: Warmer regions of the Old World, and cultivated and often escaping in the American tropics.

318. *Clitoria rubiginosa* Jussieu.

*Clitoria rubiginosa* JUSSIEU in Persoon, *Synopsis Plantarum*, II, 1807, p. 33.

*Neurocarpum ellipticum* DESVAUX, *Journal de Botanique*, I, 1813, p. 119.

*Clitoria glycinoides* P. DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, II, 1825, p. 234.

*Neurocarpum falcatum* P. DECANDOLLE, *op. cit.*, p. 236.

Near Nueva Gerona, May 8, 1904, *A. H. Curtiss*, No. 487. General Distribution: West Indies generally; Panama; and northern South America.

319. *Clitoria guianensis* (Aublet) Benth.

*Crotalaria guianensis* AUBLET, *Histoire des Plantes de la Guiane Française*, II, 1773, p. 761.

*Crotalaria longifolia* LAMARCK, *Encyclopédie Méthodique, Botanique*, II, 1811, p. 201.

*Neurocarpum guianense* DESVAUX, *Journal de Botanique*, I, 1814, p. 75.

*Clitoria guianensis* BENTHAM, *Journal of the Linnean Society, London*, II, 1858, p. 40.

Near Nueva Gerona, April 17, 1904, *A. H. Curtiss*, No. 448; near Nueva Gerona, in field, May, 1910, *O. E. Jennings*; in open pine woods, near McKinley, May 16, 1910, *O. E. Jennings*, No. 298; near Nueva Gerona, early summer, 1912, *G. A. Link*. General

Distribution: In fields, Guiana, Venezuela, Brazil, and Isle of Pines.

Curtiss's plant was distributed (*No. 448, West Indian Plants*) under the name *Clitoria cajanifolia*, and subsequent collections from the Isle of Pines seem to have been labeled the same (= *Clitoria laurifolia*), but a careful examination of various descriptions have led the writer to believe that the plants should be called *Clitoria guianensis*. The plants have a thick woody taproot and, from the crown, are sent up erect branches to a height of from 5 to 20 cm., bearing in the upper axils one or two flowers. The flowers are quite striking objects, the standard often reaching a length of 6 cm. and a width of 5 cm., the color varying from blue to rose or fading to almost white. The leaflets are narrowly oblong, about 8–12 mm. wide and from 6–10 cm. long, sometimes longer in vegetative shoots. The leaves are sparingly pubescent on the veins beneath, strongly reticulated, minutely glandular on both sides, paler and somewhat glaucous beneath. The apex is obtuse but mucronulate. The pods are about 4 cm. long by 6 mm. wide, their valves being strongly costate, the apex tapering into a beak about 5–8 mm. long.

The writer has not seen Blain's collections, now in the Herbarium of the Field Museum, but it is probable that the specimen reported by Millspaugh for the Isle of Pines, *Blain, No. 29*, is also *Clitoria guianensis*.

### 320. *Bradburya virginiana* (Linnæus) Kuntze.

*Clitoria virginiana* LINNÆUS, *Species Plantarum*, II, Ed. I, 1753, p. 753.

*Centrosema virginianum* BENTHAM, *Annalen d. K. K. Naturhistorischen Hofmuseums*, Wien, II, 1838, p. 120.

*Bradburya virginiana* KUNTZE, *Revisio Generum Plantarum*, I, 1891, p. 164.

Open savanna among palmettoes, near Nueva Gerona, May 5, 1910, *O. E. Jennings, No. 17*; same locality and collector, *No. 35*; weed on low, rich, recently cleared land north of Nueva Gerona, May 7, 1910, *O. E. Jennings, No. 142*; along arroyo east of Los Indios, May 18, 1910, *O. E. Jennings, No. 356*; west of La Cañada Mts., May 18, 1910, *O. E. Jennings, No. 633*; near Nueva Gerona, June 3, 1912, *G. A. Link*. General Distribution: In America ranging from New Jersey and Arkansas to Argentina; also occurring in the tropics of the Old World.

### 321. *Bradburya virginiana* var. *angustifolia* (Linnaeus) comb. nov.

*Clitoria virginiana* var. *angustifolia* P. DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, II, 1825, p. 234.

*Centrosema virginianum* var. *angustifolium* GRISEBACH, Flora of the British West Indian Islands, 1860, p. 193.

*Bradburya cubana* BRITTON. Herbarium name, not published.

Near Nueva Gerona, February 14, 1904, *A. H. Curtiss*, No. 343.  
General Distribution: Cuba and the Isle of Pines.

### 322. *Bradburya pubescens* (Bentham) Kuntze.

*Centrosema pubescens* BENTHAM, Annalen d. K. K. Naturhistorischen Hofmuseums, Wien, II, 1838, p. 119.

*Bradburya pubescens* KUNTZE, Revisio Generum Plantarum, I, 1891, p. 164.

Near Nueva Gerona, December 16, 1903, *A. H. Curtiss*, No. 232; between Los Indios and La Cañada Mts., May 18, 1910, *O. E. Jennings*, No. 631. General Distribution: Cuba, the Isle of Pines, the West Indies generally; continental tropical America.

### 323. *Erythrina Berteroana* Urban.

*Erythrina Berteroana* URBAN, Symbolæ Antillanæ, V, 1908, p. 370.

Near Nueva Gerona, January 11, 1904, *A. H. Curtiss*, No. 284; low shrub near Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 466. General Distribution: Cuba, the Isle of Pines, Colombia.

The Caleta Grande specimen was in fruit. Its pods being 8-14 cm. long, strongly moniliform, about 1 cm. thick but the constrictions only about 3-5 mm. in diameter, the pod greenish brown in color, tapering below into a stipe about 2 cm. long, abruptly terminated at the apex by a stiff acumination about 2-2.5 cm. long. The seeds are about 8-10 mm. long, by about 5 mm. thick, brick-red, shining. The Curtiss specimen (*West Indian Plants*, No. 284) was distributed under the name of *Erythrina carnea* Aiton.

### 324. *Erythrina* sp.

Specimen with a few flowers and immature pods, gathered from a leafless tree about 14 feet high, on the top of Caballos Mts., May 13, 1910, *O. E. Jennings*, No. 232.

Too incomplete for definite identification. The flowers have an obtusely and shallowly two-lipped calyx about 8 mm. long, the corolla being red (probably scarlet) with a closely folded standard about 3 cm. long and about 6 mm. wide when in the normal folded position.

325. *Mucuna altissima* (Jacquin) P. DeCandolle.

*Dolichos altissimus* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 27.

*Stizolobium altissimum* PERSOON, Synopsis Plantarum, II, 1807, p. 299.

*Mucuna altissima* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, II, 1825, p. 405.

*Mucuna urens* STAHL, Estudios sobre (para) la Flora de Puerto-Rico, III, 1885; p. 85 (not DeCandolle).

In jungle along stream southwest of Bibijagua, May 7, 1910, O. E. Jennings, No. 83. General Distribution: Cuba, the Isle of Pines, Jamaica, Haiti, St. Kitts, Guadeloupe, Martinique, St. Vincent, Panama, and Brazil.

A vine, climbing in the dense jungle to a height of eight or ten feet. The pods (on our specimen) are borne, four together, on a long hanging peduncle. The largest pods are 20 cm. long, 5 cm. in width, and on one edge ridged with two somewhat scalloped flanges. The valves are irregularly ridged, and are more or less brown-velvety with fine stiff hairs, which, to the skin, are very irritating and somewhat poisonous, evidently in this respect resembling closely the notorious "cowhage" (*Mucuna pruriens*). The seeds are borne one to four in a pod and are a dirty yellow-brown, shading towards the raphe into a lighter ashy color, the raphe itself being black and extending about four-fifths the way around the seed. The beans are about 2.5 cm. in diameter, almost orbicular, and about 1.5 cm. in thickness.

326. *Calopogonium cæruleum* Desvaux.

*Calopogonium cæruleum*, DESVAUX, Annales des Sciences Naturelles, Ser. I, IX, 1826, p. 423.

*Stenolobium cæruleum* BENTHAM, Annalen d. K. K. Naturhistorischen Hofmuseums, Wien, II, 1838, p. 125.

Near Nueva Gerona, December 14, 1903, A. H. Curtiss, No. 226. General Distribution: West Indies, and from Mexico to southern Brazil.

327. *Calopogonium orthocarpum* Urban.

*Calopogonium orthocarpum* URBAN, Symbolæ Antillanæ, I, 1899, pp. 327-328.

Near Nueva Gerona, January 1, 1904, A. H. Curtiss, No. 265. General Distribution: Isle of Pines, Porto Rico, Haiti, and Colombia.

328. *Galactia parvifolia* A. Richard.

*Galactia parvifolia* A. RICHARD, in Sagra, Histoire Physique, Politique et Naturelle de l'Ile de Cuba, Plantes Vasculaires, 1845, p. 414.



*Galactia stenophylla* URBAN, *Symbolæ Antillanæ*, II, 1900, p. 313. Not Hooker & Walker-Arnott.

*Galactia parvifolia triphylla*, *heterophylla*, and *monophylla* URBAN, *op. cit.*, pp. 314, 315.

*Galactia Grisebachii* URBAN, *Symbolæ Antillanæ*, V, 1908, p. 372.

Reported by Britton, "Studies of West Indian Plants", VIII, *Bulletin of the Torrey Botanical Club*, XLIII, 1916, p. 449, as follows: "Grassy fields and banks at lower elevations, all provinces [Cuba] and Isle of Pines; South Florida; Hispaniola. Consists of races differing in number, form and size of leaflets."

### 329. *Galactia suberecta* Britton.

*Galactia suberecta* BRITTON, *Studies of West Indian Plants*, VIII, *Bulletin of the Torrey Botanical Club*, XLIII, 1916, p. 450.

"Savanna near San Juan, Isle of Pines, Cuba (*Britton & Wilson 14973*)" (*Britton, l. c.*).

### 330. *Galactia striata* (Jacquin) Urban.

*Glycine striata* JACQUIN, *Hortus Botanicus Vindobonensis*, I, 1770, p. 32, Pl. 76.

*Galactia cubensis* HUMBOLDT, BONPLAND & KUNTH, *Nova Genera et Species Plantarum*, VI, 1823, p. 429.

*Galactia Berteriana* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, II, 1825, p. 238.

*Galactia striata* URBAN, *Symbolæ Antillanæ*, II, 1900, p. 320.

*Galactia striata cubensis* and *Berteriana* URBAN, *op. cit.*, p. 322.

Reported by Britton, "Studies of West Indian Plants", VIII, *Bulletin of the Torrey Botanical Club*, XLIII, 1916, p. 450, as follows: "Thickets and hillsides at lower elevations, all provinces [Cuba] and Isle of Pines; Jamaica; Hispaniola; Porto Rico; continental tropical America. Recorded by Grisebach and by Wright as *G. filiformis* Benth. Some Cuban specimens with short-peduncled inflorescence are only with difficulty separable from the following species [*Galactia spiciformis* Torrey & Gray]. Races differ in pubescence." Reported by Millspaugh: Northern part of the island, *Blain*, No. 92, as *Galactia filiformis* var. *cubensis* (Kunth) Grisebach.

### 331. *Galactia Jenningsii* Britton.

*Galactia Jenningsii* BRITTON, *Studies of West Indian Plants*, *Bulletin of the Torrey Botanical Club*, XLIII, 1916, p. 451.

Pine-barrens east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 350. Probably also belonging to this species is a fragmentary

specimen collected on the savanna ("Mal Pais" gravel) near Santa Fé, May 25, 1910, *O. E. Jennings*, No. 539. Flowers blue or purplish; "white-sand pine-barrens, Isle of Pines, scarce and local (*Britton & Wilson 19186, type*)" (*Britton, l. c.*).

### 332. *Galactia Jussieana* Kunth.

*Galactia Jussieana* KUNTH, *Mimoses et Autres Plantes Legumineuses du Nouveau Continent*, 1824, p. 196, Pl. 55.

*Clitoria glomerata* GRISEBACH, *Catalogus Plantarum Cubensium*, 1866, p. 74.

Near Nueva Gerona, March 13 and May 8, 1904, *A. H. Curtiss*, No. 402. (Distributed as *Galactia Curtisii* Britton); northern part of the island, *Blain* (Millspaugh); open woods southwest of Bibijagua, May 7, 1910, *O. E. Jennings*, No. 90; open pine woods near McKinley, May 16, 1910, *O. E. Jennings*, No. 297; sandy pine-barrens, Los Indios, May 19, 1910 (abundant at this locality), *O. E. Jennings*, No. 391. General Distribution: "Pine-lands and plains, Pinar del Rio and Isle of Pines; Jamaica; Hispaniola; tropical South America. Common in pine-lands on the Isle of Pines, attaining a height of 6 dm." Britton, "Studies of West Indian Plants," VIII, *Bulletin of the Torrey Botanical Club*, XLIII, 1916, p. 452.

Millspaugh lists for the Isle of Pines also: *Galactia angustifolia* var. *retusa* Wright, in Grisebach, *Catalogus Plantarum Cubensium*, 1866, p. 75. Northern part of the island, *Blain*, No. 61.

### 333. *Canavalia ensiformis* (Linnæus) DeCandolle. SWORD BEAN. JACK BEAN.

*Dolichos ensiformis* LINNÆUS, I, Ed. I, 1753, pp. 725-726.

*Canavalia gladiata* (SAVI) DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, II, 1825, p. 404.

*Canavalia ensiformis* DECANDOLLE, *l. c.*

Without locality, February-March, 1910, *Dr. Jared F. Shafer*. General Distribution: Tropics and subtropics of both hemispheres and often cultivated. Probably sparingly escaped in the Isle of Pines.

### 334. *Canavalia cubensis* Grisebach.

*Canavalia cubensis* GRISEBACH, *Plantæ Wrightianæ*, *Memoirs American Academy Arts and Sciences*, Ser. II, VIII, 1860, p. 178.

Northern part of the island, *Blain*, No. 97 (Millspaugh). General Distribution: Western Cuba and the Isle of Pines.

*Note.*—*Canavalia obtusifolia* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, II, 1825, p. 403, is reported by A. Richard as an Indian species cultivated and acclimated near Batabanó and in the Isle of Pines (Sagra, "Historia Fisica, Politica y Natural de la Isla de Cuba," XX, 1845, p. 194).

335. **Cajanus indicus** Sprengel.

*Cytisus Cajan* LINNÆUS, *Species Plantarum*, II, Ed. I, 1753, p. 739.

*Cajanus bicolor* DECANDOLLE, *Catalogus Plantarum Horti Monspeliensis*, 1813, p. 85.

*Cajanus flavus* DECANDOLLE, *l. c.*

*Cajanus indicus* SPRENGEL, *Systema Vegetabilium*, III, 1826, p. 248.

*Cajan(us) Cajan* MILLSPAUGH, *Field Columbian Museum, Bot. Ser.*, II, 1900, p. 53.

Pedernales Point, February 16, 1899, *Millsbaugh, No. 1416*. General Distribution: Tropics. In America extending north to Bermuda and southern Florida.

336. **Dolicholus reticulatus** (Swartz) Millspaugh.

*Glycine reticulata* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 105.

*Rhynchosia reticulata* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, II, 1825, p. 385.

*Dolicholus reticulatus* MILLSPAUGH, *Field Columbian Museum, Botany*, II, 1900, p. 53.

In savanna near Santa Fé, May 25, 1910, *O. E. Jennings, No. 557*, near Nueva Gerona, June 12, 1912, *G. A. Link*. General Distribution: Through most of the West Indian Islands and in northern South America.

337. **Dolicholus precatorius** (Humboldt & Bonpland) Rose.

*Glycine precatoria* HUMBOLDT & BONPLAND, in Willdenow, *Enumeratio Plantarum Horti Botanici Berolinensis*, 1809, p. 755.

*Rhynchosia precatoria* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, II, 1825, p. 385.

*Dolicholus precatorius* ROSE, *Contributions from the U. S. National Herbarium*, XX, (Part III), 1906, p. 101.

Near base of Mt. Colombo, in woods, May 14, 1910, *O. E. Jennings, No. 274*. General Distribution: Mexico to Panama, and the Isle of Pines.

The seeds of this vine are scarlet, with one end black-tipped, and resemble so closely the seeds of *Abrus precatorius*, the "Prayer-

beads," or "Jequirity," as to make it almost impossible to separate them when mixed. Kunth notes that the seeds of this species are strung on strings for rosaries in the same manner as those of *Abrus*.

338. **Eriosema crinitum** (Humboldt, Bonpland, & Kunth) G. Don.  
*Glycine crinita* HUMBOLDT, BONPLAND, & KUNTH, *Nova Genera et Species Plantarum*, VI, 1823, p. 421, Pl. 573.

*Rhynchosia crinita* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, II, 1825, p. 389.

*Eriosema crinitum* G. DON, *General History of the Dichlamydeous Plants*, II, 1832, p. 348.

Near Nueva Gerona, December 16, 1903, *A. H. Curtiss*, No. 233; savanna near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 20; open pine woods west of La Cañada Mts., May 18, 1910, *O. E. Jennings*, No. 634; northern part of the island, *Blain*, No. 47, reported by Millspaugh, *Field Columbian Museum, Botany*, I, 1900, p. 428. General Distribution: Cuba, Isle of Pines, and from Mexico to South America.

339. **Phaseolus adenanthus** Meyer.

*Phaseolus adenanthus* MEYER, *Primitiæ Floræ Essequiboensis*, 1818, p. 239.

*Phaseolus truxillensis* HUMBOLDT, BONPLAND, & KUNTH, *Nova Genera et Species Plantarum*, VI, 1823, p. 451.

*Phaseolus cochleatus* BELLO, *Anales de la Sociedad Española de Historia Natural*, X, 1881, p. 253.

Near Nueva Gerona, January 31 and March 20, 1904, *A. H. Curtiss*, No. 319. General Distribution: The Isle of Pines, Jamaica, Guadeloupe, Martinique, St. Vincent, Tobago, and in various localities in tropical continental America and the tropics of the Old World.

340. **Phaseolus lathyroides** Linnæus (?).

*Phaseolus lathyroides* LINNÆUS, *Species Plantarum*, II, Ed. II, 1763, p. 1018.

*Phaseolus semirectus* LINNÆUS, *Mantissa Plantarum*, I, 1767, p. 100.

Near Nueva Gerona, February and April, 1904, *A. H. Curtiss*, No. 357; pastured lands west of Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 36. Flowers flesh-pink. General Distribution: Tropics of America and Asia, extending in America as far north as the West Indies and Bahamas.

The specimens seen from the Isle of Pines have small linear-oblong leaves, the largest being 3 mm. wide and about 15–18 mm. long, at the apex mucronulate, obtuse, the edges revolute, and both sides

minutely strigose pubescent with hairs arising from glands. The identification of these specimens as *P. lathyroides* must be considered doubtful.

341. **Vigna repens** (Linnæus) Kuntze.

*Dolichos repens* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1163.

*Dolichos luteolus* JACQUIN, Hortus Botanicus Vindobonensis, I, 1770, p. 39, Pl. 90.

*Vigna luteola* BENTHAM, Martius, Flora Brasiliensis, XV (I), 1859, p. 194, Pl. 50, fig. II.

*Vigna repens* KUNTZE, Revisio Generum Plantarum, I, 1891, p. 212.

*Orobus trifoliatu*s SESSÉ & MOÇINO, Flora Mexicana, Ed. II, 1894, p. 167.

Near Caleta Grande, South Coast, May 22, 1910, *O. E. Jennings*, No. 509 (flowers yellow). General Distribution: Tropics and subtropics of both hemispheres; in America as far north as the Bermudas and the Gulf States from Florida to Texas.

Family OXALIDACEÆ.

342. **Oxalis pinetorum** (Small) Urban.

*Oxalis frutescens* GRISEBACH, Catalogus Plantarum Cubensium, 1866, not Linnæus.

*Lotoxalis pinetorum* SMALL, North American Flora, XXV, Part I, 1907, p. 49.

*Oxalis pinetorum* URBAN, Symbolæ Antillanæ, V, 1908, p. 376.

The type specimen, reported by Small, *l. c.*, was collected at Santa Rosalia, June 25, 1901, *A. A. Taylor*, 154; on "Mal Pais" gravel, Sante Fé, May 25, 1910, *O. E. Jennings*, No. 541; northern part of the island, May, *Blain*, Nos. 27, 139, reported by Millspaugh (*Field Columbian Museum, Botany*, I, 1900, p. 428) under the name of *Oxalis frutescens* Linnæus, but with the note: "Flowering peduncles twice exceeding the leaf." General Distribution: Cuba and the Isle of Pines.

Family ERYTHROXYLACEÆ.

KEY TO THE SPECIES ENUMERATED.

Leaves about 1.5–2 cm. long, obovate, emarginate.

343. *Erythroxylon alaternifolium*.

Leaves up to 6–8 cm. long, obtuse or emarginate. . . . . 344. *Erythroxylon obtusum*.

343. **Erythroxylon alaternifolium** A. Richard.

*Erythroxylon alaternifolium* A. RICHARD, in Sagra, Historia Física, Política y Natural de la Isla de Cuba, X, 1845, p. 105.

*Erythroxylon alternifolium* MAZA, Anales de la Academia de Ciencias Médicas, Físicas y Naturales de la Habana, 1890, p. 225.

Near Nueva Gerona, April 27, 1904, *A. H. Curtiss*, No. 467. General Distribution: Cuba and the Isle of Pines.

344. *Erythroxylon havanense* Jacquin.

*Erythroxylon havanense* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 21.

*Erythroxylon obtusum* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, I, 1824, p. 574.

*Erythroxylon areolatum* POEPPIG, MS, not Linnæus. (O. E. Schulz.)

Near Nueva Gerona, May 31, 1904, *A. H. Curtiss*, No. 519; northern part of the island, *Blain*, Nos. 55, 155, 165 (Millsbaugh). General Distribution: Cuba and the Isle of Pines.

## Family ZYGOPHYLLACEÆ.

345. *Guaiacum sanctum* Linnæus.

*Guaiacum sanctum* LINNÆUS, Species Plantarum, 1753, p. 382; GRISEBACH, Flora of the British West Indian Islands, 1859, p. 134.

Northern part of the island, *Blain*, No. 124 (Millsbaugh). General Distribution: Southern Florida, the Bahamas, Cuba, the Isle of Pines, Porto Rico, and Hispaniola.

## Family RUTACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Leaves with 3-5 leaflets.....346. *Amyris balsamifera*.

Leaves with but one leaflet.

Branches with thorns; leaflets ovate-oblong, about twice as long as wide.

348. *Citrus Lima*.

Branches usually thornless; leaflets widely ovate, often nearly as wide as long.

347. *Citrus vulgaris*.

346. *Amyris balsamifera* Linnæus.

*Amyris balsamifera* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1000.

*Toxicodendron arborescens* MILLER, Gardener's Dictionary, Ed. VIII, 1768.

*Rhus arborescens* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, II, 1825, p. 73.

*Amyris sylvatica* var. GRISEBACH, Memoirs of the American Academy of Arts and Sciences, Series II, VIII, 1860, p. 176.

*Elemifera balsamifera* KUNTZE, Revisio Generum Plantarum, I, 1891, p. 100.

*Schimmelia oleifera* HOLMES, Pharmaceutical Journal and Transactions, London, LXII, 1899, p. 53.

A bushy tree about 5 m. high, in moist soil at edge of jungle along west base of Mt. Colombo, May 12, 1910, *O. E. Jennings*, No. 273; near Nueva Gerona, June 10, 1912, *G. A. Link*. General Distribution: Southern Florida, Cuba, the Isle of Pines, Jamaica (type locality), Haiti, Porto Rico, and South America.

347. *Citrus vulgaris* Risso. BITTER-SWEET ORANGE.

*Citrus vulgaris* RISSO, Annales du Muséum d'Histoire Naturelle, Paris, XX, 1813, p. 190.

*Citrus Bigaradia* LOISELEUR, Traité des Arbres et Arbustes, Edit. Nov., VII, 1819, p. 99.

*Citrus Aurantium vulgaris* WIGHT & ARNOTT, Prodrômus Floræ Peninsulæ Indiæ Orientalis, I, 1834, p. 97.

*Citrus Aurantiacum Bigaradia* HOOKER, Flora of British India, I, 1872, p. 515.

Near Nueva Gerona, June 12, 1912, *G. A. Link*. Possibly naturalized. Cultivated and widely naturalized the world over in the tropics and subtropics.

348. *Citrus Lima* Lunan. LIME.

*Citrus Lima* LUNAN, Hortus Jamaicensis, 1814, p. 451.

*Citrus acida* ROXBURGH, Flora Indica, III, 1832, p. 390.

*Citrus Limetta* WIGHT, Icones Plantarum Indiæ Orientalis III (3), 1845, Pl. 4, in part, not *C. Limetto* Risso.

*Citrus Aurantium spinosissima* GRISEBACH, Flora of the British West Indian Islands, 1859, p. 132.

On site formerly occupied by a homestead, near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 39. Perhaps naturalized. General Distribution: Cultivated and widely naturalized in the tropics and subtropics.

*Note*.—The grape-fruit or pomelo (*Citrus decumana*) and the lemon (*Citrus Limonum*), as also other citrus fruits, are cultivated and naturalized in some of the West Indian islands and will likely become naturalized in the Isle of Pines, if, indeed, they have not already done so.

## Family SURIANACEÆ.

(*SIMARUBACEÆ* authors, in part.)

349. *Suriana maritima* Linnæus.

*Suriana maritima* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 284.

Along the low sandy strand at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 120; Pedernales Point, February 16, 1899, *C. F. Mills-paugh*, No. 1430. General Distribution: On sea-beaches from Florida southwards throughout the American tropics, also in the tropics of the Old World.

## Family BURSERACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Petals in the bud imbricate.....351. *Elaphrium Simaruba*.  
 Petals in the bud valvate.....350. *Icica cubensis*.

350. *Icica cubensis* Rose (?).

*Icica Copal* A. RICHARD, in Sagra, Histoire Physique, Politique et Naturelle de l'île de Cuba, I, 1845, p. 1842. Not *Icica Copal* Schlechtendal, 1830.

*Icica cubensis* ROSE, North American Flora, XXV, 1911, p. 260.

Blain's specimen No. 124, from the northern part of the island, was listed by Millspaugh under *Protium heptaphyllum* (Aublet) March. Without an examination of the specimen the writer is unable to properly refer this to any of the species recorded for the West Indies in the North American Flora, XXV, 1911, p. 268-291. It probably belongs to *Icica cubensis* Rose, as there published. See also, with reference to these species, Urban, *Symbolæ Antillanæ*. VII, 1912, pp. 239-241.

351. *Elaphrium Simaruba* (Linnæus) Rose.

*Pistacia Simaruba* LINNÆUS, Species Plantarum, 1753, p. 1026.

*Bursera gummiifera* JACQUIN, Selectarum Stirpium Americanarum, (1762?), p. 94.

Pl. 65; GRISEBACH, Flora of the British West Indian Islands, 1859, p. 173.

*Elaphrium Simaruba* ROSE, North American Flora, XXV, 1911, p. 246.

Pedernales Point, February 16, 1899.—C. F. Millspaugh. General Distribution: Florida, the West Indies, and probably Mexico.

## Family MELIACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Leaves even-pinnate.

Leaflets in 7-10 pairs; fruit a woody oblong capsule about 3 cm. long.

352. *Cedrela odorata*.

Leaflets in 5-8 pairs; fruit a globose capsule not over 1.5 cm. long.

353. *Trichilia hirta*.

Leaflets in 3-5 pairs; fruit a woody ovoid capsule about 6-12 cm. long.

355. *Swietenia Mahagoni*.

Leaves odd-pinnate, the leaflets 7-9, rarely 5, in number.

354. *Trichilia havanensis*.

352. *Cedrela odorata* Linnæus. WEST INDIAN CEDAR. CEDRO.

*Cedrela odorata* LINNÆUS, Systema Naturæ, Ed. X, II, 1759, p. 940.

*Surenus Brownii* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 574.

Near Nueva Gerona, February 2, 1904. Fruiting specimen, A. H. Curtiss, No. 325; middle slope of Caballos Mts., May 13, 1910, O. E. Jennings, No. 226 (fruiting specimen); near Nueva Gerona, early summer 1912, G. A. Link. General Distribution: West Indies and from Mexico to Colombia.

Probably at one time quite a common tree on the slopes of the



marble mountains and hills in the northern part of the island, but since taken out for its valuable timber. However, A. Richard in Sagra ("Historia Fisica, Politica y Natural de la Isla de Cuba," X, 1845, p. 126) says with regard to the distribution of the species: "Crescit in locis elevatis insulæ Cubæ, nec non insulæ Pinorum."

### 353. *Trichilia hirta* Linnæus.

*Trichilia hirta* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1020.

*Trichilia spondioides* JACQUIN, Enumeratio Plantarum, 1760, p. 20.

Near Nueva Gerona, January 27, 1904, *A. H. Curtiss*, No. 315, tree, 30 feet high, at base of Bibijagua ridge, May 7, 1910, *O. E. Jennings*, No. 116 (in fruit); lower western slope of Casas Mts., May 12, 1910, in flower, *O. E. Jennings*, No. 220; *A. H. Lanier*, in 1831 (*A. Richard*, in Sagra, "Historia Fisica, Politica y Natural de la Isla de Cuba," X, 1845, p. 123). General Distribution: Greater Antilles, St. Thomas, St. Croix, St. Jan, Grenada, Mexico, and Colombia.

### 354. *Trichilia havanensis* Jacquin.

*Trichilia havanensis* JACQUIN, Selectarium Stirpium Americanarum Historia, 1763, p. 129, Pl. 175.

*Trichilia glabra* LINNÆUS, Systema Naturæ, Ed. XIII, 1768, p. 214.

Reported for the Isle of Pines by Achille Richard, in Sagra, "Historia Fisica, Politica y Natural de la Isla de Cuba," X, 1845, p. 124, based upon specimens collected on the island, in 1831, by *A. H. Lanier*. General Distribution: Cuba, the Isle of Pines, and Central America.

### 355. *Swietenia Mahagoni* Jacquin. MAHOGANY.

*Swietenia Mahagoni* JACQUIN, Enumeratio Plantarum, 1760, p. 20.

Mahogany, ranging from the Florida Keys and Bahamas southwards through the West Indies, and from Mexico to Peru, is reported ("The Gem of the Caribbean," *I. A. Wright*, 1909, p. 10) as among the various valuable hardwoods on the coralline limestone along the South Coast. No specimens, however, appear to have been preserved by any botanical collector.

## Family MALPHIGIACEÆ.

### KEY TO THE SPECIES ENUMERATED.

Small tree with paniculate flowers; the leaves acute or acuminate, and, when mature, glabrous, or nearly so, and shining above. . . . 357. *Banisteria laurifolia*.  
Flowers racemose or in axillary, short-peduncled cymes; leaves more or less densely pubescent, or else not much acuminate.

Low mat-forming shrubs with small, spiny-lobed, leathery leaves.

358. *Malphigia horrida*.

Leaves not lobed.

Stem short, gnarled, and thickened, lying at or close to the ground; leaves mullein-like and terminal in a kind of rosette.

361. *Byrsonima verbascifolia*.

Not as above.

Flowers in small umbel-like corymbs; shrubs or vines with leaves varying from elliptic to linear. . . . . 356. *Stigmaphyllon Sagraeanum*.

Flowers in terminal raceme-like panicles.

Connectives projecting beyond the anther-sacs as acute appendages, leaves rounded or emarginate at apex.

362. *Byrsonima coccolobæfolia*.

Connectives not so projecting; leaves mostly acute or shortly acuminate at apex.

Leaves 3-5 cm. long; anthers oblong, glabrous.

360. *Byrsonima Wrightiana*.

Leaves 3-17 cm. long; anthers narrowly oblong, pubescent.

359. *Byrsonima crassifolia*.

### 356. *Stigmaphyllon Sagraeanum* Jussieu.

*Stigmaphyllon Sagraeanum* JUSSIEU, Annales des Sciences Naturelles, Ser. II, XIII, 1840, p. 290.

*Stigmaphyllon reticulatum* JUSSIEU, l. c.

*Stigmaphyllon Faustinum* WRIGHT, in Sauvalle, Anales de la Academia Ciencias, Habana, V, 1868, p. 244.

Near Nueva Gerona, December 8, 1903, and February 7, 1904, A. H. Curtiss, No. 213; shrub, 3 feet high, among palmettoes, on savanna near Nueva Gerona, May 5, 1910, O. E. Jennings, Nos. 1 and 33; a low clambering shrub, on soil derived from coralline limestone, between Bogarona and Caleta Grande, May 22, 1910, O. E. Jennings, No. 471; a slender woody vine, near Hato, May 22, 1910, O. E. Jennings, No. 520. General Distribution: The Bahamas, Cuba and the Isle of Pines.

This species is remarkable for the great variation in the shape of its leaves. In the savannas and open woods of the northern part of the island it grows as a low shrub with oval, oboval, or oblong leaves, while in the southern part of the island, on the coralline limestone of the "South Coast," it grows as a vine and its leaves there become very narrowly lance-oblong or even linear. The writer is not yet prepared to claim that the differences noted are due to the differences in the soil, but our collections would seem to indicate such a relationship.

357. **Banisteria laurifolia** Linnæus.

*Banisteria laurifolia* LINNÆUS, Species Plantarum, Ed. II, 1762, p. 611.

*Banisteria cærulea* LAMARCK, Encyclopédie Méthodique, Botanique, I, 1783, p. 367.

*Heteropteris cærulea* HUMBOLDT, BONPLAND, & KUNTH, DeCandolle's Prodrum Systematis Naturalis Regni Vegetabilis, I, 1824, p. 591.

*Heteropteris laurifolia* JUSSIEU, Annales des Sciences Naturelles, Ser. II, XIII, 1840, p. 276.

Small bushy tree about 12 feet in height, western base of Caballos Mts., May 9, 1910, *O. E. Jennings*, No. 184. General Distribution: West Indies, Mexico, and Central America.

358. **Malphigia horrida** Small.

*Malphigia coccigera* var. *ilicifolia* WRIGHT, in Grisebach's Catalogus Plantarum Cubensium, 1866, p. 43.

*Malphigia ilicifolia* WRIGHT, in Niedenzu, De Genere Malphigia, 1899, p. 18, not *M. ilicifolia* Miller, 1768.

*Malphigia horrida* SMALL, North American Flora, XXV, 1910, p. 160.

On very sterile almost barren iron-gravel soil between Los Indios and the Cañada Mts., May 18, 1910, *O. E. Jennings*, No. 371. Forms low shrubby mats. Flowers pink, one-half to three-quarters of an inch across. *Blain*, No. 36, reported by Millspaugh as *M. coccigera* L., is presumably this more recently described species. General Distribution: Cuba and the Isle of Pines.

359. **Byrsonima crassifolia** (Linnæus) DeCandolle. CORK-WOOD.

*Malphigia crassifolia* LINNÆUS, Species Plantarum, Ed. I, 1753, p. 126.

*Malphigia cinerea* POIRET, Lamarck's Encyclopédie Méthodique, Botanique, Suppl., IV, 1816, p. 7.

*Byrsonima cinerea* DECANDOLLE, Prodrum Systematis Naturalis Regni Vegetabilis, I, 1824, p. 580.

*Byrsonima crassifolia* DECANDOLLE, Prodrum Systematis Naturalis Regni Vegetabilis, I, 1824, p. 579.

*Malphigia cubensis* JUSSIEU, Annales des Sciences Naturelles, Ser. II, XIII, 1840, p. 333.

Near Nueva Gerona, April and May, 1904, *A. H. Curtiss*, No. 216. Bushy tree about 15 feet in height, savanna near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 3; along wet bank of arroyo near Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 63 & 645; on "Mal Pais" gravel in savanna near Santa Fé, May 25, 1910, *O. E. Jennings*, No. 647. "Crescit in insula Pinorum" (A. Richard, in Sagra, "Historia Fisica, Politica y Natural de la Isla de Cuba," X, 1845, p. 110, as *Byrsonima cinerea*); northern part of the island, *Blain*, No. 136

(Millspaugh) as *B. cubensis*. General Distribution: Through the West Indies and Mexico to northern South America. See Plate VI.

360. **Byrsonima Wrightiana** Urban & Niedenzu.

*Byrsonima chrysophylla* var. *lancifolia* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 42. Not *B. lancifolia* Jussieu, 1843.

*Byrsonima Wrightiana* URBAN & NIEDENZU, De Genere Byrsonima, II, 1901, p. 19.

A spreading shrub forming a flattened mat about two feet wide, in pine-barrens near Los Indios, May 17, 1910, *O. E. Jennings*, No. 328; same data, No. 329, forming low shrubby mats about eighteen inches high, on white sandy soil. General Distribution: Cuba and the Isle of Pines. (This is the first collection reported for the Isle of Pines.)

The leaves of the first-mentioned specimen are narrowly ovate, the largest being 6 cm. long by 2 cm. wide, while the largest of the leaves on the other specimen measure only about 3 cm. long by 6 mm. wide. Otherwise the two collections agree very closely.

361. **Byrsonima verbascifolia** (Linnæus) DeCandolle.

*Malpighia verbascifolia* LINNÆUS, Species Plantarum, Ed. I, 1753, p. 426.

*Byrsonima verbascifolia* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, I, 1824, p. 579.

Open savanna among palmetto-growth, near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 12; savanna, annually burned over, near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 26; *Blain*, Nos. 134, 141, and 172, reported by Millspaugh for the northern part of the island. General Distribution: Isle of Pines, Trinidad, northern South America.

The specific name *verbascifolia* is especially well chosen. The plants grow scattered about the open savanna with large mullein-like leaves arising in groups of one to several, rosette-like, from the apex of a short, gnarled, woody stem, which is often prostrate or at least ascending but a few inches above the ground. At a short distance the resemblance to rosettes of *Verbascum Thapsus* is particularly striking.

362. **Byrsonima coccolobæfolia** Humboldt, Bonpland, & Kunth.

*Byrsonima coccolobæfolia* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, V, 1822, p. 148.

*Malpighia coccolobæfolia* SPRENGEL, Systema Vegetabilium, II, 1825, p. 384.

Near Nueva Gerona, May 15, 1904, *A. H. Curtiss*, No. 500; Savanna, near Santa Fé, May 24, 1910, *O. E. Jennings*, No. 561. General Distribution: Isle of Pines and northern South America.

The plants, as seen growing on the savanna near Santa Fé, were small bushy trees rising to a height of ten feet, with much the general habit of growth and appearance of *Curatella americana* (the "Sandpaper Oak"). The flowers generally are white, tinged with pink, the stamens being yellow.

*Note.*—*Malphigia urens* Linnæus, and *M. setosa* Sprengel, *Blain*, Nos. 37 and 144 respectively, were reported for the island by Millspaugh, but these records seem not to have been accepted in the *North American Flora*, XXV, Pt. II, 1910, the former species being credited to "Jamaica and the lesser Antilles," the latter to "Hispaniola" only.

### Family POLYGALACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Flowers in a short, rounded, dense spike, deep rose-color; leaves and corolla glandular, leaves 5–10 mm. long.....363. *Polygala longicaulis*.  
Not as above.

Flowers greenish-yellow in dense acuminate spikes about 1–1.5 cm. long; flowers about 2.5–3 mm. long.....364. *Polygala squamifolia*.

Spikes slender, laxly flowered, 2 to 6 cm. long; flowers light purple to rose.

Leaves up to one cm. or more long.....366. *Polygala gracilis*.

Leaves minute, about 1–1.5 mm. long.....365. *Polygala uncinata*.

#### 363. *Polygala longicaulis* Humboldt, Bonpland, & Kunth.

*Polygala longicaulis* HUMBOLDT, BONPLAND, & KUNTH, *Nova Genera et Species Plantarum*, V, 1821, p. 396.

*Polygala stelleræ* P. DECANOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, I, 1824, p. 327.

*Polygala adenophora* BELLO, *Anales de la Sociedad Española de Historia Natural*, X, 1881, p. 238.

*Polygala variabilis* BELLO, *l. c.*

Near Nueva Gerona, May 26, 1904, *A. H. Curtiss*, No. 514. General Distribution: Cuba, Isle of Pines, Hispaniola, Porto Rico, Trinidad, and from southern Mexico to South America.

#### 364. *Polygala squamifolia* Wright.

*Polygala squamifolia* WRIGHT, in Grisebach's *Catalogus Plantarum Cubensium*, 1866, pp. 12–13.

Along arroyo east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 346; same locality, May 17, on white sand, *O. E. Jennings*, No.

## Family EUPHORBIACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Flowers not in an involucre; calyx of several sepals.

Ovules or seeds two in each cavity.

Stamens in the staminate flowers 5; staminate flowers densely clustered; shrubs.

Leaves lance-oblong or lance-oval, sublustrous on upper surface.

368. *Savia sessiliflora*.

Leaves obovate or elliptic-obovate, strongly lustrous above.

369. *Savia perlucens*.

Three stamens; fruit a three-celled capsule; leaves entire (*Phyllanthus*).

Staminate flowers with 5 sepals; styles slender.

Stipules scarious; filaments free.....372. *Phyllanthus heliotropus*.

Stipules withered dark-brown in upper half; filaments connate into a column.....370. *Phyllanthus nanus*.

Stipules never scarious; filaments connate into a column.

Flowers monœcious.

Anthers not opening in one continuous rift; seeds longitudinally ridged.....371. *Phyllanthus Niruri*.

Anthers opening in one continuous circular or triangular rift; seeds not longitudinally ridged.

375. *Phyllanthus cyclanthera*.

Anthers not opening in one continuous rift; seeds not longitudinally ridged.....376. *Phyllanthus diffusus*.

Flowers diœcious; style bifid; seeds dorsally and faintly subcostate, transversely striolate.....374. *Phyllanthus junceus*.

Staminate flowers with four sepals; styles short and thick; a tall climber.

373. *Phyllanthus scandens*.

Ovules and seeds solitary in each cavity.

Filaments inflexed in the bud; staminate flowers mostly with a corolla; flowers spicate or racemose, in axils or terminal (*Croton*).

Receptacle of the staminate flowers hairy.

Lobes of the calyx equal in the pistillate flowers.

Leaves with scurfy-scales; stamens about 6; styles 4-parted.

377. *Croton cerinus*.

Leaves not scurfy-scaly.

Lower leaves orbicular, 3-5-nerved.

383. *Croton craspedotrichus*.

Leaves mainly pinnately veined; if with 3-5 nerves, these short; leaves longer.

Seeds smooth.....385. *Croton discolor*.

Seeds minutely foveolate-impressed.

381. *Croton Sagræanus*.

Two lobes of the calyx of the pistillate flowers larger than the others.

381. *Croton Sagræanus*.

Receptacle of the staminate flowers smooth; calyx-lobes all equal.

379. *Croton lobatus*.

341 (flowers greenish-white). General Distribution: Western Cuba and the Isle of Pines.

365. *Polygala uncinata* Wright.

*Polygala uncinata* (WRIGHT, MSS.) Millspaugh, Field Columbian Museum, Botanical Series, I, 1900, p. 429.

Based on specimens collected in the northern part of the island, by *Blain*, Nos. 16, 160; on white sand, pine-barrens near Los Indios, May 17, 1910, *O. E. Jennings*, No. 317; same locality, May 18, No. 344; Los Indios, November 4, 1912, *G. A. Link*. General Distribution: Isle of Pines.

From the descriptions and from such specimens as he has seen, the writer must claim inability to distinguish this species from *Polygala glochidiata* Humboldt, Bonpland, & Kunth, a species reported as widely distributed from Mexico through continental tropical America to Brazil, with a few localities reported in the West Indies. The fully ripened seeds of the plants from the Isle of Pines, are "obovate-elliptic" (Wright) to almost perfectly spherical, the apex apiculate, the surface dark brown and somewhat shining, the hairs being white, erect, and hooked at the tip. The seeds are about 0.7-0.8 mm. in diameter. Flowers are light rose-purple in color.

366. *Polygala gracilis* Humboldt, Bonpland, & Kunth.

*Polygala gracilis* HUMBOLDT, BONPLAND, & KUNTH, *Nova Genera et Species Plantarum*, V, 1821, p. 401.

Near Nueva Gerona, February 19, 1904, *A. H. Curtiss*, No. 358. General Distribution: Cuba, the Isle of Pines, Mexico, Costa Rica, Colombia, and Venezuela.

These specimens are too near *Polygala paniculata* Linnæus, one of the four plants on the sheet being well branched. As now understood the writer considers these two species to be practically synonymous.

Family DICHAPETALACEÆ.

367. *Tapura obovata* Britton & Wilson.

*Tapura obovata* BRITTON & WILSON, in Britton, *Studies of West Indian Plants*, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 465.

"Savanna, Vivijagua [Bibijagua] (*Britton & Wilson 15607, type*); coastal plain, San Juan (*Britton & Wilson 15524*)" (Britton, *l. c.*).

(Materials and descriptions at hand do not permit a satisfactory disposal in the key for the rest of the Crotons mentioned in the list.)

Filaments erect in the bud.

(a) Calyx valvate in the staminate flowers; petals present or not.

Staminate flowers mostly apetalous; flowers in clusters, spikes, or panicles, axillary or terminal.

Staminate flowers with petals. . . . . 387. *Caperonia palustris*.

Flowers without petals.

Styles free or only slightly united at the base.

Leaves entire, stipules deciduous; stamens 12-15.

386. *Adelia Ricinella*.

Leaves usually serrate with permanent stipules; stamens usually 8. . . . . 388. *Acalypha chamædryfolia*.

Stigma practically sessile, large and disk-like, lobed.

389. *Pera oppositifolia*.

(b) Calyx valvate or almost imbricate; staminate flowers with petals; stamens usually 10 (*Jatropha*).

Petals free or slightly cohering at the base.

Petioles about as long as the leaf-blade; stipules persisting.

Petioles bearing glands on branched stalks.

390. *Jatropha gossypifolia*.

Petioles without such glands. . . . . 395. *Jatropha multifida*.

Petioles very much shorter than the leaf-blades; stipules not persisting.

Leaves distinctly petiolate; oblong or obovate; partly with one or two acuminate basal lobes.

391. *Jatropha glaucovirens*.

Leaves linear to oblanceolate, not lobed, scarcely petioled.

(*Jatropha angustifolia*.)

Leaves linear. . . . . 393. Var. *genuina*.

Leaves oblanceolate. . . . . 392. Var. *glauca*.

Petals cohering about half way; leaves broad and angularly lobed.

394. *Jatropha Curcas*.

(c) Calyx valvate; stamens free; staminate flowers without petals; woody plants with large tuberous roots. . . . . 396. *Manihot Manihot*.

(d) Calyx imbricate; staminate flowers always without petals; flowers in terminal or axillary spikes, glomerate.

Shrub with shining, leathery, laurel-like, lance-oblong leaves.

399. *Gymnanthes lucida*.

Low pubescent herb with small, lance-ovate leaves.

398. *Sebastiana corniculata*.

Large tree with rounded-cordate acuminate leaves.

397. *Hura crepitans*.

Flowers in involucre; calyx represented by a minute scale at the base of a filament-like pedicel.

Glands of the involucre with petal-like appendages, often very much reduced; leaves inequilateral, oblique at the base (*Chamæsyce*).



Leaves entire, glabrous.

Leaves fleshy, involute, whitish underneath, longer than wide.

402. *Chamasyce buxifolia*.

Leaves hardly fleshy, not involute, reddish underneath, often wider than long. . . . . 401. *Chamasyce camaguayensis*.

Leaves plainly serrate, often only at the apex.

Leaves several times longer than wide. . . . . 400. *Chamasyce brasiliensis*.

Leaves suborbicular to about three times longer than wide.

403. *Chamasyce Jenningsii*.

Glands without petaloid appendages; leaves fleshy, tapering evenly to a sessile base. . . . . 404. *Tithymalus trichotomus*.

### 368. *Savia sessiliflora* (Swartz) Willdenow.

*Croton sessiliflorum* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 100.

*Savia sessiliflora* WILLDENOW, Species Plantarum, IV, (2), 1806, p. 771.

Near Nueva Gerona, March 2, 1904, *A. H. Curtiss*, No. 381. General Distribution: Cuba, Isle of Pines, Hispaniola, Porto Rico, St. Thomas, St. Croix, St. Jan.

### 369. *Savia perlucens* Britton.

*Savia perlucens* BRITTON, Studies of West Indian Plants, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 464.

"Limestone plain, Caleta Grande (*Britton, Wilson & Leon 15330*)."  
Spring of 1916 (*Britton, l. c.*).

### 370. *Phyllanthus nanus* Millspaugh.

*Phyllanthus nanus* MILLSPAUGH, in Britton, Studies of West Indian Plants, Bulletin of the Torrey Botanical Club, XLIII, 1916, pp. 464, 465.

"In white sand in the vicinity of Los Indios (*Britton & Wilson 14192*). Type sheet in the herbarium of the Field Columbian Museum" (*Britton, l. c.*). This specimen was collected in the spring of 1916.

### 371. *Phyllanthus Niruri* Linnæus.

*Phyllanthus Niruri* LINNÆUS, Species Plantarum, 1753, p. 981.

Near Nueva Gerona, March 20, 1904, *A. H. Curtiss*, No. 422. General Distribution: Tropical regions generally, in America extending northward through the West Indies, Bahamas, and Bermuda ("Introduced", Hemsley).

### 372. *Phyllanthus heliotropus* Grisebach.

*Phyllanthus heliotropus* GRISEBACH, Nachrichten Kgl. Gesellschaft der Wissenschaften, Göttingen, 1865, p. 167.

In grassy place along the Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 411. General Distribution: Western Cuba and the Isle of Pines.

373. **Phyllanthus scandens** Mueller-Aargau.

*Phyllanthus scandens* MUELLER-AARGAU, in DeCandolle, *Prodromus Systematis Naturalis Regni Vegetabilis*, XV, (2), 1866, p. 415.

A straggling shrub on the rocky slope of the ridge at Bibijagua, May 5, 1910, *O. E. Jennings*, No. 678. General Distribution: Cuba and the Isle of Pines.

374. **Phyllanthus junceus** Mueller-Aargau.

*Phyllanthus junceus* MUELLER-AARGAU, in DeCandolle, *Prodromus Systematis Naturalis Regni Vegetabilis*, XV, (2), 1866, p. 411.

In the pine-barrens, near the Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 408. General Distribution: Western Cuba and the Isle of Pines.

375. **Phyllanthus cyclanthera** Baillon.

*Phyllanthus cyclanthera* BAILLON, *Adansonia*, I, 1806, p. 31.

Northern part of the island, *Blain*, No. 107 (Millspaugh). General Distribution: Cuba, the Isle of Pines, Hispaniola.

376. **Phyllanthus diffusus** Klotzsch.

*Phyllanthus diffusus* KLOTZSCH, in Seemann, *Voyage of the Herald*, Botany, 1852-1857, p. 105.

Northern part of the island, *Blain*, No. 174 (Millspaugh). General Distribution: The Isle of Pines, Porto Rico, Guadeloupe, and from Panama to Brazil.

377. **Croton cerinus** Mueller-Aargau.

*Croton cerinus* MUELLER-AARGAU, in DeCandolle, *Prodromus Systematis Naturalis Regni Vegetabilis*, XV, (2), 1866, pp. 570-571.

Along moist side of arroyo between Los Indios and the Cañada Mts., May 18, 1910, *O. E. Jennings*, No. 373; *Blain*, No. 64.—Millspaugh. General Distribution: Western Cuba and the Isle of Pines.

378. **Croton reptans** Swartz.

*Croton reptans* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 99.

Reported by Millspaugh (*Field Columbian Museum, Bot. Ser.*, I,

1900, p. 429) on the basis of a specimen collected in the northern part of the island by *Blain* (No. 62). General Distribution: West Indies.

379. ***Croton lobatus* Linnæus.**

*Croton lobatus* LINNÆUS, Species Plantarum, Ed. I, 1753, p. 1004.

Northern part of the Island, *Blain*, No. 81 (Millspaugh). General Distribution: Well distributed through the West Indies and continental tropical America.

380. ***Croton bispinosus* Wright.**

*Croton bispinosus* WRIGHT, in Sauvalle, Anales Académia de Ciencias Médicas, Físicas y Naturales de la Habana, V, 1868, n. 128.

Northern part of the island, *Blain*, Nos. 117, 178 (Millspaugh). General Distribution: Western Cuba and the Isle of Pines.

381. ***Croton Sagræanus* Mueller-Aargau.**

*Croton Sagræanus* MUELLER-AARGAU, in DeCandolle, Prodromus Systematis Naturalis Regni Vegetabilis, XV, (II), 1846, p. 616-617.

Near Nueva Gerona, February and April, 1904, *A. H. Curtiss*, No. 366; along side of an arroyo south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 200. General Distribution: Cuba and the Isle of Pines.

382. ***Croton procumbens* Wright.**

*Croton procumbens* WRIGHT, in Grisebach, Nachrichten Kgl. Gesellschaft der Wissenschaften, Göttingen, 1865, p. 167.

Near Nueva Gerona, March 11, 1904, *A. H. Curtiss*, No. 398. General Distribution: Western Cuba and the Isle of Pines.

383. ***Croton craspedotrichus* Grisebach.**

*Croton craspedotrichus* GRISEBACH, Nachrichten Kgl. Gesellschaft der Wissenschaften, Göttingen, 1865, p. 173.

Near Nueva Gerona, March 5, 1904, *A. H. Curtiss*, No. 385; among palmettoes on the pastured savanna near Nueva Gerona, May 5, 1910, *O. E. Jennings*, Nos. 21 and 24; *Blain*, No. 63 (Millspaugh). General Distribution: Western Cuba and the Isle of Pines.

384. ***Croton glandulosus* Linnæus.**

*Croton glandulosus* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1275.

*Croton affinis* VAHL, Sprengel's Systema Vegetabilium, III, 1826, p. 70.

Growing as a weed in a grapefruit grove north of Nueva Gerona,

May 14, 1910, *O. E. Jennings*, No. 244; in pine-barrens near Los Indios, May 19, 1910, *O. E. Jennings*, No. 392. General Distribution: Widely distributed from Florida and Texas south through tropical continental America and the West Indies.

This is a highly polymorphous species with many named varieties. The flowers were white in all the specimens seen in the Isle of Pines.

385. ***Croton discolor* Willdenow.**

*Croton discolor* WILLDENOW, Species Plantarum, IV, 1805, p. 532.

Northern part of the island, *Blain*, No. 133 (Millspaugh). General Distribution: Isle of Pines, Hispaniola, St. Thomas, St. Croix, and Porto Rico.

*Note.*—*Croton domingense* VAHL, is reported by A. Richard (Sagra, "Historia Fisica, Politica y Natural de la Isla de Cuba," XI, 1850, p. 213) on the basis of specimens collected by Lanier.

386. ***Adelia Ricinella* Linnæus.**

*Adelia Ricinella* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1298.

*Ricinella pedunculosa* MUELLER-AARGAU, Linnæa, XXXIV, 1865, p. 153.

A small tree at the base of the ridge at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 122. General Distribution: Greater Antilles, eastward as far as St. Martin.

387. ***Caperonia palustris* (Linnæus) St. Hilaire.**

*Croton palustris* LINNÆUS, Species Plantarum, 1753, p. 1004.

*Caperonia palustris* ST. HILAIRE, Histoire des Plantes les plus Remarquables du Brésil et du Paraguay, etc., 1824, p. 245.

*Caperonia castaneifolia* GRISEBACH, Flora of the British West Indian Islands, 1859, p. 43. Not St. Hilaire.

Near Nueva Gerona, May 1, 1904, *O. E. Jennings*, No. 476. General Distribution: Cuba, the Isle of Pines, Porto Rico, Hispaniola, Guadeloupe, Martinique, Tobago, and from Mexico to Paraguay; also tropical Africa.

388. ***Acalypha chamædryfolia* (Lamarck) Mueller-Aargau.**

*Croton chamædryfolius* LAMARCK, Encyclopédie Méthodique, Botanique, II, 1786, p. 214.

*Acalypha reptans* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 99.

*Acalypha chamædryfolia* MUELLER-AARGAU, in DeCandolle, Prodrum Systematis Naturalis Regni Vegetabilis, XV, (2), 1866, p. 879.

*Ricinocarpus chamædryfolius* O. KUNTZE, *Revisio Generum Plantarum*, II, 1891, p. 617.

Near Nueva Gerona, May 6, 1904, *A. H. Curtiss*, No. 481. In pine-barrens between Los Indios and the Cañada Mts., May 18, 1910, *O. E. Jennings*, No. 376; on strand at Caleta Grande, South Coast, May 22, 1910, *O. E. Jennings*, No. 501. General Distribution: Cuba, the Isle of Pines, Jamaica, Hispaniola, Porto Rico, St. Thomas, St. Croix, and Guadeloupe.

389. ***Pera oppositifolia*** Grisebach.

*Pera oppositifolia* GRISEBACH, *Nachrichten Kgl. Gesellschaft der Wissenschaften*, Göttingen, 1865, p. 167.

Northern part of the island, *Blain*, No. 53 (Millspaugh). General Distribution: Western Cuba and the Isle of Pines.

390. ***Jatropha gossypifolia*** var. ***elegans*** (Klotzsch) Mueller-Aargau.

*Adenoropium elegans* POHL, *Plantarum Brasiliæ Icones et Descriptiones Hactenus Ineditæ*, I, 1827, p. 15.

*Adenoropium gossypifolium* POHL, *op. cit.*, p. 16.

*Jatropha elegans* KLOTZSCH, in Seemann, *Voyage of the Herald*, Botany, 1845-1851, p. 102.

*Jatropha gossypifolia* LINNÆUS, *Species Plantarum*, 1753, p. 1006, var. *elegans* MUELLER-AARGAU, in DeCandolle, *Prodromus Systematis Naturalis Regni Vegetabilis*, XV, (2), 1866, p. 1087.

Near Nueva Gerona, April 2, 1904, *A. H. Curtiss*, No. 434. General Distribution: From the Bahamas and southern Mexico south through the West Indies and continental tropical America to Paraguay.

391. ***Jatropha glaucovirens*** Pax & Hoffmann.

*Jatropha glaucovirens* PAX & K. HOFFMANN, in Engler, *Pflanzenreich*, IV, 1910, p. 147.

Near Nueva Gerona, April 22, 1904, *A. H. Curtiss*, No. 458 (*type collection*); upper edge of rocky strand along front of ridge at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 88; swamp, one mile north of Nueva Gerona, May 8, 1910, *O. E. Jennings*, No. 147; near the Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, Nos. 661 and 680. General Distribution: Isle of Pines.

This is a sparsely branched shrub about two to four feet high, growing quite commonly in the sandy pine woods, rocky slopes, or even in swampy woods, in nearly every part of the island visited.

Some of the flat-topped inflorescences are composed of as many as fifty flowers, several of which are usually in bloom at once and, on account of the bright scarlet color, they make the plant quite striking. The flowers vary somewhat in color, some of them showing a tinge of yellow. Added to the striking character of the flowers, the bright green oblanceolate leaves, towards the lower part of the branches, have an unusual form. They usually swing out at the base into one or two sharply acuminate lobes.

392. *Jatropha angustifolia* var. *glauca* (Grisebach) Pax.

*Jatropha glauca* GRISEBACH, Nachrichten Kgl. Gesellschaft der Wissenschaften, Göttingen, 1865, p. 170.

*Jatropha angustifolia* var. *spathulacea* MUELLER-AARGAU, in DeCandolle, Prodrômus Systematis Naturalis Regni Vegetabilis, XV, (2), 1866, p. 1093.

*Jatropha angustifolia* var. *glauca* PAX, in Engler, Pflanzenreich, IV, (147), 1910, p. 52.

In an arroyo in the pine-barrens, near Los Indios, May 17, 1910, O. E. Jennings, No. 331; in low pine woods north of Los Indios, May 19, 1910, O. E. Jennings, No. 667. General Distribution: Western Cuba and the Isle of Pines.

393. *Jatropha angustifolia* var. *genuina* Mueller-Aargau.

*Jatropha angustifolia* var. *genuina* MUELLER-AARGAU, in DeCandolle, Prodrômus Systematis Naturalis Regni Vegetabilis, XV, (2), 1866, p. 1093.

On the white sand of the pine-barrens at Los Indios, May 17, 1910, O. E. Jennings, No. 320; near the Majagua River, north of Los Indios, May 19, 1910, O. E. Jennings, No. 666. General Distribution: Western Cuba and the Isle of Pines.

The flowers and fruit of the two varieties are identical in character, but the shape of the leaves is so strikingly different that were it not for occasional transitional forms one would have good reason for regarding them as distinct species. The plants are low, usually not over two or three feet high, simple or sparsely branched, woody, particularly below, and at the base there is often an enlarged woody stem, just underneath the soil, often an inch or more in diameter.

The flowers are not so brilliantly scarlet as are those of *Jatropha glaucovirens*, the color ranging from a purplish or rose pink to a pure white. In some localities only white ones were seen.

394. **Jatropha Curcas** Linnæus. PHYSIC NUT.

*Jatropha Curcas* LINNÆUS, Species Plantarum, 1753, p. 1006.

*Curcas indica* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, III, 1853, p. 208.

Near Nueva Gerona, April 19, 1904, *A. H. Curtiss, No. 451*. General Distribution: Widely distributed in tropical America from the Bermudas and Mexico to Paraguay and Chile; also in the tropics of the Old World, where it has been introduced. This plant is much cultivated in some regions for the nuts, which are strongly purgative and are used medicinally.

395. **Jatropha multifida** Linnæus.

*Jatropha multifida* LINNÆUS, Species Plantarum, 1753, p. 1006.

Northern part of the island, *Blain, No. 106* (Millspaugh). General Distribution: Widely distributed in the West Indies and continental tropical America, and cultivated and sub-spontaneous in the tropics of the Old World.

396. **Manihot Manihot** (Linnæus) Cockerell. CASSAVA. BITTER CASSAVA. YUCA.

*Jatropha Manihot* LINNÆUS, Species Plantarum, 1753, p. 1007.

*Janipha Manihot* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, II, 1817, p. 108.

*Manihot utilissima* POHL, Plantarum Brasilæ Icones et Descriptiones Hactenus Ineditæ, I, 1827, p. 32, Pl. 24.

*Manihot Manihot* COCKERELL, Bulletin Torrey Botanical Club, XIX, 1892, p. 95.

The writer was told that this plant has been found wild upon the island, but no specimens were seen. Dr. J. F. Shafer collected a specimen (root) in 1910, probably cultivated. General Distribution: American tropics, especially South America.

The natives of the island still use the plant for food, cooking the large roots, so that there is a chance that it may be given good opportunities to become naturalized, if it has not already done so.

397. **Hura crepitans** Linnæus. SAND-BOX TREE. JAVILLO.

*Hura crepitans* LINNÆUS, Species Plantarum, 1753, p. 1008.

Near where a house was formerly located, one mile east of Nueva Gerona, May 6, 1910, *O. E. Jennings, No. 65* (possibly naturalized). General Distribution: Rather widely distributed in the West Indies and in continental tropical America.

The fruit of this tree is of about the size of a small orange, finally becoming dry and bursting apart with much force. The seeds rattle about in the dry fruit, hence the name "Sand-box Tree." The trees are fairly large, with a spreading crown, so that they are of considerable value as shade trees, and are so used in some of the West Indian islands.

398. **Sebastiania corniculata** (Vahl) Pax.

*Sebastiania corniculata* MUELLER-AARGAU, in DeCandolle, *Prodromus Systematis Naturalis Regni Vegetabilis*, XV, (2), 1866, p. 1168.

Variety **tragioides** (Martius) Pax.

*Cnemidostachys tragioides* MARTIUS, *Nova Genera et Species Plantarum*, I, I 1824, p. 70.

*Microstachys Vahlia* A. RICHARD, in Sagra, *Historia Fisica Politica y Natural de la Isla de Cuba*, XI, 1850, p. 202.

*Microstachys corniculata* GRISEBACH, *Flora of the British West Indian Islands*, 1864, p. 49.

*Sebastiania corniculata* var. *tragioides* PAX, in Engler, *Pflanzenreich*, IV, (147, IV), 1912, p. 98.

Near Nueva Gerona, January 1 and May 8, 1904, *A. H. Curtiss*, No. 266; side of arroyo, pine-barrens, Los Indios, May 17, 1910, *O. E. Jennings*, No. 330; in low place along the Majagua River near Los Indios, May, 1910, *O. E. Jennings*, No. 405a. General Distribution: Cuba, the Isle of Pines, Haiti, Columbia, Guiana, and Brazil.

Millspaugh reports *Blain*, No. 111 to be *Sebastiania corniculata* (Cf. *Field Columbian Museum, Bot. Ser.*, I, 1900, p. 429).

399. **Gymnanthes lucida** Swartz. POISONWOOD.

*Gymnanthes lucida* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 96.

*Excæcaria lucida* SWARTZ, *Flora Indiæ Occidentalis*, II, 1800, p. 1122.

*Sebastiania lucida* MUELLER-AARGAU, in DeCandolle, *Prodromus Systematis Naturalis Regni Vegetabilis*, XV, (2), 1866, p. 1181.

Near Nueva Gerona, May 31, 1904, *A. H. Curtiss*, No. 518. General Distribution: Southern Florida, the Bahamas, and West Indian islands as far east as Guadeloupe.

400. **Chamæsyce brasiliensis** (Lamarck) Small.

*Euphorbia brasiliensis* LAMARCK, *Encyclopédie Méthodique, Botanique*, II, 1786, p. 423.

*Chamæsyce brasiliensis* SMALL, *Flora of the Southeastern U. S.*, 1903, p. 712.

Near Nueva Gerona, December 19, 1903, *A. H. Curtiss*, No. 244;



in pine-barrens east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 357; Santa Fé, May 26, 1910, *O. E. Jennings*, No. 684. General Distribution: From the Gulf States to Mexico, the West Indies, and tropical America generally.

401. ***Chamæsyce camaguayensis* Millspaugh.**

*Chamæsyce camaguayensis* MILLSPAUGH, Field Columbian Museum, Bot. Ser., II, 1914, pp. 392-393.

Field near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 608. General Distribution: Cuba and the Isle of Pines.

402. ***Chamæscye buxifolia* (Lamarck) Small.**

*Euphorbia buxifolia* LAMARCK, Encyclopédie Méthodique, Botanique, II, 1786, p. 421.

*Chamæsyce buxifolia* SMALL, Flora of the Southeastern U. S., 1903, p. 712.

On sandy beach at Bibijagua, May 7, 1910, *O. E. Jennings*, Nos. 77, 78a; on coralline beach at Caleta Grande, South Coast, May 22, 1910, *O. E. Jennings*, No. 510; February 16, 1899, *Millspaugh*, No. 1432 (Millspaugh); 1831, *A. H. Lanier*, (*A. Richard*, in *Sagra*.) General Distribution: On maritime sands, Florida, the Bahamas, and the tropical coasts of the Gulf of Mexico and the Caribbean Sea generally.

403. ***Chamæsyce Jenningsii* Millspaugh.**

*Chamæsyce Jenningsii* MILLSPAUGH, in Britton, Studies of West Indian Plants, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 465.

Near Bibijagua, along the shore, May 7, 1910, *O. E. Jennings*, No. 621. Type in the Herbarium of the Carnegie Museum; also in coastal sands at Bibijagua, spring of 1916, *Britton & Wilson*, No. 14, 690.

404. ***Tithymalus trichotomus* (Kunth) Klotzsch & Garcke.**

*Euphorbia trichotoma* KUNTH, in Nova Genera et Species Plantarum, II, 1817, p. 60.

*Tithymalus trichotomus* KLOTZSCH & GARCKE, Linne's Natürliche Pflanzenklasse Tricoccæ, 1860, p. 81.

Near Caleta Grande, "South Coast," on coralline sand May 22, 1910, *O. E. Jennings*, No. 499. General Distribution: On coastal sands, southern Florida, the Bahamas, Cuba, the Isle of Pines, Cayman Islands, and the shores of Mexico.

## Family ANACARDIACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Leaves simple; large trees.

Leaves lanceolate, acuminate. . . . . 405. *Mangifera indica*.

Leaves obovate, apex rounded or retuse. . . . . 406. *Anacardium occidentale*.

Leaves pinnate; trees or shrubs.

Leaflets sessile, minutely repand-denticulate. . . . . 408. *Comocladia dentata*.

Leaflets usually 5, thick, lustrous on upper surface. . . . 409. *Metopium Brownei*.

Leaflets usually 9-13, thin, dull, or but slightly lustrous.

407. *Spondias Mombin*.

405. *Mangifera indica* Linnæus. MANGO.

*Mangifera indica* LINNÆUS, Species Plantarum I, Ed. I, 1753, p. 200.

Near Nueva Gerona, January 17, 1904 (flowers), *A. H. Curtiss*, No. 298; no locality given, *Dr. Jared F. Shafer*, February-March, 1910. General Distribution: From the Bahamas and Florida south through the West Indies and tropical America. Naturalized throughout the tropics from southeastern Asia, and the better varieties of it furnishing a valuable fruit much appreciated by those who have become accustomed to it. The Mango has established itself, especially in the vicinity of Santa Fé, to the extent of forming small groves.

406. *Anacardium occidentale* Linnæus. CASHEW.

*Anacardium occidentale* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 383.

Near Nueva Gerona, January 4, and May, 1904, *A. H. Curtiss*, No. 271; near base of Casas Mts., west of Nueva Gerona, May 4, 1910, *O. E. Jennings*, No. 40; *Dr. Jared F. Shafer*, February-March, 1910; near Los Indios, November 4, 1912, *G. A. Link*. General Distribution: From the Bahamas and Cuba south through the West Indies and in continental tropical America. Now quite generally naturalized throughout the tropics. See Plate IX.

The cashew is a very valuable tree, as yet not sufficiently appreciated. The wood is strong, hard, and useful in a variety of ways; the peduncle of the fruit becomes enlarged and pear-shaped, and, when mature, constitutes a subacid, slightly astringent edible fruit, which is either eaten raw or prepared in various ways by cooking; and the nut, which is kidney-shaped and about one inch long, is claimed to be a strong competitor of the almond when properly roasted. The middle layer of the shell of this nut is poisonous, but the poisonous property may be destroyed by heat. Altogether the

various uses of this plant, many of them not here mentioned, give it a very prominent place among the useful trees of the tropics. (See Cook and Collins, "Economic Plants of Porto Rico," Contrib. U. S. Nat. Herbarium, VIII, 1903, pp. 57-269.)

407. **Spondias Mombin** Linnæus. HOG-PLUM.

*Spondias Mombin* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 371.

*Spondias lutea* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 613.

*Spondias pseudomyrobalanus* TUSSAC, Flora Antillarum, IV, 1827, p. 97, Pl. 33.

A loosely branched tree about 60 feet high, at the base of the Bibijagua ridge, May 7, 1910, *O. E. Jennings*, No. 123. General Distribution: From the Bahamas south through the West Indies and continental tropical America. Also in the tropics of the Old World.

This tree was quite abundant on the slopes of the Bibijagua ridge and was common on the Caballos and Casas Mts.

408. **Comocladia dentata** Jacquin. GUAO.

*Comocladia dentata* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 12.

*Comocladia propinqua* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, VII, 1824, p. 16.

*Comocladia dentata propinqua* ENGLER, in DeCandolle, Monographiæ Phanerogamarum, IV, 1883, p. 364.

A low spreading shrub with club-like, but crooked, branches, the short trunk about four inches in diameter, the uppermost branches reaching a height of about fourteen feet. In pasture at north base of Casas Mts., May 15, 1910, *O. E. Jennings*, No. 282. General Distribution: Cuba and the Isle of Pines. This species was seen to extend up the slopes of Casas Mts. for some distance. It is quite poisonous to the touch, the effects being very similar to those of Poison Ivy (*Rhus Toxicodendron*).

409. **Metopium Brownei** Urban.

*Rhus Metopium* LINNÆUS, Systema Naturæ, Ed. X, II, 1759, p. 964.

*Terebinthus Brownei* JACQUIN, Enumeratio Plantarum, 1760, p. 18.

*Metopium Linnæi* ENGLER, in DeCandolle, Monographiæ Phanerogamarum, IV, 1883, p. 367 (p.p.).

*Cotinus Metopium* MAZA, El Progreso Medico, VIII, 1896, p. 50.

*Metopium Brownei* URBAN, Symbolæ Antillanæ, V, 1908, p. 402.

Along sandy beach below Sigüanea just above the reach of ordinary wave action, May 21, 1910, *O. E. Jennings*, No. 462; on bluff of coral-

line limestone near Caleta Grande, May 22, 1910, *O. E. Jennings*, No. 468; *A. H. Lanier*, in 1831 (Achille Richard, in Sagra, "Historia Fisica, Politica y Natural de la Isla de Cuba," X, 1845, p. 157). General Distribution: Cuba, the Isle of Pines, Jamaica, San Domingo, and Yucatan.

Not seen in the northern part of the island. At Sigüanea a fine row of these trees had been left when the mangrove fringe was cleared away, just back of the bathing beach. The trees were highly ornamental, with dense heads of lustrous foliage and a whitish smooth bark. They were about thirty feet high, the trunks with a diameter of about sixteen inches. Along the south coast near Caleta Grande the species was also quite abundant, particularly along the bluffs near the sea. The tree from which specimens were taken was about forty feet high and with a trunk about twelve inches in diameter.

### Family CYRILLACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Leaves manifestly petioled; flowers not over 3 mm. long. .410. *Cyrilla racemiflora*.  
Leaves narrowed to a sessile base; outer sepals showy, rose-tinted, and up to 15 mm. long. ....411. *Costæa cubensis*.

#### 410. *Cyrilla racemiflora* Linnæus.

*Cyrilla racemiflora* LINNÆUS, Mantissa Plantarum, I, 1767, p. 50.

*Cyrilla racemifera* VANDELLI, Floræ Lusitanicæ et Brasiliensis Specimen, No. 88, 1788.

*Itea cyrilla* SWARTZ, Prodrômus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 50.

*Cyrilla antillana* MICHAUX, Flora Boreali-Americana, I, 1803, p. 158.

Near Nueva Gerona, May 9, 1904, *A. H. Curtiss*, No. 490; tree, on the bank of the river at Los Indios, May 20, 1910, *O. E. Jennings*, No. 436. General Distribution: Along the coastal plain from North Carolina to Florida and Texas, West Indies, Guiana, and northern Brazil.

#### 411. *Costæa cubensis* A. Richard.

*Costæa cubensis* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, II, 1850, p. 76, Pl. 53.

In pine-barrens east of Los Indios, May 17, 1910, *O. E. Jennings*, No. 326. General Distribution: Cuba and the Isle of Pines, this being the first report for the latter island.

A low shrub with few branches, these ranging from more or less

stiffly ascending to erect and bearing at the apex a rather close tuft of leaves. The plants were growing in a soil largely composed of white quartzose gravel. The showy terminal racemes suggest that the plant might be of some value as an ornamental shrub.

Family AQUIFOLIACEÆ.

(*ILICACEÆ*.)

412. *Ilex montana* Grisebach.

*Ilex montana* GRISEBACH, Memoirs of the American Academy of Arts and Sciences, New Series, VIII, 1861, p. 171.

Northern part of the island, *Blain*, No. 152 (Millspaugh). General Distribution: Cuba, the Isle of Pines, and perhaps other West Indian Islands. See recently described species and varieties in Urban's *Symbolæ Antillanæ*.

Family CELASTRACEÆ.

413. *Maytenus buxifolia* Grisebach.

*Monterverdia buxifolia* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, p. 142, Pl. 36.

*Celastrus parvifolius* A. RICHARD, *op. cit.*, p. 143.

*Maytenus buxifolia* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 53.

*Maytenus cochlearifolius* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 53.

*Celastrus Richardi* G. MAZA, Diccionario Botanico, 1889, p. 25.

Along Casas River, about three miles south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 211. General Distribution: Bahamas, Cuba, the Isle of Pines, Haiti, and Santo Domingo.

Family HIPPOCRATEACEÆ.

414. *Salacia Blainii* Millspaugh.

*Salacia Blainii* MILLSPAUGH, Field Columbian Museum, Botanical Series, I, 1900, p. 430.

Northern part of the island, *Blain*, No. 176. Type (Millspaugh, *l. c.*). Known only from the type-locality.

Family STAPHYLEACEÆ.

415. *Huertia cubensis* Grisebach.

*Huertia cubensis* GRISEBACH, Catalogus Plantarum Cubensium, 1866, pp. 66, 67.

Northern part of the island, *Blain*, Nos. 115, 169 (Millspaugh). General Distribution: Cuba and the Isle of Pines.

## Family SAPINDACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Leaves with usually 6-10 (4-12) leaflets.

Leaflets scabrous-pubescent (or glabrate) beneath, obovate-oblong, serrate, or repand-crenate.....419. *Cupania americana*.

Leaflets glabrous, entire, lance-oblong.

421. *Matayba apetala* forma *oppositifolia*.

Leaves with 3-5 leaflets.

Climbing woody vines with tendrils.....416. *Serjania diversifolia*.

Non-climbing shrubs or trees.

Leaflets three.....417. *Allophyllus Cominia*.

Leaflets four, in two pairs.....418. *Melicocca bijuga*.

Leaflets mostly five; fruit with three almost spherical lobes.

420. *Cupania macrophylla*.

416. *Serjania diversifolia* (Jacquin) Radlkofer.

*Paullinia diversifolia* JACQUIN, Enumeratio Plantarum, 1760, p. 36.

*Serjania diversifolia* RADLKOFER, Monographie der Sapindaceen Gattung Serjania, 1875, p. 179.

Near Nueva Gerona, January 31 (flowers) and March 24 (fruit), 1904, *A. H. Curtiss*, No. 321; in clearing on low ground north of Nueva Gerona, May 8, 1910, *O. E. Jennings*, No. 149; along South Coast, near Caleta Grande, May 22, 1910, *O. E. Jennings*, No. 506; in thicket along river south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 652. General Distribution: Bahamas, Cuba, the Isle of Pines, Porto Rico, Haiti, Venezuela.

This plant is a woody climber and is quite common in thickets on low grounds in various parts of the island, often growing at the edge of the mangrove association in brackish soil. The plant helps materially to make the thickets almost impenetrable, clinging to its supports with strong tendrils; but it is often highly ornamental, the winged seeds, usually tinted a rose-purple, hanging in large racemes.

417. *Allophyllus Cominia* (Swartz) Radlkofer.

*Schmidelia Cominia* SWARTZ, Prodrromus Descriptionum Vegetabilium Indiæ Occidentalis.

*Allophyllus Cominia* RADLKOFER, Natürliche Pflanzenfamilien, III, Abt. V, 1895, p. 312.

Near Nueva Gerona, December 18, 1904, *A. H. Curtiss*, No. 242. General Distribution: Cuba, Haiti, the Isle of Pines, Jamaica.

418. **Melicocca bijuga** Linnæus. GENIP TREE.

*Melicocca bijuga* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 495.

Near Nueva Gerona, April 15 and June 1, 1904, *A. H. Curtiss*, No. 444. General Distribution: Widely distributed in the West Indies and in the American tropics from Nicaragua southwards. Sometimes used as a shade tree.

419. **Cupania americana** Linnæus.

*Cupania americana* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 200.

*Cupania tomentosa* SWARTZ, Prodrömus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 61.

Near Nueva Genona, February 14, 1904, *A. H. Curtiss*, No. 351. General Distribution: Cuba, the Isle of Pines, Haiti, Porto Rico, Martinique, Trinidad, and Venezuela.

420. **Cupania macrophylla** A. Richard. GUARA COLORADO.

*Cupania macrophylla* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, p. 120.

Reported from Cuba and from the Isle of Pines by Achille Richard, *l. c.* General Distribution: Mexico, Cuba, and the Isle of Pines.

421. **Matayba apetala** forma **oppositifolia** (A. Richard) Radlkofer.

*Cupania oppositifolia* A. RICHARD, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, p. 121, Pl. 32.

*Matayba apetala* forma *oppositifolia* RADLKOFER, in Urban, Symbolæ Antillanæ, I, 1899, p. 354.

River-bank at Los Indios, May 19, 1910, *O. E. Jennings*, No. 406; near Nueva Gerona, February 7 and April 5, 1904, *A. H. Curtiss*, No. 329. General Distribution: Cuba, the Isle of Pines, Porto Rico, and Honduras.

A characteristic tree of the river-banks near Los Indios, growing to a height of about forty feet, and the trunk reaching a diameter of six inches or more.

Family DODONÆACEÆ.

KEY TO THE SPECIES ENUMERATED.

Leaves mostly obovate-lanceolate; wings of fruit of nearly uniform width.

422. *Dodonæa viscosa*.

Leaves mostly spatulate-lanceolate; wings of fruit broader at apex.

423. *Dodonæa jamaicensis*.

422. *Dodonæa viscosa* Jacquin.

*Dodonæa viscosa* JACQUIN, Enumeratio Systematica Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 19.

Near Nueva Gerona, January 1, and February 4, 1904, *A. H. Curtiss*, No. 263; in wet sandy soil at west base of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 267. General Distribution: Tropical and subtropical regions generally, extending north in America to southern Florida and the Bermudas.

423. *Dodonæa jamaicensis* DeCandolle.

*Dodonæa jamaicensis* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, 1824, I, p. 616.

In pastured land near base of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 276b. General Distribution: Jamaica and the Isle of Pines.

## Family RHAMNACEÆ.

424. *Gouania polygama* (Jacquin) Urban.

*Rhamnus polygamus* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 17.

*Gouania tomentosa* JACQUIN, Selectarium Stirpium Americanarum Historia, 1763, p. 263.

*Lupulus lupuloides* var. *tomentosus* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 119.

*Gouania polygama* URBAN, Symbolæ Antillanæ, IV, 1910, p. 378.

Near Nueva Gerona, January 5, 1904, *A. H. Curtiss*, No. 272. General Distribution: Cuba, the Isle of Pines, Hispaniola, Porto Rico, Tobago, Trinidad, and the American continental tropics.

## Family VITACEÆ.

## KEY TO THE SPECIES ENUMERATED.

- Leaves large, widely cordate-ovate, minutely undulate-dentate, the upper usually slenderly lobed.....425. *Vitis tiliifolia*.  
 Leaves ovate or oblong-ovate, smaller (3-8 cm. long), distantly serrate with bristle-tipped teeth, blades simple.....426. *Cissus sicyoides*.  
 Leaves 3-foliolate with small (1-2 cm. long) leaflets.....427. *Cissus intermedia*.

425. *Vitis tiliifolia* Hooker & Bentham. GRAPE.

*Vitis tiliifolia* HOOKER & BENTHAM ex Schultes, Systema Vegetabilium, V, 1819, p. 320.

*Vitis caribæa* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, I, 1824, p. 634.



In swampy forest at west base of Mt. Colombo, May 14, 1910, *O. E. Jennings, No. 261*. General Distribution: From Florida southwards through the West Indies and South America to Ecuador.

426. *Cissus sicyoides* Linnæus.

*Cissus sicyoides* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 897.

*Vitis sicyoides* MORALES, Monografía de las Ampelideas de Cuba, in Poey, Repertorio Fisico-Natural de la Isla de Cuba, I, 1866, p. 206.

*Vitis vitiginea* var. *repens* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 138.

A low vine with light yellow flowers, in swampy forest at base of Mt. Colombo, May 14, 1910, *O. E. Jennings, No. 269*; a woody vine climbing to about ten feet over low shrubs at Caleta Grande, May 22, 1910, *O. E. Jennings, No. 465*. General Distribution: From Florida and the Bahamas south through tropical America.

427. *Cissus intermedia* A. Richard.

*Cissus intermedia* A. RICHARD in Sagra, Historia Fisica, Política y Natural de la Isla de Cuba, X, 1845, p. 128.

Near Nueva Gerona, April 8, 1904, *A. H. Curtiss, No. 438*. General Distribution: Bahamas, Cuba, the Isle of Pines, Haiti, and Porto Rico.

Family ELÆOCARPACEÆ.

428. *Muntingia Calabura* Linnæus.

*Muntingia Calabura* LINNÆUS, Species Plantarum, 1753, p. 509.

Near Nueva Gerona, December 8, 1903 (flowers), and January 8, 1904 (fruit), *A. H. Curtiss, No. 215*; in rather open scrubby forest near Nueva Gerona, May 9, 1910, *O. E. Jennings, No. 182*; near Nueva Gerona, June 12, 1912, *G. A. Link*. General Distribution: Haiti (Grisebach, "Flora of the British West Indian Islands," 1864, p. 98), the Isle of Pines, Mexico to Brazil.

The globose fruit, red and about 1 cm. in diameter is palatable and is said to be eaten by the Spanish inhabitants.

Family TILIACEÆ.

KEY TO THE SPECIES ENUMERATED.

Shrubs, or herbs of shrubby aspect.

Leaves usually more or less 3-lobed; fruit small, dry, globose, and armed with prickles.....429. *Triumfetta althæoides*.

Leaves not lobed; fruit an elongated capsule without prickles.

430. *Corchorus siliquosus*.

Trees; leaves not lobed; fruit an obovoid capsule, somewhat obcordate in outline.

431. *Belotia mexicana*.

429. *Triumfetta althæoides* Lamarck.

*Triumfetta althæoides* LAMARCK, Encyclopédie Méthodique, Botanique, III, 1789, p. 420.

Near Nueva Gerona, December 16, 1903, *A. H. Curtiss*, No. 234. General Distribution: Bahamas, West Indies, and continental tropical America.

In the present unsatisfactory condition of the genus *Triumfetta*, the determination of species is not easy. The specimen from the Isle of Pines is probably correctly placed under Lamarck's species *althæoides*, but the writer is not entirely satisfied with this disposition. The leaves are distinctly and acuminate three-lobed, in general outline very similar to those of *Acer spicatum*. The basal teeth are not conspicuously transformed into glands, the calyx is densely tomentose, the sepals and petals are narrow and about 7–8 mm. long, the stamens are about twenty-five in number, and the body of the fruit, as well as the spines, is pubescent. Although *Triumfetta althæoides* is regarded as quite variable, the writer is of the opinion that the plant from the Isle of Pines will be found eventually to be distinct from that species, and, possibly, more nearly related to some of the numerous South American species.

430. *Corchorus siliquosus* Linnæus.

*Corchorus siliquosus* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 529.

On low, recently cleared ground, north of Nueva Gerona, May 7, 1910, *O. E. Jennings*, No. 143; Pedernales Point, February 16, 1899, *C. F. Millspaugh*, No. 1433 (*Plantæ Utowanæ. Field Columbian Museum, Botanical Series*, II, No. 1, 1900, p. 70). General Distribution: From Florida and Texas southwards through the West Indies and tropical America to Guiana.

431. *Belotia mexicana* (DeCandolle) K. Schumann.

*Grewia mexicana* DECANDOLLE, Prodrromus Systematis Naturalis Regni Vegetabilis, I, 1824, p. 510.

*Belotia greviæfolia* A. RICHARD in Sagra, Historia Física, Política y Natural de la Isla de Cuba, X, 1845, p. 83–84, and XII, Plate 21.

*Belotia mexicana* K. SCHUMANN, Engler & Prantl, Natürliche Pflanzenfamilien, III, (6), 1890, p. 28.

Northern part of the island, *Blain*, No. 175 (*Millspaugh, Field Columbian Museum, Botanical Series*, I, No. 6, 1900, p. 430). General Distribution: Cuba, the Isle of Pines, and Mexico.

## Family MALVACEÆ.

## KEY TO THE SPECIES ENUMERATED.

- Fruit of several radially placed carpels which separate from each other at maturity.  
 Stigmas and carpels of the same number; calyx without involucre bracts.
- Carpels 2—several-seeded.....432. *Abutilon permolle*.  
 Carpels one-seeded (*Sida*).  
 Small plants with weak stems and orbicular, cordate, dentate leaves  
 about 1 cm. in diameter.....438. *Sida hederæfolia*.  
 Not as above.  
 Leaves linear or lance-linear, not over 1 cm. wide.  
 Leaves entire and flowers mostly in terminal clusters.  
 441. *Sida linifolia*.  
 Leaves serrate, flowers in axils of stem and branch leaves.  
 435. *Sida angustifolia*.  
 Leaves ovate to cuneate or lanceolate, often over 1 cm. wide.  
 Leaves conspicuously cordate at the base.  
 Calyx 6–7 mm. long, lobes almost as wide; whole plant lustrous  
 velvety-tomentose.....437. *Sida cordifolia*.  
 Calyx 6–7 mm. long, the lobes about one-half as wide; plant  
 not lustrous, but with fine spreading hairs.  
 439. *Sida urens*.  
 Calyx 2–3 mm. long; plant not lustrous, but velvety-tomen-  
 tose.....440. *Sida micrantha*.  
 Leaves tapering or but slightly cordate at base.  
 Flowers solitary or glomerate; stipules 10–15 mm. long,  
 obliquely lanceolate, two to three times as long as the  
 petiole.....434. *Sida glomerata*.  
 Flowers solitary or glomerate; stipules linear-subulate, about  
 5–6 mm. long; petioles 1 cm. or more in length.  
 433. *Sida spinosa*.  
 Flowers solitary; stipules about as long as petiole (5–6 mm.).  
 436. *Sida acuta*.
- Stigmas twice as many as carpels.  
 Inflorescence capitate; calyx without involucre bracts.  
 Lower leaves rounded-cordate in outline and three to five-lobed; carpels  
 glabrous.....443. *Malachra fasciata*.  
 Lower leaves more ovate, less lobed; carpels villous.  
 442. *Malachra urens*.  
 Inflorescence axillary or racemose; calyx furnished with involucre bracts.  
 Involucre bractlets 5, partially united; carpels spiny all over (*Urena*).  
 444. *Urena sinuata*.  
 Involucre bractlets 5–15, distinct; carpels unarmed or with 1–3 dorsal  
 spines (*Pavonia*).  
 Leaves cordate-ovate, up to 6–10 cm. wide....445. *Pavonia spicata*.  
 Leaves lance-linear, barely 1 cm. wide....446. *Pavonia intermixta*.

Fruit a capsule, loculicidal (or indehiscent).

Styles distinct, spreading; seeds reniform, not clothed with cotton (*Hibiscus*).

Bractlets of the involucre distinct or nearly so.

Nearly glabrous; calyx becoming thick, fleshy, and red; corolla yellow.

452. *Hibiscus Sabdariffa*.

Not as above.

Leaves glabrous; peduncle twice the length of the petiole.

451. *Hibiscus spiralis*.

Leaves sparsely covered with small, stellate, stiff hairs; peduncle longer than petiole. . . . . 450. *Hibiscus costatus*.

Leaves white-tomentose beneath; peduncles shorter than petioles.

449. *Hibiscus furcellatus*.

Bractlets of the involucre more or less united into a toothed cup; leaves large and cordate-rounded.

Petals about 5-8 cm. long, yellow; seeds essentially glabrous.

447. *Hibiscus tiliaceus*.

Petals about 19 cm. long, changing from pale-primrose through orange to deep-red; seeds densely villous. . . . . 448. *Hibiscus elatus*.

Styles united; seeds densely clothed with long white hairs (cotton).

453. *Gossypium barbadense*.

#### 432. *Abutilon permolle* (Willdenow) Sweet.

*Sida permollis* WILLDENOW, Enumeratio Plantarum Horti Botanici Berolinensis, 1809, p. 728.

*Abutilon permolle* SWEET, Hortus Britannicus, I, 1826, p. 53.

"Dry field of scrub at Pedernales Point, Isle of Pines No. 1431." (Millspaugh). General Distribution: Southern Florida, Cuba, and the Isle of Pines.

#### 433. *Sida spinosa* Linnæus.

*Sida spinosa* LINNÆUS, Species Plantarum, 1753, p. 683.

Credited to the Isle of Pines by Urban (*Symbolæ Antillanæ*, IV, 1910, p. 389). General Distribution: Warmer regions of both hemispheres, ranging north in America to Florida and the Bahamas.

#### 434. *Sida glomerata* Cavanilles.

*Sida glomerata* CAVANILLES, Monadelphicæ Classis Dissertationes Decem, I, 1785, p. 18, Pl. 2, fig. 6.

*Sida Berteriana* BALBIS, according to DeCandolle, Prodrômus Systematis Naturalis Regni Vegetabilis, I, 1824, p. 460.

*Sida jamaicensis* BELLO, Anales de la Sociedad Española de Historia Natural, I, 1881, p. 239, no. 43. Not Linnæus.

Near Nueva Gerona, December 16, 1903, *A. H. Curtiss*, No. 231. General Distribution: Bermudas (introduced), Bahamas, West Indies, Central and northern South America.

435. *Sida angustifolia* Lamarck.

*Sida angustifolia* LAMARCK, Encyclopédie Méthodique, Botanique, I, 1783, p. 4.

Near Nueva Gerona, May 6, 1904, *A. H. Curtiss*, No. 482. This has been considered by Urban to be merely a variety of *Sida spinosa* Linnæus (Urban, *Symbolæ Antillanæ*, IV, 1910, p. 389). It probably has about the same distribution as the latter, extending northward, however, to Texas and Arizona.

436. *Sida acuta* Burmann.

*Sida acuta* BURMANN, Flora Indica, 1768, p. 147.

*Sida carpinifolia* LINNÆUS, FIL., Supplementum Plantarum, 1781, p. 307.

*Sida Balbisiana* DECANDOLLE, Prodrômus Systematis Naturalis Regni Vegetabilis, I, 1824, p. 460.

Near Nueva Gerona, March 25, 1904, *A. H. Curtiss*, No. 430; forming mats on the grounds at the back of the Nueva Gerona Hotel, May 7, 1910, *O. E. Jennings*, No. 127; *G. A. Link*, Nueva Gerona, May 31, 1912. General Distribution: Widely distributed in the tropics, extending north in America to the Bermudas, Florida, and Alabama.

The flowers are yellow, and in the vicinity of Nueva Gerona, at least, the bases of the branches are quite decumbent, mats thus being formed.

437. *Sida cordifolia* Linnæus.

*Sida cordifolia* LINNÆUS, Species Plantarum, 1753, p. 684.

*Sida conferta* LINK, Enumeratio Plantarum Horti Regii Botanici Berolinensis, II, 1822, p. 207.

*Sida portoricensis* SPRENGEL, Systema Vegetabilium, III, 1826, p. 111. (Ex Garcke.)

Northern part of the island, *Blain*, No. 102 (Millspaugh); near Nueva Gerona, December 25, 1903, *A. H. Curtiss*, No. 253; on savanna, south of Sante Fé, May 25, 1910, *O. E. Jennings*, No. 616. General Distribution: In sand, usually near the coast, southern Florida, the West Indies, continental tropical America, and the tropics of the Old World.

438. *Sida hederæfolia* Cavanilles.

*Sida hederæfolia* Cavanilles, Monadelphix Classis Dissertationes Decem, I, 1785, p. 8, Pl. IX, fig. 3.

Near Nueva Gerona, February 27, 1904, *A. H. Curtiss*, No. 372; northern part of the island, *Blain*, No. 41 (Millspaugh). General Distribution: The Bahamas, Cuba, the Isle of Pines, Porto Rico, and Hispaniola.

439. *Sida urens* Linnæus.

*Sida urens* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1145.

Near Nueva Gerona, December 25, 1903, *A. H. Curtiss*, No. 254. General Distribution: The Bahamas, West Indies, and northern South America; also tropical Africa.

440. *Sida micrantha* St. Hilaire.

*Sida micrantha* ST. HILAIRE, Flora Brasiliæ meridionalis, I, 1824, p. 190.

Near Nueva Gerona, December 21, 1903, *A. H. Curtiss*, No. 248. General Distribution: West Indies and South America.

441. *Sida linifolia* Jussieu.

*Sida linifolia* JUSSIEU, in Cavanilles, Monadelphix Classis Dissertationes Decem, I, 1785, p. 14, Pl. II, fig. 1.

Near Nueva Gerona, January 9, 1904, *A. H. Curtiss*, No. 279; weed in grapefruit grove north of Nueva Gerona, May 14, 1910, *O. E. Jennings*, No. 246. General Distribution: The West Indies, and from southern Mexico to tropical South America; also tropics of the Old World.

Flowers about one-half inch in diameter, creamy-white, with a purplish "eye."

442. *Malachra urens* Poiteau.

*Malachra urens* POITEAU, in Ledebour & Adlerstam, Dissertatio Botanica Sistens Plantarum Domingensium Decadem, 1805, p. 22.

*Malachra ciliata* POIRET, in Lamarck, Encyclopédie Méthodique, Supplementa in Dictionnaire de Botanique, III, 1813, p. 578.

*Urena urens* MAZA, Anales Sociedad Española de Historia Natural, 1890, p. 220.

Near Nueva Gerona, May 1, 1904, *A. H. Curtiss*, No. 475. General Distribution: Florida Keys, Cuba, the Isle of Pines, Jamaica, Hispaniola, Porto Rico, and Central America.

443. *Malachra fasciata* Jacquin.

*Malachra fasciata* JACQUIN, Collectanea ad Botanicam, etc., II, 1788, p. 352.

*Malachra radiata* GRISEBACH, Flora of the British West Indian Islands, 1859, p. 81.

Near Nueva Gerona, May 12, 1904, *A. H. Curtiss*, No. 492. General Distribution: West Indies and continental tropical America.

444. *Urena sinuata* Linnæus.

*Urena sinuata* LINNÆUS, Species Plantarum, 1753, p. 692.

*Urena lobata* var. *sinuata* MIQUEL, in Plantæ Junghuhnianæ, 1851-1855, p. 283.

Near Nueva Gerona, December 24, 1903, *A. H. Curtiss*, No. 252; in open place in river-bank forest at Los Indios, May 21, 1910, *O. E. Jennings*, No. 452. General Distribution: Widely distributed in the West Indies; Panama, Colombia, Venezuela; and the tropics of the Old World. As noted in the field, the flowers are pink with a purplish center.

445. ***Pavonia spicata*** Cavanilles.

*Malache scabra* VOGEL, in Trew, *Plantæ Selectæ ab Ehret Pictæ*, 1772, p. 50, Pl. 90.  
*Pavonia spicata* CAVANILLES, *Monodelphiæ Classis Dissertationes* Decem, III, 1787, p. 136, Pl. 46, fig. 1.

*Althæa racemosa* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 102.

*Pavonia racemosa* SWARTZ, *Flora Indiæ Occidentalis*, II, 1800, p. 1215.

*Malache spicata* O. KUNTZE, *Revisio Generum Plantarum*, I, 1891, p. 70.

In swamp one mile north of Nueva Gerona, May 8, 1910, *O. E. Jennings*, No. 135; northern part of the island, *Blain*, No. 87 (Millsaugh). General Distribution: Occurring widely in the West Indies; Panama, Colombia, Venezuela; and the tropics around the Indian Ocean.

446. ***Pavonia intermixta*** A. Richard.

*Pavonia intermixta* A. RICHARD, in Sagra, *Historia Fisica, Politica y Natural de la Isla de Cuba*, X, 1845, pp. 45-46.

Near Nueva Gerona, January 14, 1904, *A. H. Curtiss*, No. 290. General Distribution: Western Cuba and the Isle of Pines.

447. ***Hibiscus tiliaceus*** Linnæus. LA MAJAGUA.

*Hibiscus tiliaceus* LINNÆUS, *Species Plantarum*, 1753, p. 694.

*Paritium tiliaceum* JUSSIEU, in St. Hilaire, *Flora Brasiliæ Meridionalis*, I, 1825, p. 256.

In abandoned field at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 103; "Pedernales Point, Isle of Pines." (Millsaugh); fair-sized tree on river bank in forest at Los Indios, May 20, 1910, *O. E. Jennings*, No. 435; Los Indios, *G. A. Link*, November 4, 1912. General Distribution: In sandy soil, southern Florida, Bermuda, the Bahamas, the West Indies, and in tropical regions generally.

The bast of this plant furnishes a valuable fiber, used in many places in the tropics for making ropes, and having also other uses, mainly domestic. The fiber becomes stronger after long maceration in water, and, as the plant grows very readily from cuttings or from

the cut stumps, it is highly probable that, in the future, the plant will be cultivated and appreciated to a much greater extent than is the case at the present time. (See Cook & Collins, "Economic Plants of Porto Rico," Contributions U. S. National Herbarium, VIII, 1903, p. 212.)

448. **Hibiscus elatus** Swartz.

*Hibiscus elatus* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 102.

*Paritium elatum* G. DON, General History of the Dichlamydeous Plants, I, 1831, p. 485.

A tree about twenty feet high, growing in the swamp at the western base of Mt. Colombo, May 12, 1910, *O. E. Jennings*, No. 265. General Distribution: Cuba, the Isle of Pines, Jamaica, southern Mexico, Guiana, and probably the West Indies and tropical continental America generally.

There is a difference of opinion among botanists as to the distinctness of *Hibiscus tiliaceus* and *Hibiscus elatus*, a number of leading botanists having treated them as one and the same species. The writer has not investigated the subject to any great extent but the evidence indicates two distinct species.

449. **Hibiscus furcellatus** Lamarck.

*Hibiscus furcellatus* LAMARCK, Encyclopédie Méthodique, Botanique, III, 1789, p. 358.

*Hibiscus tomentosus* STAHL, Estudios sobre la Flora de Puerto Rico, II, 1884, p. 92. Not Miller.

*Hibiscus fraternus* SESSÉ & MOÇINO, Flora Mexicana, Ed. II, 1894, p. 161. Not Linnæus.

Along an arroyo, Los Indios, May 17, 1910, *O. E. Jennings*, No. 336; in pine-barrens near Los Indios, May 19, 1910, *O. E. Jennings*, No. 397. General Distribution: Naturalized in Florida; native in Cuba, the Isle of Pines, Dominica, Trinidad, Central and South America; Sandwich Islands.

Flowers large, rose-color, like *Hibiscus Moscheutos*.

450. **Hibiscus costatus** A. Richard.

*Hibiscus costatus* A. RICHARD, in Sagra, Historia Física, Política y Natural de la Isla de Cuba, X, 1845, pp. 49-50, and plate 15, Vol. XII.

Near Nueva Gerona, February 4, 1904, *A. H. Curtiss*, No. 326. General Distribution: Western Cuba and the Isle of Pines.



The plate accompanying Richard's description, and the description itself, each indicate non-lobed leaves for this species, but all the Cuban specimens the writer has seen, as well as the specimens from the Isle of Pines, have the leaves more or less acuminate lobed.

451. **Hibiscus spiralis** Cavanilles.

*Hibiscus spiralis* CAVANILLES, Icones et Descriptiones Plantarum, etc., II, 1786, p. 47, t. 162.

Rocky slope of ridge at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 126. General Distribution: Mexico and the Isle of Pines.

452. **Hibiscus Sabdariffa** Linnæus. ROSELLE. JAMAICA SORREL.

*Hibiscus Sabdariffa* LINNÆUS, Species Plantarum, 1753, p. 695.

Specimen collected by Dr. Jared F. Shafer, February–March, 1910, probably from a cultivated plant. This species is a native of the Old World tropics and is rather widely cultivated for the acid, fleshy calyx, which, when cooked, much resembles cranberry sauce. The stems are also used in some countries as a source of fiber, which is strong, silky, and quite highly esteemed especially in the Asiatic tropics, where it is known as the "Roselle Hemp."

453. **Gossypium barbadense** Linnæus. SEA-ISLAND COTTON.

*Gossypium barbadense* LINNÆUS, Species Plantarum, 1753, p. 693.

*Hibiscus barbadensis* var. *latifolius* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 68.

Collected in the Isle of Pines February–March, 1910, by Dr. Jared F. Shafer, probably from a cultivated plant. General Distribution: Cultivated and spontaneous in sandy soil, mostly near the coast, from the Carolinas to Florida, the Bahamas, the West Indies, and the tropics generally.

Family BOMBACACEÆ.

454. **Bombax emarginatum** (A. Richard) Decaisne. CEIBA TREE.

*Pachira emarginata* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, pp. 70–71 and XII, Pl. 20.

*Bombax emarginatum* DECAISNE, Flora des Serres, Series II, XIII, 1880, p. 40.

In the Journal of the New York Botanical Garden, XVIII, 1916, p. 67, Dr. N. L. Britton notes that the steep slopes of the rough hills and mountains in the northeastern part of the island are "dotted by the large and peculiar green-barked ceiba tree (*Bombax emarginata*),

one of the few deciduous-leaved trees of the flora, essentially bare of foliage at the time of our visit."

No good specimens are at hand representing this species, it being leafless at the time of our visit also. It is the most conspicuous tree on the upper slopes of the Caballos Mts., at least during the dry season. See photograph (Plate XII). Towards the top of the mountains the large sprawling limbs of the trees furnish favorite habitats for a considerable number of epiphytic orchids and bromeliads.

### Family STERCULIACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Low shrubs or bushes; leaves widely acute to obtuse.

Leaves and upper parts of plant more or less brownish or yellowish tomentose.

455. *Melochia hirsuta*.

Leaves and upper parts of plant whitish tomentose. . . . 456. *Waltheria americana*.

Tall shrubs or trees; leaves more or less acuminate. . . . 457. *Guazuma Guazuma*.

#### 455. *Melochia hirsuta* Cavanilles.

*Melochia hirsuta* CAVANILLES, Monadelphix Classis Dissertationes Decem, VI, 1788, p. 323; Pl. 175, fig. 1.

*Riedlea serrata* VENTENAT, Choix des Plantes, 1803, Pl. 37.

*Riedlea hirsuta* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, I, 1824, p. 492.

*Melochia serrata* ST. HILAIRE & NAUDIN, Annales de Sciences Naturelles, Series II, vol. XVIII, 1842, p. 36.

A common low shrub on the "Mal Pais" gravel lands near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 16; near Nueva Gerona, 1904, *A. H. Curtiss*; northern portion of the island, *Don José Blain*, No. 14 (Millspaugh, *Field Columbian Museum, Botanical Series*, I, 1900, p. 430.) General Distribution: From Florida southwards through the West Indies and continental tropical America. A common weed in the fields and pastures near Nueva Gerona, and where frequently subjected to grass fires there develops eventually a large woody base at the surface of the ground from which springs each year a growth of short scraggly twigs.

#### 456. *Waltheria americana* Linnæus.

*Waltheria americana* LINNÆUS, Species Plantarum, II, Ed. I, 1753, p. 673.

*Waltheria indica* LINNÆUS, *l. c.*

Along sandy beach at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 74; open spot in jungle at Los Indios, May 20, 1910, *O. E. Jen-*

*nings*, No. 444. General Distribution: From the Florida Keys through the Bahamas and the West Indies, and through continental tropical America; also in the tropics of the Old World.

This occasionally occurs as a weed in the pasture-lands with *Melochia hirsuta*, which, in a general way, it quite closely resembles.

#### 457. *Guazuma Guazuma* Cockerell.

*Guazuma tomentosa* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, V, 1821, p. 320.

*Guazuma ulmifolia* var. *tomentosa* C. SCHUMACHER in Martius, Flora Brasiliensis, XII (3), 1886, p. 81.

*Guazuma Guazuma* COCKERELL, Bulletin of the Torrey Botanical Club, XIX, 1892, p. 95 (in part).

Near Nueva Gerona, January 4 and March 3, 1904, *A. H. Curtiss*, No. 270; on lower slope on the inland side of the ridge at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 119; in flower, a tree about 30 feet in height; reported for the Isle of Pines on the basis of specimens collected by Lanier in 1831. (A. Richard, in Sagra, "Historia Fisica, Politica y Natural de la Isla de Cuba," X, 1845, pp. 74, 75). General Distribution: Bahamas and generally throughout the West Indies and tropical continental America.

#### Family DILLENACEÆ.

Two inner sepals becoming enlarged, crustaceous, or woody, and shining, enclosing the fruit; clambering shrubs; flowers yellow.....458. *Davilla rugosa*.  
Sepals all about the same size, not enlarging nor hardening nor enclosing fruit; flowers white; tortuous shrub to low tree.....459. *Curatella americana*.

#### 458. *Davilla rugosa* Poiret.

*Davilla rugosa* POIRET, Encyclopédie Méthodique, Supplementa in Dictionnaire de Botanique, II, 1811, p. 457.

Near Nueva Gerona, February 11, 1904, *A. H. Curtiss*, No. 339; *Dr. Jared F. Shafer*, February–March, 1910; swampy margin of pond east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 45; a clambering shrub along Majaguay River, near Los Indios, May 19, 1910, *O. E. Jennings*, No. 415; bank of arroyo near Sante Fé, May 25, 1910, *O. E. Jennings*, No. 537. General Distribution: Cuba, the Isle of Pines, Jamaica, St. Thomas, Colombia, Guiana, and Brazil.

459. *Curatella americana* Linnæus. SANDPAPER TREE.

*Curatella americana* LINNÆUS, Systema Naturæ, Ed. X, p. 1079.

"Crescit in insula *de Pinos*, locis inundatis." (A. Richard, in Sagra, "Historia Física, Política y Natural de la Isla de Cuba," X, 1845, p. 10); near Nueva Gerona, February 11, 1904, *A. H. Curtiss*, No. 337; Dr. Jared F. Shafer, February–March, 1910; a bushy tree about 15 feet in height, on "Mal Pais" gravel, on savanna near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 4. General Distribution: Widely distributed in the interior of tropical America from Colombia and Guiana to Brazil; the Isle of Pines. (See Plate XIII.)

The leaves of this tree are very rough and are used in some localities for polishing wood, etc. The leaves are also rich in tannic acid and are locally used for tanning purposes. In South America Gilg notes (Engler & Prantl, "Die Natürliche Pflanzenfamilien," III (Abt. VI), 1895, p. 114) that it is especially common in the "catinga" formation.

## Family OCHNACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Low herbs with leaves less than 2 cm. long; stipules conspicuously laciniate-fringed.

460. *Sauvagesia Brownei*.

Shrubs with larger coriaceous leaves; stipules soon deciduous.

Leaves not seriate.

Leaves oblong-elliptic, obtuse at each end. . . . . 461. *Ouratea elliptica*.

Leaves, at least the upper ones, lance-ovate, subacute at the apex.

462. *Ouratea* sp.

Leaves more or less serrate.

Leaves large, up to 12 or 15 cm. long, about half as wide, abruptly acuminate, sharply serrate above the middle. . . . . 464. *Ouratea cubensis*.

Leaves smaller, about 2.5–4 cm. wide and 5–8 cm. long, the crinkled margin undulately serrate and with spine-tipped teeth, holly-like.

463. *Ouratea agrophylla*.

460. *Sauvagesia Brownei* Planchon.

*Sauvagesia Brownei* PLANCHON, MS. in Herb. Hooker: Troisième Voyage de J. Linden, Botanique par J. Linden et J. E. Planchon, I, 1863, p. 64. (Reprinted in Urban: Symbolæ Antillanæ, V, 1908, p. 430–431.)

Near Nueva Gerona, April 28, 1904, *A. H. Curtiss*, No. 469; growing in thin sandy soil on pine roots, in barrens east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 366; as a weed in field at Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 657. General Distribution: Cuba, the Isle of Pines, and Jamaica.

461. *Ouratea elliptica* (A. Richard) G. Maza.

*Gomphia elliptica* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, p. 140.

*Ouratea elliptica* G. MAZA, Contribuciones al Catalogo de las Periantiadadas Cubanas, Anales de la Sociedad Española de Historia Natural XXIII, 1894, p. 45.

*Camptouratea elliptica* VAN TIEGHEM, Annales des Sciences Naturelles, Series VIII, Vol. XVI, 1902, pp. 214 and 215.

Growing on the white sands of the pine-barrens near Los Indios, May 17, 1910, *O. E. Jennings*, No. 325. General Distribution: Cuba and the Isle of Pines (*see* Plate XIV).

The Los Indios specimen has leaves much shorter than that from Sante Fé, the leaves of the former being not more than twice as long as wide. On neither of the numbers can there be detected, along the revolute edge of the leaves, any sign of the obsolete crenulation mentioned by Sagra ("foliis . . . margine obsolete crenulatis," *l. c.*).

462. *Ouratea* sp.

The specimens under this number have been labelled *Ouratea Curtissii* Britton, but Dr. Britton has since referred them to *Ouratea elliptica*. Near Nueva Gerona, February 28 and April 26, 1904, *A. H. Curtiss*, No. 377; shrub about two feet in height, along bank of an arroyo near Sante Fé, May 25, 1910, *O. E. Jennings*, No. 532. General Distribution: Known only from the Isle of Pines.

463. *Ouratea agrophylla* (Van Tieghem) Urban.

*Gomphia ilicifolia* A. RICHARD in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, p. 138. Not A. DeCandolle; GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 36.

*Ouratea ilicifolia* G. MAZA, Contribuciones al Catalogo de las Periantiadadas Cubanas, 1894, p. 46. Not Baillon.

*Camptouratea agrophylla* VAN TIEGHEM, Annales des Sciences Naturelles, Series VIII, Vol. XVI, 1902, p. 214.

*Ouratea agrophylla* URBAN, Symbolæ Antillanæ, V, 1908, p. 426.

Between Bogarona and Caleta Grande, on the coralline limestone soil, May 22, 1910, *O. E. Jennings*, Nos. 470 and 517. General Distribution: Western Cuba and the Isle of Pines.

To the excellent recent description of this peculiar plant, as given by Urban in the Symbolæ Antillanæ, V, 1908, p. 426, it should be added that the leaves on vigorous non-fruiting branches tend to have a decidedly obtuse or rounded outline at the apex and that the

base is then often quite strongly cordate, thus presenting quite a contrast to the leaves of the fruiting branches on the same plant. The shrubs, as the writer found them on the Isle of Pines, have a maximum of about seven feet in height. They are rather straggling in habit, and the flowers are a bright yellow or golden-yellow. The leaves are lustrous on the upper surface but dull below.

464. *Ouratea cubensis* Urban.

*Gomphia acuminata* A. RICHARD in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, p. 139. Not P. DeCandolle.

*Gomphia nitida* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 36. Not Vahl.

*Ouratea nitida* MAZA, Contribuciones al Catalogo de las Periantias Cubanas, 1894, p. 46. Not Engler.

*Ouratea cubensis* URBAN, Symbolæ Antillanæ, I, 1899, p. 362.

In thicket on swampy ground along the river south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 214; near base of Mt. Colombo, in wet jungle, May 12, 1910, *O. E. Jennings*, No. 270. General Distribution: Cuba and the Isle of Pines.

Family THEACEÆ.

(*TERNSTRÆMIACEÆ*.)

KEY TO THE SPECIES ENUMERATED.

Anthers roundish, not grown fast to the filament; fruit a capsule.

465. *Hæmocharis Curtyana*.

Anthers linear, grown fast to the filament; fruit not capsule-like.

466. *Ternstroemia obovalis*.

465. *Hæmocharis Curtyana* (A. Richard) Millspaugh.

*Laplacea Curtyana* A. RICHARD, Essai d'une Flore de l'Ile de Cuba, in Sagra, Histoire Physique, Politique et Naturelle de l'Ile de Cuba, I, 1845, p. 225.

*Hæmocharis Curtyana* MILLSPAUGH, Field Columbian Museum, Botanical Series, I, 1900, p. 430.

Northern part of the island, *Blain*, No. 22 (Millspaugh). General Distribution: Cuba and the Isle of Pines.

466. *Ternstroemia obovalis* A. Richard.

*Ternstroemia obovalis* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de la Cuba, X, 1845, p. 89-90, also XII, Pl. 25.

Near Nueva Gerona, March 22 and May 29, 1904, *A. H. Curtiss*, No. 429; bank of dry arroyo in savanna east of Nueva Gerona, May

5, 1910, *O. E. Jennings*, No. 8. General Distribution: Western Cuba and the Isle of Pines.

Family HYPERICACEÆ.

KEY TO THE SPECIES ENUMERATED.

Shrubs or low bushes with the leaves not over 2 cm. long.

Leaves linear or subulate.

Leaves of the axillary clusters mostly much shorter than the main pair.

467. *Hypericum galioides* var. *cubense*.

Clusters of small leaves borne in the axils of the larger ones.

468. *Hypericum aspalathoides*.

Leaves lance-ovate or wider and often strongly 4-ranked.

469. *Hypericum styphelioides*.

Shrubs, woody twiners, or trees, with leaves 4 cm. or more long.

Leaves tipped with a sharp spine 2-3 mm. long.....471. *Rheedia aristata*.

Leaves not spine-tipped.

Leaves elliptic-oblong with numerous straight pinnate veins only about 1 mm. apart.....470. *Calophyllum Calaba*.

Leaves obovate-cuneate with the less regular pinnate veins 2-3 mm. apart.

472. *Clusia rosea*.

467. *Hypericum galioides* var. *cubense* Grisebach.

*Hypericum galioides* var. *cubense* GRISEBACH, *Catalogus Plantarum Cubensium*, 1866, p. 39.

About 1850, *José Blain*, Nos. 129, 150 (*Millspaugh, Botanical Series, Field Columbian Museum*, I, 1900, p. 430); probably to this variety also belongs the report by Achille Richard, in Sagra, *Historia Fisica, Politica y Natural de la Isla de Cuba*, X, 1845, p. 97, based on the collections of A. H. Lanier, 1831. Richard lists this as *Hypericum galioides*, but notes that upon comparison of the specimens from the Isle of Pines with material from North America differences are plainly evident. Lanier's specimens appear to answer to the description of the variety *cubense* as later published by Grisebach. General Distribution: Cuba and the Isle of Pines.

468. *Hypericum aspalathoides* Willdenow.

*Hypericum aspalathoides* WILLDENOW, *Species Plantarum*, III, 1805, p. 1451.

*Hypericum fasciculatum* var. *aspalathoides* TORREY & GRAY, *Flora of North America*, I, 1840, p. 672.

In dry arroyo in the pine barrens at Los Indios, May 17, 1910, *O. E. Jennings*, No. 333; pine barrens east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 360. General Distribution: Open pine

lands, North Carolina to Florida and Louisiana, and in the Isle of Pines.

Our specimens agree closely with specimens of this species from the Gulf States, except that the leaves average a little longer, often one cm. long for the larger ones, and the corymbose cymes become rather more densely branched.

469. ***Hypericum styphelioides*** A. Richard (?).

*Hypericum styphelioides* A. RICHARD in Sagra, *Historia Fisica, Politica y Natural de la Isla de Cuba*, X, 1845, pp. 96-97.

A scraggly shrub forming a prominent part of the vegetation on the white sand and gravel of the pine-barrens near Los Indios. The plants are never massed into thickets, but are quite abundant, growing singly and with few rather irregular branches, and with the rigid leaves arranged in 4-ranks and somewhat imbricated. On the white sand in the pine-barrens at Los Indios, May 17, 1910, *O. E. Jennings*, No. 316; same locality, May 21, 1910, *O. E. Jennings*, No. 455; no locality given, February-March, 1910, *Jared F. Shafer*. General Distribution: Cuba and the Isle of Pines.

Unfortunately the plants were not in such condition when found as to furnish good specimens of flowers or fruit. For this reason it has been thought best to regard the plant provisionally as *Hypericum styphelioides*, although a comparison of the specimens with a fine sheet of specimens of that species collected by J. A. Shafer (No. 432) at Herradura, Pinar del Rio Province, Cuba, April 30, 1903, leaves considerable doubt as to the identity of the plants from the two islands. The Isle of Pines specimens have larger, thicker, more closely imbricated, and more conspicuously 4-ranked leaves, and it is not unlikely that they represent an undescribed species.

470. ***Calophyllum Calaba*** Jacquin.

*Calophyllum Calaba* JACQUIN, *Selectarum Stirpium Americanarum Historia*, 1763, p. 269, Pl. 165. (Not Linnæus, *Species Plantarum*, Ed. I, 1753, p. 514.)

Near Nueva Gerona, April 17, 1904, *A. H. Curtiss*, No. 445. General Distribution: Bahamas and Cuba and southwards through the West Indies generally.

471. ***Rheedia aristata*** Grisebach.

*Rheedia aristata* GRISEBACH, *Catalogus Plantarum Cubensium*, 1866, p. 38.

Near Nueva Gerona, March 6, flowers, and April 23, fruit, 1904,



*A. H. Curtiss*, No. 389. General Distribution: Western Cuba and the Isle of Pines.

Urban (*Symbolæ Antillanæ*, I, 1899, pp. 368-369) has described as *Rheedia portoricensis* a plant of Porto Rico very closely related to *R. aristata*, but having the petioles 5-8 mm. long, instead of 2-3 mm., lateral nerves 25-35, instead of 15-20, and pedicels 2-3 cm. long, instead of but 1-1.5 cm. Curtiss's specimen from the Isle of Pines is intermediate in most characters; the petioles often reach 5 mm. in length, the lateral nerves on the larger leaves are between 20 and 25 in number, and the longer pedicels reach a length of over 2 cm. Further study of more extensive collections will probably show good reasons for regarding *Rheedia portoricensis* as a variety of *R. aristata*.

#### 472. *Clusia rosea* Jacquin.

*Clusia rosea* JACQUIN, Enumeratio Systematica Plantarum, 1760, p. 34.

A small tree about fifteen feet high, growing on the bank of an arroyo south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 196; February-March, 1910, no locality given, *Jared F. Shafer*. General Distribution: The Bahamas, most of the larger West Indian islands, Panamá, and Venezuela.

### Family FLACOURTIACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Shrub or small tree with flowers about 4 cm. long; leaves oblong, obtuse, often retuse, the upper surface shining and pebbly-roughened.

473. *Samyda grandiflora*.

Shrubs or trees; flowers small, less than 10 mm. long; leaves acuminate or mucronate (*Casearia*).

Branchlets and under surface of leaves softly and densely brownish-pubescent.

Calyx-lobes about 5-6 mm. long; shorter branchlets not ending in a spine.

476. *Casearia hirsuta*.

Calyx-lobes somewhat shorter; shorter branchlets often aculeate.

475. *Casearia aculeata*.

Branchlets and under surface of leaves glabrous, or, if hairy, scarcely softly and densely pubescent.

Plants essentially glabrous; calyx-lobes about 1.5 mm. long.

474. *Casearia sylvestris*.

Plants, especially the flowers, younger branchlets and petioles, pubescent; calyx-lobes somewhat longer. . . . . 475. *Casearia hirta* = *C. aculeata*.

473. *Samyda grandiflora* Grisebach.

*Samyda grandiflora* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 11.

Near Nueva Gerona, March and April, 1904, *A. H. Curtiss*, No. 368.  
General Distribution: Western Cuba and the Isle of Pines.

474. *Casearia sylvestris* Swartz. SARNA DE PERRO.

*Samyda parviflora* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1025. Not of Loeffling.

*Casearia parviflora* WILLDENOW, Species Plantarum, II, 1799, p. 627.

*Casearia sylvestris* SWARTZ, Flora Indiæ Occidentalis, II, 1800, p. 752.

*Casearia punctata* SPRENGEL, Neue Entdeckungen im Ganzen Umfang der Pflanzenkunde, II, 1821, p. 154.

Near Nueva Gerona, January 6, February 15, February 26, 1904, *A. H. Curtiss*, Nos. 274 and 347; slender shrub about twelve feet high, at west base of Caballos Mts., May 9, 1910, *O. E. Jennings*, No. 187; tree about twenty feet high, bushy, near base of Mt. Colombo, *O. E. Jennings*, No. 272; spreading tree, about eighteen feet high, base of Casas Mts., May 14, 1910, *O. E. Jennings*, No. 281. General Distribution: Throughout the West Indies and from Mexico to South America.

475. *Casearia aculeata* Jacquin.

*Casearia aculeata* JACQUIN, Enumeratio Plantarum, Quas in Insulis Caribæis Detexit, 1760, p. 21.

*Samyda spinosa* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 557.

*Casearia spinosa* WILLDENOW, Species Plantarum, II, 1799, p. 626.

*Casearia hirta* SWARTZ, Flora Indiæ Occidentalis, II, 1800, p. 756.

*Casearia ramiflora* var. *spinosa* GRISEBACH, Flora of the British West Indian Islands, 1859, p. 23.

*Casearia ramiflora* STAHL, Estudios sobre la Flora de Puerto-Rico, IV, 1886, p. 30, not Vahl.

Near Nueva Gerona, February 9, 1904, *A. H. Curtiss*, No. 336; small tree at base of ridge at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 117; small spreading tree near Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 275. General Distribution: Greater Antilles and continental tropical America.

476. *Casearia hirsuta* Swartz.

*Samyda tomentosa* SWARTZ, Prodrromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 68.

*Casearia hirsuta* SWARTZ, Flora Indiæ Occidentalis, II, 1800, p. 756.

Near Nueva Gerona, January 22, 1904, *A. H. Curtiss*, No. 310

General Distribution: Cuba, the Isle of Pines, Jamaica, and from Panama to Guiana and Brazil.

The various species of *Casearia*, particularly *C. sylvestris*, form, as to numbers, quite a prominent part of the forest on the lower slopes and around the bases of the limestone ridges in the northern part of the island.

*Flacourtia inermis* Roxburgh, Hortus Bengalensis, 1814, p. 73, is represented by *Blain*, No. 121, reported by Millspaugh (*Field Columbian Museum, Bot. Series*, I, 1900, p. 431) and Blain's note is added: "An introduced tree.—Blain."

### Family TURNERACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Peduncles slender, axillary, not united with the petiole; stem usually with stellate pubescence (*Piroqueta*).

Leaves sharply serrate, lance-ovate; hairs viscid. . . . . 478. *Piroqueta viscosa*.

Leaves obscurely denticulate-serrate, lance-linear; hairs not viscid.

477. *Piroqueta cistoides*.

Peduncles short and apparently arising from the apex of the petiole; usually little or no stellate pubescence (*Turnera*).

Annuals, low, the lower branches spreading and often procumbent; leaves with no glands. . . . . 479. *Turnera Pumilea*.

Shrubby, branches tending towards erect; two glands on petiole immediately below base of blade. . . . . 480. *Turnera ulmifolia*.

#### 477. *Piroqueta cistoides* (Linnæus) Meyer.

*Turnera cistoides* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 387.

*Piroqueta cistoides* MEYER, ex Steudel, Nomenclator Botanicus, II, Ed. II, 1841, p. 344.

*Piroqueta longifolia* BELLO, Anales Sociedad Española de Historia Natural, I, 1881, p. 275.

*Piroqueta villosa* COOK & COLLINS, Contributions U. S. National Herbarium, VIII, 1903, p. 220.

Near Nueva Gerona, May 12, 1904, *A. H. Curtiss*, No. 496; in pine-barrens, near Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 404. Flowers golden-yellow. General Distribution: Throughout the West Indies and American continental tropics.

#### 478. *Piroqueta viscosa* Grisebach.

*Piroqueta viscosa* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 114.

Pine-barrens at Los Indios, May 19, 1910, *O. E. Jennings*, No. 395. Included also in the printed list of plants collected in the Isle of

Pines and distributed by A. H. Curtiss, but no specimen is in the set acquired by the Carnegie Museum. General Distribution: Cuba, the Isle of Pines, and Colombia.

479. *Turnera Pumilea* Linnæus.

*Turnera Pumilea* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 965.

Near Nueva Gerona, May 17, 1904, A. H. Curtiss, No. 503; in pine-barrens near the Majagua River, north of Los Indios, May 19, 1910, O. E. Jennings, No. 400. General Distribution: Cuba, the Isle of Pines, Jamaica, Curaçao, South America.

The writer's notes say, as to the color of the flower: "rose-pink;" Urban ("Symbolæ Antillanæ," IV, 1910, p. 423) says: "Flores albi;" Grisebach ("Flora of the British West Indian Islands," 1860, p. 297) describes the color as "tawny."

480. *Turnera ulmifolia* Linnæus.

*Turnera ulmifolia* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 271.

On coralline strand at Caleta Grande, May 22, 1910, O. E. Jennings, No. 514. General Distribution: A species, breaking up into many varieties and forms, through a wide range from the West Indies and Mexico south to Argentina.

Family PASSIFLORACEÆ.

KEY TO THE TWO SPECIES ENUMERATED.

Leaves not glandular-villous, not cordate at the base; no involucre below the calyx.....482. *Passiflora suberosa*.  
Leaves glandular-villous, cordate at the base; calyx subtended by a large, finely tripinnatifid involucre.....481. *Passiflora fœtida*.

481. *Passiflora fœtida* Linnæus.

*Passiflora fœtida* LINNÆUS, Species Plantarum, II, Ed. I, 1753, p. 959.

Near Nueva Gerona, March 6, 1904, A. H. Curtiss, No. 388. General Distribution: Widely distributed in the tropics, extending north in America to the Bahamas and Texas.

482. *Passiflora suberosa* var. *minima* (Linnæus) Masters.

*Passiflora suberosa* LINNÆUS, Species Plantarum, II, Ed. I, 1753, p. 958.

*Passiflora minima* LINNÆUS, *op. cit.*, p. 959.

*Passiflora hirsuta* LINNÆUS, *op. cit.*, p. 959.

*Passiflora hederacea* CAVANILLES, Monadelphicæ Classis Dissertationes Decem, X, 1790, p. 448.

*Passiflora suberosa* var. *minima* MASTERS, in Martius, Flora Brasiliensis, XIII (I), 1872, p. 579.

Near Caleta Grande, South Coast, May 22, 1910, *O. E. Jennings*, No. 525 (flowers yellow-green, unripe berries blue); also same locality and date, No. 528 (fruits globose, yellowish, reaching one and one-half inches in diameter; flowers yellow). General Distribution: From southern Florida and the Bahamas, south through the West Indies and South America as far as Argentina.

An exceedingly polymorphous species, or, according to some botanists, one of a group of closely related species. The synonymy given above is based upon Urban's "Flora Portoricensis," (*Symbolæ Antillanæ*, IV, 1910, p. 424).

#### Family CARICACEÆ.

##### 483. *Carica cubensis* Solms (?).

*Carica cubensis* SOLMS, in Martius, Flora Brasiliensis, XIII, 3, 1899, p. 177.

Alongside of old stone wall at old marble quarry, east base of Caballos Mts., May 9, 1910, *O. E. Jennings*, No. 671. Identity doubtful, possibly *Carica Papaya*.

#### Family CACTACEÆ. CACTI.

##### KEY TO THE SPECIES ENUMERATED.

- Stem more or less erect or becoming procumbent, consisting of flattened obovate joints.....484. *Opuntia Dillenii*.
- Stems erect, cylindrical with 5-8 ridges or flutings; the tubercles on the ridges bearing slender spines up to 7-8 cm. long.....485. *Harrisia* sp.
- Stems trailing or climbing, throwing out roots from their whole length.
  - Stems triangular-winged or very strongly three-fluted.
    - 486. *Hylocereus triangularis*.
  - Stems with five or more ridges or flutings.
    - Spines on the tubercles only about 2-3 mm. long.....488. *Selenicereus* sp.
    - Spines up to 5 mm. long.....487. *Cephalocereus Bakeri*.

##### 484. *Opuntia Dillenii* (Ker) Haworth.

*Cactus Dillenii* KER, Botanical Register, III, 1818, Pl. 255.

*Opuntia Dillenii* HAWORTH, Supplementum Plantarum Succulentarum, 1819, p. 79.

Dry sandy fields near Bibijagua, May 7, 1910, *O. E. Jennings*, No. 99. General Distribution: Coasts of Florida, the Bermudas, a number of the West Indian islands, and Vera Cruz.

485. *Harrisia* sp.(Probably near *Harrisia eriophora* (Pfeiffer) Britton.)

Live specimens of this plant were brought to Pittsburgh by Mr. G. A. Link in 1912 and some of these are now growing in the Phipps Conservatories, Schenley Park, Pittsburgh, others in a window of the Herbarium Room, Carnegie Museum. The plants were collected from the upper slopes of the Caballos Mts., and Mr. Link states that the species was quite abundant on the upper slopes of Mt. Colombo. Mr. Link's observations with regard to the flowers were that they were two or three inches across, about the same in length, yellow; the fruits were yellow, about two inches in diameter, and nearly round. The tallest plants noted were about six or eight feet, the stems branching towards the top, with spreading and then ascending branches.

486. *Hylocereus triangularis* (Linnæus) Britton & Rose.*Cactus triangularis* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 468.*Cereus compressus* MILLER, Gardener's Dictionary, Ed. VIII, 1768, no. 10.*Cereus triangularis* HAWORTH, Synopsis Plantarum Succulentarum, 1812, p. 180.*Cereus trigonus* HAWORTH, *op. cit.*, p. 181.*Hylocereus triangularis* BRITTON & ROSE, Contributions, U. S. National Herbarium, XII, 1909, p. 429.

This record is based on specimens now growing in the Herbarium Room, Carnegie Museum, and collected on the Caballos Mts., by Mr. G. A. Link, in 1912. General Distribution: Southern Mexico to Panama, Jamaica, the Isle of Pines, Cuba, Haiti, Porto Rico, and widely planted and escaped in the tropics from Florida southwards.

487. *Cephalocereus Bakeri* Britton & Rose.*Cephalocereus Bakeri* BRITTON & ROSE, Contributions from the U. S. National Herbarium, XII, 1909, p. 415.*Cereus Bakeri* VAUPEL, Monatsschrift für Kakteenkunde, XXIII, 1913, p. 23.

In swamp one mile north of Nueva Gerona, May 8, 1910, *O. E. Jennings*, No. 136; *Dr. J. F. Shafer*, February–March, 1910; climbing on tree along bank of the Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 420; tall climber, from top of tall tree recently blown down, north of Caleta Grande, South Coast, May 22, 1910, *O. E. Jennings*, No. 513. General Distribution: Western Cuba and the Isle of Pines.

A night-blooming cereus with flowers of rare beauty and exquisite fragrance. The plants climb, rope-like, to the tops of tall trees, and the flowers reach a length of about eleven inches.

488. *Selenicereus* sp.

Rocky slope of ridge at Bibijagua, facing the sea, May 7, 1910, O. E. Jennings, No. 124. Not certainly identifiable; no flowers or fruit seen, but it probably represents an unpublished species still being investigated by Drs. Britton and Rose.

Family THYMELÆACEÆ.

489. *Lagetta lintearia* Lamarck. LACE-BARK TREE.

*Lagetta lintearia* LAMARCK, Encyclopédie Méthodique, Botanique, III, 1789, p. 376

Northern part of the island, *Blain*, No. 158 (Millsbaugh). General Distribution: The species has been variously reported from Cuba, Jamaica, and Santo Domingo, but with the more recent description of new species, e. g., *Lagetta Wrightiana* Krug & Urban, it is likely that this distribution will be decreased in extent. The writer is not prepared, however, to dispute the correctness of the reference of Blain's specimen to *Lagetta lintearia*.

The lace-bark tree is said to be common in some parts of the island. Dr. Britton has this to say of it in the San Juan region: "The Loma Daguilla (Lace-bark Hill), an isolated mountain about 600 feet high, situated about two miles west-southwest of the San Juan Hills, is of exceptional interest. It takes its name from the lace-bark tree (La Daguilla), a near relative of the Jamaica lace-bark, here rather abundant; its inner bark is separable into a beautiful netted fiber."

Family LYTHRACEÆ.

KEY TO THE SPECIES ENUMERATED.

Leaves linear-oblong to lance-oblong, more or less auriculate-clasping at the base.

Leaves about 3-7 cm. long; capsules 3-4 mm. in diameter.

491. *Ammania latifolia*.

Leaves about 1-3 cm. long; capsules 2-2.5 cm. in diameter.

490. *Ammania auriculata*.

Leaves not as above.

Leaves less than 1 cm. long, broadly ovate, almost sessile, cordate at base; flowers white.

Disk more or less erect.....492. *Parsonsia Melanium*.

Disk horizontal.....496. *Parsonsia Swartziana*.

Leaves either distinctly larger or else tapering at base.

Leaves linear-oblongate, up to about 1 cm. long.

495. *Parsonsia pseudosilene*.

Leaves lance-oblong to ovate.

Leaves ovate, somewhat glandular, but hardly pubescent.

494. *Parsonsia Grisebachiana*.

Leaves lance-oblong to ovate, minutely glandular, and also scabrous-pubescent.....493. *Parsonsia micrantha*.

490. ***Ammania auriculata* var. *arenaria* f. *brasiliensis*** (St. Hilaire) Koehne.

*Ammania senegalensis* var. *brasiliensis* ST. HILAIRE, Flora Brasiliensis, III, 1833, p. 135, Pl. 187.

*Ammania auriculata* var. *arenaria* f. *brasiliensis* KOEHNE, in Engler's Pflanzenreich, IV (216), 1903, p. 46.

Near Nueva Gerona, December 19, 1903, *A. H. Curtiss*, No. 245. General Distribution: From Nebraska to Louisiana and New Mexico and south to Brazil; Cuba, the Isle of Pines; and Africa.

491. ***Ammania latifolia* Linnæus.**

*Ammania latifolia* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 119.

*Isnarda subhastata* RUIZ & PAVON, Floræ Peruvianæ et Chilensis Prodrum, I, 1798, p. 66, Pl. 86, fig. b.

*Ammannia ramosior* ELLIOTT, Sketch of the Botany of South Carolina and Georgia, I, 1821, p. 219.

*Ammania lingulata* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 106.

Between Bogarona and Caleta Grande, on coralline-limestone soil, May 22, 1910, *O. E. Jennings*, No. 472. General Distribution: From the Bahamas and the northern shores of the Gulf of Mexico south through the West Indies and continental tropical America.

492. ***Parsonsia Melanium* Linnæus.**

*Lythrum Melanium* LINNÆUS, Systema Naturæ, Ed. X, 1759, p. 1045.

*Cuphea Melanium* R. BROWN, in Steudel, Nomenclator Botanicus, Ed. I, 1821, f. 245.

*Melanium alliaceum* SPRENGEL, Systema Vegetabilium, II, 1825, p. 454.

*Cuphea pseudomelanium* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 186.

Dry savanna, south of Sante Fé, May 25, 1910, *O. E. Jennings*, No. 546; *Blain*, Nos. 55, 56 (according to Millspaugh). (Flowers white.) General Distribution: Cuba, Jamaica, Haiti, and the Isle of Pines.

493. ***Parsonsia micrantha* Humboldt, Bonpland, & Kunth.**

*Cuphea micrantha* HUMBERT, BONPLAND, & KUNT, Nova Genera et Species Plantarum, VI, 1823, p. 196.

*Melanium hirtum* SPRENGEL, Systema Vegetabilium, II, 1825, p. 451.



*Cuphea hirta* DECANDOLLE, Prodrromus Systematis Naturalis Regni Vegetabilium, III, 1828, p. 83.

*Cuphea rapunculoides* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 105.

Near Nueva Gerona, April 21, 1904, and May 25, 1904, *A. H. Curtiss*, Nos. 455 and 513. General Distribution: Cuba, the Isle of Pines, Hispaniola, Porto Rico, and from Honduras and Guatemala to Brazil.

Curtiss's No. 455 consists of very diminutive specimens, some of them not over 2.5 cm. high; these being, probably, merely starved forms.

494. **Parsonsia Grisebachiana** (Koehne) comb. nov.

*Cuphea Grisebachiana* KOEHNE, Flora Brasiliensis, XIII, (II), 1877, p. 225.

*Cuphea hyssopifolia* GRISEBACH (in part), Catalogus Plantarum Cubensium, 1866, p. 105, not of Humboldt, Bonpland, & Kunth.

*Parsonsia Grisebachiana*. (Herbarium name, as distributed in Curtiss' *West Indian Plants*, and unpublished.)

Near Nueva Gerona, April 3, 1904, *A. H. Curtiss*, No. 433. General Distribution: Western Cuba and the Isle of Pines.

495. **Parsonsia pseudosilene** (Grisebach) comb. nov.

*Cuphea pseudosilene* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 105.

*Parsonsia pseudosilene*. (Herbarium name, as distributed in Curtiss' *West Indian Plants*, and unpublished.)

On white sand in the pine-barrens near Los Indios, May 17, 1910, *O. E. Jennings*, No. 337; on sour-looking spots on the white sand of the pine-barrens, May 18, 1910, *O. E. Jennings*, No. 384 (flowers purplish); near Los Indios, November 4, 1912, *G. A. Link*. General Distribution: The Isle of Pines and Cuba.

496. **Parsonsia Swartziana** (Sprengel) comb. nov.

*Cuphea Swartziana* SPRENGEL, Systema Vegetabilium, II, 1825, p. 455.

*Cuphea cordifolia* KOEHNE, Engler, Botanische Jahrbücher, II, 1881, p. 140.

*Parsonsia cordifolia*. (Herbarium name, as distributed in Curtiss' *West Indian Plants*, and unpublished.)

Near Nueva Gerona, April 21, 1904, *A. H. Curtiss*, No. 426. General Distribution: Western Cuba and the Isle of Pines. In a recent letter to the writer Dr. Britton refers Curtiss' no. 426 to *P. Swartziana*.

Family RHIZOPHORACEÆ.

497. **Rhizophora Mangle** Linnæus. MANGROVE. MANGLE.

*Rhizophora Mangle* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 443.

Along margin of river south of Nueva Gerona, in brackish water, May 12, 1910, *O. E. Jennings*, No. 692. General Distribution: Along sea-coasts from the Bermudas and southern Florida south through the West Indies and continental tropical America; also tropics of Africa.

In the Isle of Pines the mangrove forms a continuous border around the coast, excepting where the coast is rocky, and it also fringes the rivers for several miles back from the sea, as far as the limit of salt water.

### Family COMBRETACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Flowers in peduncled spikes.

Corolla none.

Leaves glabrous or nearly so; calyx persistent; branchlets thorny.

Leaves about 2 cm. long and 5 mm. wide. . . . . 501. *Bucida spinosa*.

Leaves 2-4 cm. long and 5-20 mm. wide. . . . . 500. *Bucida Buceras*.

Leaves on the midrib beneath and on the margin rusty hirsute.

498. *Buchenavia capitata*.

Corolla present; leaves opposite, oblong to oval or obovate, rounded or retuse.

502. *Laguncularia racemosa*.

Flowers in dense, round, peduncled heads; leaves alternate, elliptic to oval, acute or acuminate. . . . . 499. *Conocarpus erecta*.

#### 498. *Buchenavia capitata* (Vahl) Eichler.

*Bucida capitata* VAHL, *Eclogæ Americanæ*, I, 1796, p. 50, Pl. VIII.

*Buchenavia capitata* EICHLER, *Flora*, 1866, p. 165.

*Pseudolmedia bucidæfolia* BELLO, *Anales de la Sociedad Española de Historia Natural*, II, 1883, p. 109, no. 701.

Near Nueva Gerona, February 28 and March 29, 1904, *A. H. Curtiss*, No. 376. General Distribution: From Cuba south through the West Indies and tropical South America.

#### 499. *Conocarpus erecta* Linnæus. BUTTONWOOD.

*Conocarpus erecta* LINNÆUS, *Species Plantarum*, I, Ed. I, 1753, p. 176.

Pedernales Point, southwestern corner of the island, February 16, 1899, *C. F. Millsbaugh*, No. 1428. General Distribution: From the Bermudas and southern Florida south through the West Indies and tropical America, along muddy or sandy shores.

#### 500. *Bucida Buceras* Linnæus. BLACK OLIVE.

*Bucida Buceras* LINNÆUS, *Systema Naturæ*, II, Ed. X, 1759, p. 1025.

Near Nueva Gerona, May 3, 1904, *A. H. Curtiss*, No. 479; in swamp

southwest of Bibijagua, May 7, 1910, *O. E. Jennings, No. 100*; near Hato, north of Caleta Grande, May 22, 1910, *O. E. Jennings, No. 463a*; northern part of the island, *Blain, No. 130* (Millspaugh). General Distribution: From the Bahamas and southern Florida south through the West Indies and tropical America.

501. **Bucida spinosa** (Northrop) comb. nov.

*Terminalia spinosa* NORTHROP, Memoirs of the Torrey Botanical Club, XII, 1902, p. 54.

Conspicuous in the chaparral near Hato, north of Caleta Grande, May 22, 1910, *O. E. Jennings, No. 469*. General Distribution: The West Indies.

502. **Laguncularia racemosa** (Linnæus) Gaertner, filius. WHITE  
BUTTONWOOD. WHITE MANGROVE.

*Conocarpus racemosa* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 930.

*Laguncularia racemosa* GAERTNER, FILIUS, De Fructibus et Seminibus Plantarum, III, 1807, p. 209.

Based on specimen *Blain, No. 80*, reported by Millspaugh, collected in the northern part of the island. General Distribution: Along coasts, from the Bermudas and southern Florida south through the West Indies and tropical America.

Family MYRTACEÆ.

KEY TO THE SPECIES ENUMERATED.

- Leaves long, up to 20 cm. or more, lance-linear, acuminate. . . 506. *Eugenia Jambos*.
- Leaves lanceolate, or narrowly ovate, acuminate. . . . . 509. *Psidium Guayabita*.
- Leaves orbicular to rounded-cordate, very obtuse. . . 510. *Calypttranthes pinetorum*.
- Leaves narrowly elliptic to oval or oblong, not cordate nor sharply acuminate.
- Flowers densely grouped in a head at the apex of a long axillary peduncle.
- Leaves elliptic, obtuse to shortly bluntly acuminate; glomerule 5-9-flowered.
- calyx-lobes obtuse. . . . . 511. *Calypttranthes micrantha*;
- Leaves narrowly elliptic, obtuse; glomerule fewer-flowered; calyx-lobes apiculate. . . . . 512. *Calypttranthes punctata*.
- Flowers not grouped into a long-peduncled head.
- Leaves small, up to 2.5 cm. long by 1 cm. wide. . . 507. *Eugenia puniceifolia*.
- Leaves larger.
- Flowers 2.5-3.5 cm. in diameter, solitary, axillary; leaves pubescent beneath. . . . . 508. *Psidium Guajava*.
- Flowers much smaller.
- Peduncles axillary, dichotomously branching, 3-7 (or 1)-flowered;
- leaf-blades oblong to obovate-cuneate, 2-4 cm. long.
- 505. *Ananomis dichotoma*.

- Peduncles axillary, solitary (or more), one-flowered; leaves oboval to oblong-oboval, 2.5-4 cm. long.....504. *Eugenia brevipes*.  
 Flowers short-peduncled, in short axillary clusters; leaves elliptic-ovate, 3-5 cm. long.....513. *Eugenia axillaris*.  
 Peduncles 1-flowered and simple, or branched and 3-4-flowered, bibracteolate below the flower, short and congested in the axils.  
 503. *Eugenia faramoides*.

503. ***Eugenia faramoides* A. Richard.**

*Eugenia faramoides* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, p. 281.

Small shrub in a thicket along bank of arroyo, near Sante Fé, May 24, 1910, *O. E. Jennings*, No. 562. General Distribution: Cuba and the Isle of Pines.

504. ***Eugenia brevipes* A. Richard.**

*Eugenia brevipes* A. RICHARD, in Sagra, Histoire Physique, Politique et Naturelle de l'Ile de Cuba, I, 1845, p. 584.

Northern part of island, *Blain*, No. 54 (Millspaugh). General Distribution: Cuba and the Isle of Pines.

505. ***Ananomis dichotoma* (Vahl) Sargent.**

*Myrtus dichotoma* VAHL, in Poiret, Encyclopédie Méthodique, Supplementa, IV, 1816, p. 63.

*Eugenia dichotoma* DECANDOLLE, Prodrum Systematis Regni Vegetabilis, III, 1828, p. 278.

*Ananomis dichotoma* SARGENT, Garden and Forest, VI, 1893, p. 130.

Northern part of the island, *Blain*, No. 114 (reported by Millspaugh). General Distribution: Rocky woods, Florida, the Bahamas, and several West Indian islands.

506. ***Eugenia Jambos* Linnæus. ROSE-APPLE. JAMBOS.  
JAMROSADE.**

*Eugenia Jambos* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 470.

*Jambosa vulgaris* P. DECANDOLLE, Prodrum Systematis Naturalis Regni Vegetabilis, III, 1828, p. 286.

*Jambosa Jambos* MILLSPAUGH, Field Columbian Museum, Botanical Series, II, 1900, p. 80.

Near Nueva Gerona, January 22, 1904, *A. H. Curtiss*, No. 308; among palmettoes on savanna, two miles east of Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 13. General Distribution: Native to the tropics of the Old World, but now extensively cultivated and

escaped in the American tropics. The fruit is apricot-flavored and is highly valued for making jelly.

507. **Eugenia puniceifolia** (Humboldt, Bonpland, & Kunth) DeCandolle.

*Myrtus puniceifolia* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, VI, 1823, p. 149.

*Eugenia puniceifolia* P. DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, III, 1828, p. 267.

Near Nueva Gerona, May 13, 1904, *A. H. Curtiss*, No. 408; swampy places along river south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 203; near Los Indios, Nov. 4, 1912, *G. A. Link*. General Distribution: Northern South America and the Isle of Pines.

508. **Psidium Guajava** Linnæus. GUAVA. LEMON GUAVA.

*Psidium Guajava* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 470.

*Psidium pyriferum* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 672.

*Psidium pomiferum* LINNÆUS, *l. c.*

*Psidium Guava* GRISEBACH, Flora of the British West Indian Islands, 1860, p. 241.

On old homestead site, near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 38. General Distribution: American tropics, widely cultivated, now introduced and naturalized, sometimes as a weed, as far north as the Bermudas, Bahamas, Florida, and California. Fruit somewhat astringent, but highly valued for jellies and preserves.

509. **Psidium Guayabita** A. Richard.

*Psidium Guayabita* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, p. 277.

Near Nueva Gerona, March and May, 1904, *A. H. Curtiss*, No. 350; on dry savanna, near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 29; dry savanna near Casas Mts., May 12, 1910, *O. E. Jennings*, No. 217. General Distribution: Cuba and the Isle of Pines.

510. **Calypttranthes pinetorum** Britton & Wilson.

*Calypttranthes pinetorum* BRITTON & WILSON, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 465.

An interesting plant, forming shrubby mats about two feet high, on the white gravelly soil about one mile north of Los Indios. May 19, 1910, *O. E. Jennings*, No. 390, type. The specimens were not as complete as desirable for study, but they represent a species very

closely related to *Calyptranthes nummularia* Berg, from Santo Domingo. The leaves are orbicular to orbicular-ovate, truncate to cordate at the base, the apex broadly rounded, the upper surface impressed-punctate, the lower surface densely punctate, leaves gray-green, paler below, coriaceous; younger twigs and peduncles more or less chestnut-brown, punctate, glabrous; peduncles more or less divaricate-branched at apex, one to two times as long as the subtending leaves; calyx-tube punctate-pellucid, about 2 mm. long. Older twigs ashy-gray in color. Known only from the Isle of Pines.

511. *Calyptranthes micrantha* Wright.

*Calyptranthes micrantha* WRIGHT, in Grisebach, Catalogus Plantarum Cubensium, 1866, p. 85.

Near Nueva Gerona, May 15, 1904, *A. H. Curtiss*, No. 499; side of ridge at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 638. General Distribution: Cuba and the Isle of Pines.

In recent years the lines of demarcation between the West Indian species of *Calyptranthes* have been drawn very closely—it seems to the writer too closely in some cases—so that ordinary variations are in many cases very difficult to place in the species, as they are now described.

The two specimens catalogued above perhaps represent the same species, the Bibijagua specimen having slightly narrower leaves and more nearly glabrous twigs.

512. *Calyptranthes punctata* Grisebach.

*Calyptranthes punctata* GRISEBACH, Memoirs of the American Academy of Arts and Sciences, VIII, Series II, 1860, p. 181.

*Chytraculia punctata* MILLSPAUGH, Field Columbian Museum, Botanical Series, I, 1900, p. 431.

Reported by Millspaugh, *l. c.*, on the basis of *Blain*, Nos. 158, 166. General Distribution: Cuba and the Isle of Pines.

513. *Eugenia axillaris* (Swartz) Willdenow.

*Myrtus axillaris* SWARTZ, Prodrromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 78.

*Eugenia axillaris* WILLDENOW, Species Plantarum, II, 1800, p. 970.

Medium-sized tree at base of ridge at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 102. General Distribution: On sandy shores from the Bermudas and southern Florida south through the West Indies.

## Family MELASTOMACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Small herbaceous annuals with partly long-spurred anthers.

516. *Acisanthera glandulifera*.

Woody, at least at the base.

Low plants with a woody base and narrow leaves less than 2 cm. long.

Calyx-lobes obtusish, ovate-subrotund. . . . . 514. *Chatolepis saturioides*.

Calyx-lobes acuminate, ciliate, oblong-lanceolate. . . 515. *Chatolepis cubensis*.

Shrubs or trees; leaves more than 2.5 cm. long:

Leaves with white to brownish, stiff hairs 1-3 mm. long.

Long hairs apically reddish-glandular; spur produced from back of calyx-lobe considerably below the apex. . . . . 528. *Clidemia hirta*.

Long hairs only occasionally glandular; spur on back of calyx-lobe very close to the apex. . . . . 529. *Clidemia strigillosa*.

Leaves not as above.

Leaves essentially glabrous.

Calyx-lobes prominently tuberculate near their apex; leaves 2.5-5 by 5-12 cm.

Calyx 7-8 mm. long; largest leaves on flowering shoots lance-ovate, at least 10-13 cm. long. . . 526. *Pachyanthus longifolius*.

Calyx 5-6 mm. long; largest leaves on flowering shoots usually less than 10 cm. long, ovate. . . . . 527. *Pachyanthus ovatus*.

Calyx-lobes none or very small, not tuberculate.

Leaves about 1-1.5 by 20-30 mm., sessile, more or less yellow beneath. . . . . 519. *Tamonea androsæmifolia*.

Leaves about 10-15 cm. by 2-3.5 cm., distinctly petioled, whitish beneath. . . . . 517. *Tetrazygia bicolor*.

Leaves ovate or oval-oblong, 5-10 cm. long, very shortly petioled. 523. *Tamonea Wrightii*.

(See also 524. *Tamonea præcox*).

Leaves not as above. . . . . 530. *Ossæa macrandra*.

Leaves stellate-pubescent (or simply pubescent).

Leaves attenuate into a margined petiole. . . 520. *Tamonea prasina*.

Leaves not thus attenuate at base.

Leaves up to 3 dm. or more long, elliptic to obovate, acuminate, petiole short or almost none. . . . . 521. *Tamonea impetiolearis*.

Leaves much shorter, broadly ovate, distinctly petioled.

Margins of leaves closely and finely denticulate, blades more or less brownish beneath, flowers pinkish.

518. *Tamonea tomentosa* var. *auriculata*.

Margins entire, usually closely revolute.

Flowers orange; leaves rounded at apex, at maturity smooth and lustrous above. . . 525. *Pachyanthus cubensis*.

Flowers light yellow; leaves bluntly acute, dull, stellate-pubescent and more or less yellowish above.

522. *Tamonea delicatula*.

Leaves acute, somewhat strigillose below, about 1.5 dm.  
long by half as wide..... 531. *Henrietella parviflora*.

514. **Chætolepis saturioides** (Grisebach) Triana.

*Chætogastra satirejoides* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 103.

*Chætolepis saturioides* TRIANA, Transactions of the Linnean Society, London, XXVIII, 1871, p. 51.

Northern part of the island, *Blain*, No. 164 (Millsпах); near Nueva Gerona, April 23, 1904, *A. H. Curtiss*, No. 459; on the dry savanna east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 54; fields near Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 669. General Distribution: Western Cuba and the Isle of Pines.

515. **Chætolepis cubensis** (A. Richard) Triana.

*Arthrostemma cubense* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, 1845, X, p. 258.

*Chætogastra cubensis* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 103.

*Chætolepis cubensis* TRIANA, Transactions of the Linnean Society, London, XXVIII, 1871, p. 51.

Northern part of the island, *Blain*, No. 67 (Millsпах); *A. H. Lanier*, (A. Richard, *l. c.*) 1831, General Distribution: Cuba and the Isle of Pines.

516. **Acisanthera glandulifera** Jennings, sp. nov. (PLATE XXI.)

Herbaceous, glandular pubescent: stem erect to sub-procumbently ascending, rooting at the nodes towards the base, acutely tetragonal to narrowly winged, branched, up to 2.5 dm. high; leaves 5-16 mm. long, petioled, ovate, subacute at the apex, rather acute at the base, when young crenate-ciliate, finally becoming merely crenate, above at length glabrous, punctate-foveolate, three-nerved; flowers 4-merous, solitary, in alternate axils, shortly pedicellate; calyx-tube ovoid-campanulate, rather terete, rounded at the base, about 3 mm. long, 8-nerved, along the nerves sparsely glandular-pubescent, lobes 4, erect and at length spreading, sparsely glandular-pubescent, elongate triangular, 3 mm. long; petals 4, about 5 mm. long, oblong, apparently purplish or violet, abruptly spreading; stamens 8, exserted, anthers linear, unequal, arcuate, about 1 mm. long, the connective arcuate, produced below the anther to the length of about 1 mm., and at the base prolonged into two slender spurs about 1 mm. long; style



3 mm. long; pistil 2-loculed, free; capsules 3.5 mm. long, globose, smooth; seeds 0.5–0.8 mm. long, subreniform, dorsally 2–4-sulcate, chestnut-colored, glandular-punctate.

Planta herbacea, glanduloso-pubescent: caule erecto vel subprocumbente adscendente, ad basin e nodis radicante, acute tetragono vel anguste 4-alato, ramoso, usque ad 2.5 dm. alto; foliis 5–16 mm. longis, petiolatis, ovatis, apice subacutis, basi acutiusculis, margine crenato-ciliatus demum crenatis, supra demum glabris punctulato-foveolatis, triplinerviis; floribus 4-meris, solitariis, alterne axillaribus, breviter pedicellatis; calycis tubo campanulato-ovoideo, teretiusculo, basi subrotundato, circiter 3 mm. longo, 8-nervato, ad nervos sparse glanduloso-pubescente, lobis 4, erectis demum patulis, sparse glanduloso-pubescentibus, triangulari-linearibus, 3 mm. longis; petalis 4, circiter 5 mm. longis, oblongis, manifeste purpureis aut violaceis, abrupte patulis; staminibus 8, exsertis, antheris linearibus, inæqualibus, arcuatis, circiter 1 mm. longis, majorum connectivo arcuato, infra loculos distincte producto ad 1 mm., basi distincte attenuato-calcarato ad circiter 1 mm. in longum; stylo 3 mm. longo; ovario 2-loculare, libero; capsulis 3.5 mm. longis, globosis, glabris; seminibus 0.5–0.8 mm. longis, dorso 2–4 sulcatis, subreniformibus, castaneis, glanduloso-punctulatis.

*Type*.—Near Nueva Gerona, Isle of Pines, December 15, 1903, A. H. Curtiss, No. 228, *West Indian Plants*. Specimen in the Herbarium of the Carnegie Museum.

The type specimen was issued as *Acisanthera quadrata* Jussieu, but it very clearly differs from that species in a number of prominent characters, it being much nearer to *A. recurva* (DeCandolle) Grisebach, which, however, has the basal spurs on the connectives of the anthers blunt, and has 5-merous flowers and a 3-loculed capsule.<sup>1</sup>

The writer has not examined *Blain's Nos. 70 and 162*, collected in the northern part of the island and referred by Millspaugh to *Acisanthera quadrata* Jussieu, but they in all probability are of the same species as *Curtiss's No. 228*.

#### 517. *Tetrazygia bicolor* (Triana) Cogniaux.

*Naudinia argyrophylla* A. RICHARD, in Sagra, *Historia Fisica, Politica y Natural de la Isla de Cuba*, X, 1845, p. 265 and XII, Pl. 44.

<sup>1</sup> Triana, J. *Les Melastomacées*. *Transactions of the Linnean Society*, 28: 34 and Pl. II, b. 1873; also DeCandolle, *Prodromus Systematis Naturalis Regni Vegetabilis*, 3: 118, 1828, where treated as *Microlicia recurva*.

*Tetrazygia angustiflora* var. *argyrophylla* GRISEBACH, Flora of the British West Indian Islands, 1860, p. 254.

*Miconia bicolor* TRIANA, Transactions of the Linnean Society, London, XXVIII, 1871, p. 103.

*Tetrazygia bicolor* COGNIAUX, in DeCandolle, Monographiæ Phanerogamarum, VII, 1891, p. 724.

Northern part of the island, *Blain*, No. 131, (Millsbaugh, as *Tetrazygia argyrophylla*); near Nueva Gerona, April 5, 1904, *A. H. Curtiss*, No. 414; in swampy place in the savanna east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 57; in savanna southwest of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 171; a small tree along the arroyo south of Sante Fé, May 25, 1910, *O. E. Jennings*, No. 544. General Distribution: The Bahamas, southern Florida, Cuba, and the Isle of Pines. (See Plate XV.)

518. ***Tamonea tomentosa* var. *auriculata* Jennings, var. nov.**

(PLATE XXII.)

Leaves broadly ovate, auricled at base, the petioles about 2-3 cm. long, the margin very shortly crenate.

Folia late ovata, basi auriculata, petiolis circiter 2-3 cm. longis, margine brevissime dense crenatis.

In a fresh-water jungle near Los Indios, May 20, 1910, No. 442, *O. E. Jennings*, TYPE. A slender tree about fifteen feet high, with pink flowers.

*Tamonea tomentosa*, ranging from Trinidad to Guiana and Brazil, apparently varies considerably in the shape of the base of the leaf, but it is possible that the plant here described as a variety may prove to be a distinct species. The brown-tomentose character of the axis and branches of the inflorescence and of the under side of the leaves makes it a striking plant. The upper surface of the leaves is only slightly stellate-pubescent and turns blackish in drying. The leaves are 9-nerved, the outermost nerve being rather indistinct and bordering closely the bases of the low closely approximate crenations, the innermost nerve being placed about half-way between the mid-nerve and the margin. The inflorescence is compact, in our specimen being 6 cm. in diameter by 19 cm. long. Calyx-tube about 10-12 mm. long, the lower third about 4 mm. in diameter, cylindric, the upper third abruptly enlarging into a campanulate portion with widely rounded lobes only about 1 mm. high, and tuberculate on

the back of the tip. Petals about 8-10 mm. long, narrowed below into a claw, the upper portion obliquely ovate, about 5 mm. wide, oblique and retuse at apex, finely stellate tomentose on the outside, glabrous and pinkish inside. Anthers 9-11 mm. long, from a shortly spurred base gradually long tapering, the base of the connective on the back densely stipitate glandular. Style fleshy, about 1 mm. thick, 17-18 mm. long, curved, stigmatic at the apex.

519. **Tamonea androsæmifolia** (Grisebach) Jennings, comb. nov.

(PLATE XXIII.)

*Miconia androsæmifolia* GRISEBACH, *Catalogus Plantarum Cubensium*, 1866, p. 100.

In the absence of a recent extended description of the species, the following description is given, in the hope that it may be of assistance in making more clear the systematic relationship:

Shrub, six or eight feet high, of straggly aspect, the few main branches being tufted at the ends with usually one to four pairs of chestnut-colored branchlets about two to six inches long, plant glabrous in all parts: leaves approximate, 2 to 4 cm. long, about half as wide, ovate or ovate-oblong, sessile or very nearly so, the base subcordate or slightly clasping, margin entire and usually more or less narrowly revolute, the apex obtuse, leaves yellowish-green above, quite decidedly so beneath, the two (or four) lateral nerves and the cross veins almost hidden in the rather thick and coriaceous lamina; inflorescence rather densely cymose, terminal, about 2 to 4 cm. long, extending somewhat beyond the uppermost leaves; peduncles and pedicels two-bracteolate at the summit, the bracts partly fallen by flowering time; calyx-tube 2-3 mm. long, subglobose to oval, constricted at the neck and with 4 short triangular spreading lobes; petals 4, distinctly clawed, the lamina 4-5 mm. long, more or less broadly ovate or ovate-cordate, obtuse, widely spreading, when freshly opened bright scarlet to reddish-orange and in age and in dried specimens becoming more or less completely orange-yellow; stamens exserted, the connective not prolonged below the anthers but abruptly bent at the base of the anther, the anthers 1.5-2 mm. long, ventrally somewhat gibbous, opening by one terminal pore; style curved, slender, about 4-5 mm. long; capsule 3-4 mm. in diameter, globose, dark chestnut-brown, smooth to somewhat verruculose, 2-loculed; seeds yellowish, smooth, obpyramidal, the sides angled, the top slightly convex, about 1 mm. long.

In patches of dazzling white quartzose sand and gravel in the pine-barrens near Los Indios, May 17, 1910, *Nos.* 321 and 323, *O. E. Jennings*; northern part of the island, *Blain*, *No.* 171 (Millsaugh).

520. ***Tamonea prasina*** (Swartz) Krasser.

*Melastoma prasina* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 69.

*Miconia collina* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, III, 1828, p. 185.

*Miconia prasina* DECANDOLLE, *op. cit.*, p. 188.

*Acinodendron prasinum* O. KUNTZE, *Revisio Generum Plantarum*, I, 1891, p. 245.

*Tamonea prasina* KRASSER, in Engler & Prantl, *Natürliche Pflanzenfamilien*, III, (7), 1893, p. 142.

Northern part of the island, *Blain*, *Nos.* 1, 2, 4, 5, 6, 127 (Millsaugh); a tree about twenty feet in height in forest on river at Los Indios, May 20, 1910, *O. E. Jennings*, *No.* 447; near Nueva Gerona, February and April, 1914, *A. H. Curtiss*, *No.* 373. General Distribution: Cuba, the Isle of Pines, Jamaica, Porto Rico, Hispaniola, Tortola, Grenada, Trinidad, Margarita, and the continental American tropics.

521. ***Tamonea impetiolaris*** (Swartz) Cook & Collins.

*Melastoma impetiolaris* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 70.

*Miconia impetiolaris* D. DON, *Memoirs of the Wernerian Society of Natural History*, IV, 1823, p. 316.

*Miconia Wydleriana* DECANDOLLE, *Mémoire sur la Famille des Mélastomacées*, 1828, p. 77.

*Tamonea impetiolaris* COOK & COLLINS, *Contributions from the United States National Herbarium*, VIII, 1903, p. 249.

Near Nueva Gerona, February 17, 1904, *A. H. Curtiss*, *No.* 352. General Distribution: Through the West Indies rather generally and in the continental American tropics.

522. ***Tamonea delicatula*** (A. Richard) Jennings, comb. nov.

*Miconia delicatula* A. RICHARD, in Sagra, *Historia Fisica, Politica y Natural de la Isla de Cuba*, X, 1845, p. 268.

"Crescit in insula Pinorum" 1831. *A. H. Lanier*. Type (*A. Richard, l. c.*); a shrub about eight feet in height, on savanna ("Mal Pais" gravel), near Nueva Gerona, May 5, 1910, *O. E. Jennings*, *No.* 5; on savanna near Sante Fé, May 25, 1910, *O. E. Jennings*, *No.* 545; in pine-barrens at Los Indios, May 18, 1910, *O. E. Jennings*, *No.* 607. General Distribution: The Isle of Pines.

523. **Tamonea Wrightii** (Triana) Jennings, comb. nov.

*Pachyanthus Wrightii* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 101.

*Miconia Wrightii* TRIANA, Transactions of the Linnean Society, XXVIII, 1871, p. 103.

*Acinodendron Wrightii* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 953.

Northern part of the island, *Blain*, Nos. 138, 149 (Millspaugh).  
General Distribution: Western Cuba and the Isle of Pines.

524. **Tamonea præcox** (Wright) Jennings, comb. nov.

*Miconia præcox* WRIGHT, in Sauvalle, Flora Cubana, 1873, p. 47.

Northern part of the island, *Blain*, No. 167 (Millspaugh). General Distribution: Cuba and the Isle of Pines.

The writer has not seen Blain's specimen, and from the meager description he is not able to say that the specimen might not belong to one or the other species enumerated above.

525. **Pachyanthus cubensis** A. Richard.

*Pachyanthus cubensis* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, X, 1845, p. 264.

"Crescit in insula Pinorum." 1831. A. H. Lanier. Type. (A. Richard, l. c.); northern part of the island, *Blain*, No. 68 (Millspaugh); J. F. Shafer, February to March, 1910; in sandy pine-barrens near the western base of the Cañada Mts., May 18, 1910, O. E. Jennings, No. 374. General Distribution: Western Cuba and the Isle of Pines.

The flowers are rich orange in color and quite attractive.

526. **Pachyanthus longifolius** Jennings, sp. nov. (PLATE XXIV).

Small tree or shrub: the young branches, petioles, the nerves below, and the peduncles stellate-furfuraceous; leaves anisophyllous, coriaceous, petioled, ovate or lance-ovate, rounded and emarginate at the base, 5-nerved, at length glabrous, 3.5-5 × 5-12 cm., margin entire, narrowly revolute, apex obtuse or subacute; petioles rather slender, 8-20 mm. long; cymes with rather long peduncles, densely few-flowered; calyx densely stellate-furfuraceous, 7-8 mm. long, the tube broadly suburceolate-campanulate, rounded at the base, the limb divided into obtuse truncate-retuse lobes with a thick dorsal tubercle, the lobes about 3 mm. long, the tubercles about 1.5 mm. high; petals verruculose on both sides, rather broadly long-clawed,

12-15 mm. long, 5-8 mm. wide, obliquely ovate; filaments of the stamens 6 mm. long, apically geniculate, anthers 5 mm. long, narrowly oblong, with one apical pore, the connective, at the base, dorsally minutely tubercled; ovary usually 5-loculed; style 12-14 mm. long.

Arbor parva vel frutex: ramis junioribus, petiolis foliorum, nervis subtus pedunculisque stellato-furfuraceis; foliis anisophyllis, coriaceis, petiolatis, ovatis vel lanceolato-ovatis, basi rotundatis et emarginatis, 5-nerviis, demum glabris, 3-5.5  $\times$  5-12 cm., margine integerrimis, anguste revolutis, apice obtusis vel subacutis; petiolis satis gracilibus, 8-20 mm. longis; cymis longiuscule pedunculatis, densiuscule paucifloris; calyce dense stellato-furfuraceo, 7-8 mm. longo, tubo late campanulato suburceolato, basi rotundato, limbo demum in lobos obtusos apice truncato-retusos dorso crasse tuberculatos diviso, lobis 3 mm. longis, tuberculis 1.5 mm. altis; petalis utrinque verruculosus, latiuscule longiusculeque unguiculatis, 12-15 mm. longis, 5-8 mm. latis, irregulariter ovatis; staminum filamentis 6 mm. longis, apice geniculatis; antheris 5 mm. longis, anguste oblongis, apice uniporosis; connectivo basi dorso minute tuberculato; ovario plerumque 5-loculare; stylo 12-14 mm. longo.

*Type*.—Along arroyo bank near Los Indios, May 19, 1910, *O. E. Jennings*, No. 426. Herbarium, Carnegie Museum. Other specimens of the same species were collected as follows: Swampy margin of pond one mile east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 56, and a small tree along an arroyo near Sante Fé, May 25, 1910, *O. E. Jennings*, No. 553. Flowers white.

This species is a small tree or perhaps more commonly a tall shrub growing in the marginal thicket of ponds, or along the banks of arroyos, and is closely related to *Pachyanthus ovatus* Cogniaux and *P. cordifolius* Cogniaux, and there is a possibility that with more complete collections available for study these three species will be best treated as one, under the name of *Pachyanthus ovatus* Cogniaux. The present status of the group would not, however, justify such a decision. The specimen (No. 334, *Jennings*) collected in the xerophytic sandy pine-barren at Los Indios fits the description of Cogniaux's *ovatus* very closely, thus indicating a possible ecological relationship between that species and *longifolius*.

527. **Pachyanthus ovatus** Cogniaux.

*Pachyanthus ovatus* COGNIAUX, in Urban, *Symbolæ Antillanæ*, V, 1908, p. 449.

A tree about twelve feet in height, growing in the pine-barrens near Los Indios, May 17, 1910, *O. E. Jennings*, No. 334. General Distribution: In Pinar del Rio Province, Cuba; and in the Isle of Pines.

528. **Clidemia hirta** (Linnæus) D. Don.

*Melastoma hirta* LINNÆUS, *Species Plantarum*, 1753, p. 390.

*Clidemia hirta* D. DON, *Memoirs of the Wernerian Natural History Society*, IV, 1823, p. 309; GRISEBACH, *Flora of the British West Indian Islands*, 1860, p. 246.

*Clidemia crenata* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, III, 1828, p. 157.

Near Nueva Gerona, February 13, 1904, *A. H. Curtiss*, No. 342 (*in part*); swampy margin of pond about two miles east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 42. General Distribution: General throughout the West Indies and continental tropical America.

A rather common low shrub around margins of ponds and along moist banks of arroyos.

529. **Clidemia strigillosa** (Swartz) DeCandolle.

*Melastoma strigillosa* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 71.

*Staphidium spicatum* NAUDIN, in *Annales des Sciences Naturelles*, Series III, XVII, 1852, p. 316 (*in part*).

*Clidemia spicata* var. *strigillosa* GRISEBACH, *Flora of the British West Indian Islands*, 1860, p. 247.

Near Nueva Gerona, February 13, 1904, *A. H. Curtiss*, No. 342 (as to Carnegie Museum specimen, *in part*); moist bank of arroyo between Los Indios and the Cañada Mts., May 18, 1910, *O. E. Jennings*, No. 375. General Distribution: Cuba, the Isle of Pines, Jamaica, Hispaniola, Porto Rico, Guiana, and Peru.

*Note*.—*Clidemia spicata* (Aublet) DeCandolle, as reported by Millspaugh, *Blain*, Nos. 69, 125, has not been examined. The more recent reports as to the distribution of the species would seem to leave some doubt as to its occurrence on the Isle of Pines, and from an examination of the current descriptions of the species the writer believes that Blain's specimens may be *C. strigillosa*.

530. **Ossæa macrandra** (Wright) Millspaugh.

*Sagræa macrandra* WRIGHT, in Sauvalle, *Flora Cubana*, 1873, p. 46.

*Ossæa macrandra* MILLSPAUGH, *Field Columbian Museum, Botany*, Series I, 1900, p. 432.

Northern part of the island, *Blain*, Nos. 73, 74, 91 (Millspaugh, *l. c.*). General Distribution: Cuba and the Isle of Pines.

531. *Henrietella parviflora* (Grisebach) Triana.

*Henriettea parviflora* GRISEBACH, *Catalogus Plantarum Cubensium*, 1866, p. 95.

*Henrietella parviflora* TRIANA, *Transactions of the Linnean Society*, XXVIII, 1871, p. 144.

Northern part of the island, *Blain*, Nos. 3, 71 (Millspaugh). General Distribution: Cuba and the Isle of Pines.

Family ONAGRACEÆ.

(ÆNOTHERACEÆ.)

KEY TO THE SPECIES ENUMERATED.

- Leaves reaching a maximum of 10 cm. or more in length, lanceolate to ovate; flowers 4-5 cm. broad.....532. *Jussiaea peruviana*.  
 Leaves linear-lanceolate to narrowly oblong, the largest 5-15 cm. long; flowers 2-3 cm. broad.....533. *Jussiaea suffruticosa*.  
 Leaves obovate or broadly spatulate, tapering below into a flat petiole, the largest 4-5 cm. long; flowers less than 1 cm. broad.....534. *Isnarda repens*.

532. *Jussiaea peruviana* Linnæus.

*Jussiaea peruviana* LINNÆUS, *Species Plantarum*, I, Ed. I, 1753, p. 388.

*Ænothera hirta* LINNÆUS, *Systema Naturæ*, Ed. X, II, 1759, p. 998.

*Jussiaea hirta* VAHL, *Eclogæ Americanæ*, II, 1798, p. 31.

Near Nueva Gerona, 1904, *A. H. Curtiss*; along irrigation ditch, Keenan's estate, May 9, 1910, *O. E. Jennings*, No. 163. General Distribution: On wet banks, southern Florida, the Greater Antilles, and continental tropical America.

533. *Jussiaea suffruticosa* Linnæus.

*Jussiaea suffruticosa* LINNÆUS, *Species Plantarum*, I, Ed. I, 1753, p. 388.

*Jussiaea angustifolia* LAMARCK, *Encyclopédie Méthodique, Botanique*, III, 1789, p. 331.

*Jussiaea octonervia* LAMARCK, *l. c.*

*Jussiaea octofila* P. DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, III, 1828, p. 57.

*Jussiaea acuminata* STAHL, *Estudios Sobre la Flora de Puerto-Rico*, IV, 1886, p. 132, in part, not Swartz.

Specimens from near Nueva Gerona, 1904, *A. H. Curtiss*; a weed, Keenan's estate, south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, Nos. 169 & 173; in partly cleared swamp along river at Los Indios, May 20, 1910, *O. E. Jennings*, No. 450. General Distribution:



From North Carolina and Arkansas to Florida, Texas, the West Indies, and to Brazil.

534. *Isnarda repens* (Swartz) DeCandolle.

*Ludwigia repens* SWARTZ, Flora Indiæ Occidentalis, I, 1797, p. 273, Pl. 8.

*Isnarda repens* DECANDOLLE, Prodrômus Systematis Naturalis Regni Vegetabilis, III, 1828, p. 60-61.

In swamp one mile north of Nueva Gerona, May 8, 1910, *O. E. Jennings*, No. 137. General Distribution: Cuba, the Isle of Pines, and Jamaica.

Family ARALIACEÆ.

535. *Dendropanax cuneifolium* (C. Wright) Seemann.

*Hedera cuneifolia* C. WRIGHT, in Grisebach's Catalogus Plantarum Cubensium, 1866, p. 117.

*Dendropanax cuneifolium* SEEMANN, Journal of Botany, VI, 1868, p. 140.

*Schefflera cuneifolia* MAZA, Anales de la Sociedad Española de Historia Natural, XIX, 1890, p. 249.

*Gilibertia cuneifolia* E. MARCH, MS., in Urban's Symbolæ Antillanæ, I, 1899, p. 201.

Along bank of the Majagua River, near Los Indios, May 9, 1910, *O. E. Jennings*, No. 423; along arroyo east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 358; along bank of dry arroyo near Santa Fé, May 25, 1910, *O. E. Jennings*, No. 536. General Distribution: Western Cuba and the Isle of Pines.

Dr. N. L. Britton ("Studies of West Indian Plants, IV," *Bulletin of the Torrey Botanical Club*, XXXIX, 1912, p. 2) notes that this species attains a height of six meters and that the umbel is 7-20-flowered. The Sante Fé specimen (No. 536) was taken from a tree at least thirty-five feet in height, while in our specimens the umbels are often up to 30-flowered. The leaves sometimes are retuse at the rounded apex. Further, the berries are not black, but are a very dark blue and glaucous, although in the dried specimens they are blackish.

Family ERICACEÆ.

KEY TO THE SPECIES ENUMERATED.

- Leaves narrowly ovate to lance-linear, strongly revolute; flowers light pink, with corolla 17-20 mm. broad.....536. *Kalmiella aggregata*.  
 Leaves 6-12 cm. long, 1.5-2.5 cm. wide, margin slightly revolute; corolla white, 9-10 mm. long; capsules angled, depressed-globose, 5-7 mm. high and somewhat wider.....537. *Pieris cubensis*.  
 Leaves 1-3 cm. long, oblong to oval or spatulate, thick, leathery, lepidote, especially beneath, obtuse at the apex; capsules ovoid, 3-5 mm. long; corolla urceolate, about 4 mm. long.

- Leaves glaucous beneath..... 539. *Xolisma vaccinioides*.  
 Leaves not glaucous beneath..... 538. *Xolisma myrtilloides*.

536. ***Kalmiella aggregata*** Small.

(PLATE XVII, FIGURES A-D.)

*Kalmiella aggregata* SMALL, North American Flora, XXIX (I), 1914, p. 54-55.

On the white quartzose sand, pine-barrens north of Los Indios, May 17, 1910, *O. E. Jennings*, No. 324 (TYPE); same date and locality, No. 625. General Distribution: Known only from the type-locality.

The plants grew scattered about in the pine-barrens, the growth always open and scraggly, the branches few and more or less erect, the leaves small and closely bunched towards the ends of the branches. The flowers occur densely bunched at the apex of the branches, the corolla being light pink and up to 20 mm. broad, glandular-pubescent, as is also practically the whole upper part of the plant. The lanceolate, acute sepals are about 4 mm. long, copiously soft-ciliate with gland-tipped and naked hairs, the peduncles and calyx more or less deeply reddish-purple in color. The filaments are pubescent near the base, this not being a good distinguishing character between *K. aggregata* and the closely related *Kalmiella ericoides* of western Cuba (Small, *l. c.*, in the key to species of *Kalmiella*, noting for *K. aggregata*: "Filaments glabrous").

537. ***Pieris cubensis*** (Grisebach) Small.

*Andromeda cubensis* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 51.

*Pieris cubensis* SMALL, North American Flora, XXIX, Part I, 1914, p. 63.

Along arroyo east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 302. General Distribution: Pinar del Rio, Cuba, and the Isle of Pines. This is the first report for the Isle of Pines.

538. ***Xolisma myrtilloides*** (Grisebach) Small.

*Lyonia myrtilloides* GRISEBACH, Catalogus Plantarum Cubensium, 1866, pp. 50-51.

Including also varieties *parvifolia* Grisebach and *ovatifolia* Grisebach, *op. cit.*, p. 51.

*Xolisma myrtilloides* SMALL, North American Flora, XXIX, Part I, 1914, p. 67.

On white quartz sand in the pine barrens north of Los Indios, May 17, 1910, *O. E. Jennings*, Nos. 309 and 309a. The first-named number is a small-leaved variety, perhaps Grisebach's var. *parvifolia*. General Distribution: Cuba and the Isle of Pines.

539. *Xolisma vaccinioides* Small.

*Xolisma vaccinioides* SMALL, North American Flora, XXIX, Part I, 1914, p. 68.

Nueva Gerona, March, 1904, *A. H. Curtiss*. (Type in Herbarium N. Y. Botanical Garden, Small, *l. c.*). General Distribution: Known only from the type locality.

Family THEOPHRASTACEÆ.

Leaves about 2.5-5 cm. long by 5-10 mm. wide; twigs scurfy scaly.

540. *Jacquinia aculeata*.

Leaves about 2-3 cm. long by 3-4 mm. wide; twigs puberulent.

541. *Jacquinia Curtissii*.

540. *Jacquinia aculeata* (Linnæus) Mez. ESPUELLA DE CABALLERO (Cuba).

*Medeola aculeata* LINNÆUS, Species Plantarum, 1753, p. 339.

*Jacquinia ruscifolia* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 15.

*Jacquinia aculeata* MEZ, Urban, Symbolæ Antillanæ, II, 1901, pp. 445-446.

On lower slope of Casas Mt., May 12, 1910, *O. E. Jennings*, No. 221. General Distribution: Western Cuba and the Isle of Pines.

541. *Jacquinia Curtissii* Britton.

*Jacquinia Curtissii* BRITTON, Torreya, V, 1905, p. 44.

Near Nueva Gerona, April 24, 1904, *A. H. Curtiss*, No. 463. General Distribution: Known only from the type locality.

Family PRIMULACEÆ.

542. *Centunculus pentandrus* Robert Brown.

*Anagallis pumila* SWARTZ, Flora Indiæ Occidentalis, I, 1797, p. 345.

*Centunculus pentandrus* ROBERT BROWN, Prodrum Floræ Novæ-Hollandiæ et Insulæ Van Diemen, 1810, p. 427.

*Micropyxis pumila* DUBY, in DeCandolle, Prodrum Systematis Naturalis Regni Vegetabilis, VIII, 1844, p. 72.

Near Nueva Gerona, December 15, 1903, *A. H. Curtiss*, No. 230. General Distribution: Cuba, the Isle of Pines, Jamaica; and, on the mainland, in Florida and from Mexico to South America; also in the tropics of the Old World.

## Family PLUMBAGINACEÆ.

543. *Plumbago scandens* Linnæus.

*Plumbago scandens* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 215.

Growing as a weed in dry fields near Nueva Gerona, May 6, 1910, *O. E. Jennings, No. 664*. General Distribution: From Florida and the Bahamas south through the West Indies and the American continental tropics.

## Family SAPOTACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Leaves covered underneath with a lustrous copper-colored pubescence.

547. *Chrysophyllum oliviforme*.

Leaves little or not at all pubescent as above.

Leaves obovate or widely oblanceolate, the largest 20 cm. or more in length.

545. *Achradelpha mammosa*.

Leaves not as above.

Leaf-blades acuminate..... 546. *Lucuma nervosa*.

Leaf-blades not acuminate.

Petioles distinctly rusty-sericeous; blades with very numerous fine lateral veins..... 544. *Achras Zapota*.

Petioles glabrous or nearly so; blades with about 8-12 lateral veins.

548. *Sideroxylon fœtidissimum*.

544. *Achras Zapota* Linnæus. SAPODILLA. CHICLE-TREE. NASE-BERRY (Jamaica).

*Achras Zapota* LINNÆUS, Species Plantarum, II, Ed. I, 1753, p. 1190.

*Achras Sapota* LINNÆUS, *op. cit.*, I, Ed. II, 1762, p. 470.

*Sapota Achras* MILLER, Gardener's Dictionary, Ed. VIII, 1768, no. 1.

*Sapota zapotilla* COVILLE, Contributions from the U. S. National Herbarium, IX, 1905, p. 369.

Large round-headed tree in Nueva Gerona (probably planted), May 5, 1910, *O. E. Jennings, No. 643*; specimen without data, probably near Columbia, February-March, 1910, *J. F. Shafer*. General Distribution: Cultivated and naturalized in the tropics of both hemispheres. In America found from the Bahamas through the West Indies, and from Mexico to Guiana.

545. *Achradelpha mammosa* (Linnæus) Cook. SAPOTE. MAMEY COLORADO (Cuba).

*Sideroxylum Sapota* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 15.

*Achras mammosa* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 469.

*Sapota mammosa* MILLER, Gardener's Dictionary, Ed. VIII, 1768, no. 2.

*Lucuma mammosum* GAERTNER, De Fructibus et Seminibus Plantarum, III, 1807, p. 130, pl. 203-4.

*Vitellaria mammosa* RADLKOFER, Sitzungsberichte König. Bayr. Akad. d. Wissensch. XII, 1882, p. 325.

*Calocarpum mammosum* PIERRE, in Urban, Symbolæ Antillanæ, V, 1904, p. 98.

*Achradelpha mammosa* COOK, Journal of the Washington Academy of Science, III, 1913, p. 160.

Near Nueva Gerona, June, 1912, *G. A. Link*; near Nueva Gerona, December 12, 1903, *A. H. Curtiss*, No. 224. General Distribution: Cultivated and also found wild in the West Indies and Central America; also in the Philippines.

546. ***Lucuma nervosa*** A. DeCandolle. CANISTÉ (Cuba).

*Lucuma nervosa* A. DECANDOLLE, Prodrum Systematis Naturalis Regni Vegetabilis, VIII, 1844, p. 169.

*Lucuma Rivicoa* var. *angustifolia* MIQUEL, in Martius, Flora Brasiliensis, VII, 1863, p. 71.

*Vitellaria nervosa* RADLKOFER, Sitzungsberichte Königliche Bayerische Akademie der Wissenschaften, XII, 1882, p. 326.

*Vitellaria tenuifolia* ENGLER, Engler's Botanischer Jahresbericht, XII, 1890, p. 513.

Near Nueva Gerona, May 10, 1904, *A. H. Curtiss*, No. 491. General Distribution: Cuba and the Isle of Pines.

547. ***Chrysophyllum oliviforme*** Linnæus. SATIN-LEAF. CAIMITILLO (Cuba). DAMSON PLUM (Jamaica).

*Chrysophyllum oliviforme* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 937.

*Chrysophyllum Cainito* var. *microphyllum* JACQUIN, Selectarium Stirpium Americanarum Historia, 1763, p. 53, Pl. 37, fig. 2.

*Chrysophyllum monopyrenum* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 49.

Probably near Columbia, February-March, 1910, *Dr. Jared F. Shafer*. General Distribution: Southern Florida, the Bahamas, Cuba, the Isle of Pines, Jamaica, Hispaniola, and Porto Rico.

The specimen consists of two leaves only, and in size and shape they appear to be the variety *platyphyllum* Urban, *Symbolæ Antillanæ*, V, 1904, p. 157. The larger leaf is 13 mm. long by 8 cm. wide, oval-suborbicular, obtuse, while the other leaf is slightly smaller and with a broadly rounded apex. This variety has been heretofore reported only for the type-locality, *i. e.*, Haiti.

548. ***Sideroxylon foetidissimum*** Jacquin. MASTIC.

*Sideroxylon foetidissimum* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 15.

*Sideroxylon mastichodendron* JACQUIN, Collectanea, II, 1788, p. 253, Pl. 17, fig. 5.  
*Sideroxylon pallidum* SPRENGEL, Systema Vegetabilium, I, 1825, p. 666.

"Crescit . . . in insula Pinorum." 1831, A. H. Lanier (A. Richard, in Sagra, "Historia Fisica, Politica y Natural de la Isla de Cuba," XI, 1850, p. 84). General Distribution: Florida, the Bahamas, and many of the West Indian Islands.

### Family EBENACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Fruit 6-seeded; ovary hairy..... 549. *Maba caribæa*.  
 Fruit with more than 6 seeds; ovary not hairy..... 550. *Diospyros laurifolia*.

#### 549. *Maba caribæa* (DeCandolle) Hiern.

*Macreightia caribæa* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, VIII, 1844, p. 221.

*Maba caribæa* HIERN, Transactions of the Cambridge Philosophical Society, XII, 1873, p. 125.

Northern part of the island, *Blain*, Nos. 128, 180 (Millspaugh).  
 General Distribution: Cuba and the Isle of Pines; Hispaniola.

#### 550. *Diospyros laurifolia* A. Richard.

*Diospyros laurifolia* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, XI, 1850, p. 86 and XII, Pl. 55.

Northern part of the island, *Blain*, No. 179 (Millspaugh). General Distribution: Cuba and the Isle of Pines.

### Family SYMPLOCACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Stamens more or less distinctly separate from each other.  
 551. *Symplocos salicifolia*.  
 Stamens connate into a long tube..... 552. *Symplocos martinicensis*.

#### 551. *Symplocos salicifolia* Grisebach.

*Symplocos salicifolia* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 168.

Northern part of the island, *Blain*, No. 137 (Millspaugh); near Nueva Gerona, February 23, 1904, A. H. Curtiss, No. 365. General Distribution: Western Cuba and the Isle of Pines.

#### 552. *Symplocos martinicensis* Jacquin.

*Symplocos martinicensis* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 24.

Northern part of the island, *Blain*, No. 157 (Millspaugh). General Distribution: Widely distributed in the West Indies from Porto Rico through the lesser Antilles.

### Family LOGANIACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Flowers solitary and sessile in the forks of the branchlets and axils of the leaves.

553. *Polypremum procumbens*,

Flowers in terminal and axillary spikes or spike-like racemes.

554. *Spigelia Blainii*.

#### 553. *Polypremum procumbens* Linnæus.

*Polypremum procumbens* LINNÆUS, Species Plantarum, 1753, p. 111.

On coralline strand, Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 502. General Distribution: From Pennsylvania to Florida and Texas, Mexico, and the West Indies.

#### 554. *Spigelia Blainii* Millspaugh.

*Spigelia Blainii* MILLSPAUGH, Field Columbian Museum, Botanical Series I, 1900, p. 432.

Northern part of the island, *Blain*, No. 51 (TYPE.) General Distribution: Known only from the type locality.

### Family GENTIANACEÆ.

#### 555. *Eustoma exaltatum* (Linnæus) Grisebach.

*Lisianthus glaucifolius* JACQUIN, Icones Plantarum Rariorum, 1781, t. 33.

*Gentiana exaltatum* LINNÆUS, Descourtilz, Flore (Pittoresque et) Médicale des Antilles, I, 1821, Pl. 15.

*Urananthus glaucifolius* BENTHAM, Plantas Hartwegianas Imprimas Mexicanas, 1839, p. 46.

*Eustoma cheironioides* GRISEBACH, DeCandolle, Prodromus Systematis Naturalis Regni Vegetabilis, IX, 1845, p. 51.

*Eustoma exaltatum* GRISEBACH, Flora of the British West Indian Islands, 1861, p. 422.

Along the strand west of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 253. General Distribution: Florida to Texas, California, Mexico, a number of the West Indian islands, and south to Panama and Venezuela.

This is a quite ornamental Gentian, with a tinge of pink showing in the bluish flowers, the center of the corolla being darker.





the slopes and, especially on the tops, of the smaller crystalline limestone hills in the northeastern part of the island.

557. **Rauwolfia cubana** A. DeCandolle.

*Rauwolfia cubana* A. DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, VIII, 1844, p. 339.

On swampy ground along the river south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, Nos. 212 and 665. General Distribution: Western Cuba and the Isle of Pines.

558. **Rauwolfia heterophylla** Roemer & Schultes.

*Rauwolfia heterophylla* ROEMER & SCHULTES, *Systema Vegetabilium*, IV, 1817-20, p. 805.

Near Nueva Gerona, May 27, 1904, *A. H. Curtiss*, No. 517. General Distribution: Continental tropical America from Mexico to Colombia and Ecuador; the Isle of Pines.

559. **Cameraria retusa** Grisebach.

*Cameraria retusa* GRISEBACH, *Flora of the British West Indian Islands*, 1861, p. 410.

Northern part of the island, *Blain*, No. 145 (Millsпах); near Nueva Gerona, May 4, 1904, *A. H. Curtiss*, No. 480; on savanna southwest of Nueva Gerona, May 7, 1910, *O. E. Jennings*, No. 93; Nueva Gerona, *G. A. Link*, June 12, 1912. General Distribution: Cuba, the Isle of Pines, and Jamaica.

560. **Echites myrtifolia** Roemer & Schultes.

*Echites myrtifolia* ROEMER & SCHULTES, *Systema Vegetabilium*, IV, 1817-1820, p. 795. Not Jacquin.

*Echites rosea* A. DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, VIII, 1844, p. 450.

Near Nueva Gerona, December 9, 1903, and February 15, 1904, *A. H. Curtiss*, No. 217; in dry sandy field near Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 166; dry sandy field north of Nueva Gerona, May 14, 1910; *O. E. Jennings*, No. 249. General Distribution: Cuba and the Isle of Pines.

561. **Echites umbellata** Jacquin.

*Echites umbellata* JACQUIN, *Enumeratio Plantarum Quas in Insulis Caribæis Detexit*, 1760, p. 13.

Northern part of the island, *Blain*, No. 88 (Millsпах). General Distribution: Southern Florida and the West Indies.

562. *Rhabdadenia paludosa* (Vahl) Miers.

*Echites paludosa* VAHL, *Eclogæ Americanæ*, II, 1798, p. 19.

*Rhabdadenia paludosa* MIERS, *Apocynaceæ of South America*, 1878, p. 119.

Northern part of the island, *Blain*, No. 78 (Millspaugh); in swampy place along arroyo at Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 205; Along river bank at Los Indios, May 21, 1910, *O. E. Jennings*, No. 454. General Distribution: Southern Florida, the Bahamas, Cuba, the Isle of Pines, Jamaica, Porto Rico, Hispaniola, Central America, and Colombia (Urban).

563. *Rhabdadenia biflora* (Jacquin) Mueller-Aargau.

*Echites biflora* JACQUIN, *Enumeratio Plantarum Quas in Insulis Caribæis Detexit*, 1760, p. 13.

*Rhabdadenia biflora* MUELLER-AARGAU, in *Martius, Flora Brasiliensis*, VI (1), 1860, p. 175.

None of the specimens from the Isle of Pines appear to be the true *Rhabdadenia biflora*, with the relatively much shorter calyx-lobes, but the specimens listed under *R. paludosa* are somewhat intermediate and it is probable that specimens could be found on the island representing the species. The differences between these two species are too insignificant or are too unreliable to be depended upon. General Distribution: Porto Rico, and from Guadeloupe through the Windward Islands to Venezuela, Guiana, and Brazil (Urban).

564. *Rhabdadenia Sagrai* (A. DeCandolle) Mueller-Aargau.

*Echites Sagrai* A. DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, VIII, 1844, p. 450.

*Rhabdadenia Sagrai* MUELLER-AARGAU, in *Grisebach, Flora of the British West Indian Islands*, 1861, p. 415.

Along the marshy border of a pond about two miles east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 44; south of Sante Fé, May 25, 1910, *O. E. Jennings*, No. 618; Nueva Gerona, May 31, 1912, *G. A. Link*; Los Indios, November 4, 1912, *G. A. Link*. General Distribution: Sandy thickets, Pine Key, Florida (Small), Cuba, and the Isle of Pines.

565. *Rhabdadenia cubensis* Mueller-Aargau.

*Rhabdadenia cubensis* MUELLER-AARGAU, *Linnæa*, XXX, 1859-1860, p. 435.

*Echites cubensis* GRISEBACH, *Catalogus Plantarum Cubensium*, 1866, p. 172.

Near Nueva Gerona, March 10 and April 2, 1904, *A. H. Curtiss*, No. 395. General Distribution: Cuba and the Isle of Pines.

566. *Urechites lutea* (Linnæus) Britton.

*Vinca lutea* LINNÆUS, Centuria Plantarum, II, 1756, p. 12.

*Echites suberecta* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 13.

*Echites barbata* DESVAUX, Prodromus Plantarum Indiæ Occidentalis, 1825, p. 30.

*Urechites suberecta* MUELLER-AARGAU, Linnæa, XXX, 1860, p. 444.

*Echites neriandra* GRISEBACH, Flora of the British West Indian Islands, 1861, p. 415.

*Echites obovata* SESSÉ & MOÇINO, Flora Mexicana, Ed. II, 1894, p. 39. Not Nees.

*Urechites lutea* BRITTON, Bulletin of the New York Botanical Garden, V, 1907, p. 316.

In low clearing one mile north of Nueva Gerona, May 8, 1910, *O. E. Jennings*, No. 150; near Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 463b; summer of 1912, *G. A. Link*. General Distribution: Southern Florida, the Bahamas, and the West Indies quite generally.

567. *Forsteronia corymbosa* (Jacquin) G. F. W. Meyer.

*Echites corymbosa* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 13.

*Forsteronia corymbosa* G. F. W. MEYER, Primitiæ Floræ Essequiboensis, 1818, p. 134.

Northern part of the island, *Blain*, No. 93 (Millsпах). General Distribution: Cuba, the Isle of Pines, Hispaniola, Porto Rico, and Guiana.

Family ASCLEPIADACEÆ.

KEY TO THE SPECIES ENUMERATED.

Leaves oblanceolate to obovate or oblong, 4 cm. or more long; vines; pollinia erect.

Leaves about 4 cm. long; corolla about 4 mm. long. . . . . 575. *Marsdenia clausa*.

The largest leaves 10 cm. long; corolla about 8 mm. long.

576. *Marsdenia umbellata*.

Leaves smaller or linear, or else not vines; pollinia pendulous.

Erect herbs; corona simple (*Asclepias*).

Corolla white. . . . . 568. *Asclepias nivea*.

Corolla deep purple, inner parts yellow. . . . . 569. *Asclepias Curassavica*.

Twining vines; corona simple.

Corolla lobes pubescent inside; corona lobes entire.

Leaves narrowly linear; pedicels and peduncles glabrous.

570. *Metastelma linearifolium*.

Leaves narrowly oblong or lance-oblong; pedicels and peduncles puberulent. . . . . 571. *Metastelma hamatum*.

Corolla lobes glabrous inside; corona lobes slightly notched at apex.

572. *Seutera palustris*.

Leaves large and broadly ovate or smaller and lanceolate or oblong-elliptic; vines; pollinia pendulous; corona double.

Outer corona thin; leaves lanceolate or oblong elliptic. . 573. *Philibertia clausa*.

Outer corona fleshy; leaves large and ovate. . . . . 574. *Fischeria crispiflora*.

#### 568. *Asclepias nivea* Linnæus.

*Asclepias nivea* LINNÆUS, Species Plantarum, 1753, p. 215.

On thin soil derived from underlying coralline limestone, May 22, 1910, *O. E. Jennings*, No. 476. General Distribution: Cuba, the Isle of Pines, Porto Rico, Hispaniola, and Martinique.

#### 569. *Asclepias Curassavica* Linnæus.

*Asclepias Curassavica* LINNÆUS, Species Plantarum, 1753, p. 314.

*Asclepias nivea* var. *Curassavica* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 418.

Field at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 101; weed in a pasture near Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 276a; near Nueva Gerona, June 13, 1912, *G. A. Link*. General Distribution: Quite widely distributed in the Bahamas and West Indies, and (probably introduced) in Florida and Louisiana.

#### 570. *Metastelma linearifolium* A. Richard.

*Metastelma linearifolium* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, XI, 1850, p. 96, Pl. 57.

*Amphistelma linearifolium* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 175.

*Amphistelma filiforme* GRISEBACH, Flora of the British West Indian Islands, 1861, p. 418 (in part).

"Crescit in insula Pinorum (*Isla de Pinos*)" 1831, *A. H. Lanier*. Type (*A. Richard*, l. c.); near Nueva Gerona, March 10, 1904, *A. H. Curtiss*, No. 394; among palmettoes on dry savanna near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 22. General Distribution: Cuba and the Isle of Pines.

#### 571. *Metastelma hamatum* Grisebach.

*Metastelma hamatum* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 173.

Northern part of the island, *Blain*, No. 110 (Millspaugh). General Distribution: Western Cuba and the Isle of Pines.

#### 572. *Seutera palustris* (Pursh) Vail.

*Ceropegia palustris* PURSH, Flora Americæ Septentrionalis, I, 1814, p. 184.

*Lyonia maritima* ELLIOTT, Sketch of the Botany of South Carolina and Georgia, I, 1817, p. 316.

*Cynanchium angustifolium* PERSEON, Synopsis Plantarum seu Enchiridium Botanicum, I, 1805, p. 274.

*Seutera maritima* DECAISNE, in DeCandolle, Prodrum Systematis Naturalis Regni Vegetabilis, VIII, 1844, p. 590.

*Amphistelma salinarum* WRIGHT, in Grisebach, Catalogus Plantarum Cubensium, 1866, p. 175.

*Vincetoxicum palustre* A. GRAY, Proceedings of the Academy of Natural Sciences, Philadelphia, 1890, p. 392.

*Seutera palustris* VAIL, in Small, Flora of the Southeastern United States, 1903, p. 952.

In pasture near Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 276a; sandy shores of Nuevas River, May 16, 1910, *O. E. Jennings*, No. 303. General Distribution: Mostly in coastal salt marshes from North Carolina and Florida to Texas, south through the Bahamas, western Cuba, and the Isle of Pines.

A small twining plant with linear leaves and with very much the general aspect of *Metastelma linearifolium*.

#### 573. *Philibertia clausa* (Jacquin) K. Schumann.

*Asclepias clausa* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 17.

*Asclepias viminalis* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 53.

*Philibertia viminalis* A. GRAY, Proceedings of the American Academy of Arts and Sciences, XII, 1877, p. 64.

*Philibertia Brownei* BENTHAM & HOOKER, Filius, List of the Flowering Plants of Jamaica, 1893, p. 24.

*Philibertia clausa* K. SCHUMANN, in Engler & Prantl, Natürliche Pflanzenfamilien, IV (Abt. II), 1895, p. 229.

Northern part of the island, *Blain*, No. 104 (Millsbaugh). General Distribution: Florida, Cuba, Isle of Pines, Jamaica, Hispaniola, and Grenada.

#### 574. *Fischeria crispiflora* (Swartz) Schlechter.

*Cynanchum crispiflorum* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 52.

*Gonolobus crispiflorus* ROBERT BROWN, Memoirs of the Wernerian Natural History Society, Edinburgh, I, 1809, p. 35.

*Fischeria scandens* DECANDOLLE, Catalogus Plantarum Horti Botanici Monspeliensis, 1813, p. 112; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 421.

*Fischeria crispiflora* SCHLECHTER, in Urban, Symbolæ Antillanæ, I, 1899, p. 268.

A vine with greenish-yellow flowers, in river-bank forest at Los Indios, May 20, 1910, *O. E. Jennings*, No. 438. General Distribution: Cuba, the Isle of Pines, and Jamaica.

575. *Marsdenia clausa* Robert Brown.

*Marsdenia clausa* ROBERT BROWN, Memoirs of the Wernerian Society of Natural History, Edinburgh, I, 1809, p. 30.

*Marsdenia agglomerata* DECAISNE, in DeCandolle, Prodrromus Systematis Naturalis Regni Vegetabilis, VIII, 1844, p. 615.

*Marsdenia picta* DECAISNE, *l. c.*, excluding synonyms.

*Marsdenia clausa* GRISEBACH, in part, Flora of the British West Indian Islands, 1861, p. 422.

Between Bogarona and Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 487. General Distribution: Cuba, the Isle of Pines, and Hispaniola.

A vine in the hardwood jungle. Flowers pink inside.

576. *Marsdenia umbellata* Grisebach.

*Marsdenia umbellata* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 178.

Northern part of the island, *Blain*, No. 118 (Millsпах). General Distribution: Cuba and the Isle of Pines.

## Family CUSCUTACEÆ.

577. *Cuscuta americana* Linnæus.

*Cuscuta americana* LINNÆUS, Species Plantarum, 1753, p. 124; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 476.

"Over weeds on the margin of an old clearing at Pedernales Point, Isle of Pines (1439)," February 16, 1899 (Millsпах). General Distribution: The Bahamas, West Indies, and tropical continental America.

## Family CONVULVACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Styles distinct, each two-parted; corolla white or blue, more or less rotate.

Shaggy-pubescent with long silky hairs. . . . . 579. *Evolvulus Wrightii*.

Closely appressed-pubescent.

Leaves acute, linear to narrowly oblong. . . . . 578. *Evolvulus sericeus*.

Leaves mostly obtuse or rounded, ovate to elliptic. . 580. *Evolvulus arenicola*.

Styles united up to the stigma.

Stigma not distinctly flattened.

Stamens protruding during the expansion of the limb of the corolla (*Exogonium*).

Inflorescence with conspicuous bracts. . . . . 582. *Exogonium Wrightii*.

Inflorescence without bracts.

Leaf-blades silvery-canescens beneath.

583. *Exogonium argentifolium*.

Leaf-blades neither silvery nor sericeous beneath.

581. *Exogonium microdactylum*.

Stamens included within the corolla.

Sepals blunt to acuminate; ovary 2-4-celled; capsule 4-seeded (*Ipomæa*).

Stems prostrate or creeping, not twining.

Leaf-blades broadly ovate, cordate, acute.

584. *Ipomæa asarifolia*.

Leaf-blades suborbicular, obcordate, or emarginate at the apex,  
not cordate. . . . . 585. *Ipomæa Pes-Capræ*.

Stems trailing or twining, at least the tips twining.

Seeds with a dorsal or marginal coma longer than the seed, or  
the seed completely covered with long hairs.

Leaf-blades divided to the petiole into 3 to 9, stalked or sessile  
leaflets. . . . . 592. *Ipomæa carolina*.

Leaf-blades entire, or, if lobed, not divided to the petiole.

Leaf-blades deeply 5-lobed. . . . . 591. *Ipomæa quinquefolia*.

Leaf-blades entire or 3-lobed, rarely 5-lobed.

586. *Ipomæa lacteola*.

Seeds glabrous or pubescent but not with a conspicuous coma.

Sepals very unequal in size.

Leaf-blades linear to broadly lanceolate; corolla small.

589. *Ipomæa tenuissima*.

Leaf-blades ovate in outline.

Sepals 10-14 mm. long; stems usually prostrate and  
blades usually lobed, glabrous.

588. *Ipomæa Batatas*.

Sepals 8-19 mm. long; the pilose or pubescent stems  
usually twining. . . . . 587. *Ipomæa tiliacea*.

Sepals equal in size or nearly so. . . . . 590. *Ipomæa sagittata*.

Sepals with long tips; ovary 3-5-celled; capsules 6-10-seeded.

593. *Pharbitis acuminata*.

Stigmas distinctly flattened.

Leaves cordate-oblong; peduncle short or none; flower-clusters incon-  
spicuous. . . . . 595. *Jacquemontia verticillata*.

Leaves ovate or ovate-oblong; peduncles long; flower-clusters dense and  
conspicuously bracted and tawny-pubescent.

594. *Jacquemontia tamnifolia*.

### 578. *Evolvulus sericeus* Swartz.

*Evolvulus sericeus* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occi-  
dentalis, 1788, p. 55.

Northern part of the island, *Blain*, No. 10 (Millspaugh); near  
Nueva Gerona, February 14, 1904, *A. H. Curtiss*, No. 344; *O. E. Jennings*, No. 614. General Distribution: From Georgia and Florida  
to Texas, Mexico, South America and in the West Indies and Bahamas.

The specimens from the Isle of Pines are very close to *Evolvulus*  
*Bracei* House, of the Bahama Islands.

579. *Evolvulus Wrightii* House.

*Evolvulus Wrightii* HOUSE, Bulletin of the Torrey Botanical Club, XXXIII, 1906, pp. 316-317.

Near Nueva Gerona, March 13, 1904, *A. H. Curtiss*, No. 409. General Distribution: Pinar del Rio, Cuba, and the Isle of Pines.

580. *Evolvulus arenicola* Britton & Wilson.

*Evolvulus arenicola* BRITTON & WILSON, in Britton, Studies of West Indian Plants, VIII, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 466.

White sand in the vicinity of Los Indios, spring of 1916, *Britton & Wilson*, 14, 190 (Britton). General Distribution: Los Indios, Isle of Pines.

According to the description this is a diminutive perennial sending up from a slender woody root one or a few short (2-5 cm.) ascending or nearly prostrate stems. Leaves ovate to elliptic, 9-15 mm. long, mostly obtuse or rounded at both ends. Flowers one or two, at the ends of the branches, with a white rotate corolla 9-12 mm. broad. For more complete description see Britton, *l. c.*

581. *Exogonium microdactylum* variety *integrifolium* House.

*Exogonium microdactylum* var. *integrifolium* HOUSE, Bulletin of the Torrey Botanical Club, XXXV, 1908, p. 103.

In pine-barrens east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 359, and May 19, No. 389, in gravelly soil one mile north of Los Indios. General Distribution: Florida, the Bahamas, Cuba, and the Isle of Pines.

582. *Exogonium Wrightii* House.

*Ipomæa racemosa* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 205. Not Poirét, 1816.

*Exogonium Wrightii* HOUSE, Bulletin of the Torrey Botanical Club, XXXV, 1908, p. 99, Pl. I, fig. d.

House, *l. c.*, gives the following as to distribution: "CUBA: 'N. Sophie [Isle of Pines], climbing to tops of tall trees,' *C. Wright* 1650, 1859-60. (Type in the Gray Herbarium.)" The species is known from no other locality.

The writer is including this species in the Isle of Pines list only with considerable doubt. The "N. Sophie" [Nouvelle Sophie] referred to rather frequently in Wright's correspondence is probably the station from which this specimen came, and, if so, the record refers to Cuba and not to the Isle of Pines. See "A Summary of Charles



Wright's Explorations in Cuba," by Underwood (*Bulletin of the Torrey Botanical Club*, XXXII, 1905, pp. 291-300), where a considerable number of Wright's localities are mentioned.

583. *Exogonium argentifolium* (A. Richard) House.

*Ipomæa ? argentifolia* A. RICHARD, in Sagra, *Historia Física, Política y Natural de la Isla de Cuba*, XI, 1850, p. 131.

*Ipomæa præcox* WRIGHT, *Anales Académia de la Ciencias Médicas, Físicas y Naturales de la Habana*.

*Exogonium argentifolium* HOUSE, *Bulletin of the Torrey Botanical Club*, XXXV, 1908, p. 102.

"Crescit in insula Pinorum (*Isla de Pinos*)"—A. Richard, *l. c.*; near Nueva Gerona, 1904, *A. H. Curtiss*, No. 489; *W. W. Rowlee*, No. 182, in 1901 (House, *l. c.*). General Distribution: Cuba, the Isle of Pines, and Mexico.

584. *Ipomæa asarifolia* (Desrousseaux) Rømer & Schultes.

*Convolvulus asarifolius* DESROUSSEAUX, in Lamarck, *Encyclopédie Méthodique, Botanique*, III, 1789, p. 562.

*Ipomæa asarifolia* ROEMER & SCHULTES, *Systema Vegetabilium*, IV, 1817-20, p. 251.

*Ipomæa urbica* CHOISY, in DeCandolle, *Prodromus Systematis Naturalis Regni Vegetabilis*, IX, 1845, p. 349.

*Ipomæa nymphaefolia* GRISEBACH, *Catalogus Plantarum Cubensium*, 1866, p. 203. Not Blume, 1826.

Near Nueva Gerona, December 10, 1903, and January 7, 1904, *A. H. Curtiss*, No. 219; along the river about 3 miles south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 617. General Distribution: Tropical Africa, Asia, the West Indies, and the Gulf Coast of Mexico.

The slight difference of absence or presence of small glands at the base of the blade is scarcely a sufficient difference between *Ipomæa nymphaefolia* and *I. asarifolia*.

585. *Ipomæa Pes-Caprae* (Linnæus) Roth.

*Convolvulus Pes-Caprae* LINNÆUS, *Species Plantarum*, 1753, p. 159.

*Ipomæa biloba* FORSKAÖL, *Flora Ægyptiaco-Arabica*, 1775, p. 44.

*Ipomæa Pes-Caprae* ROTH, *Novæ Plantarum Species Præsertim Indiæ Orientalis*, 1821, p. 109.

On sandy beach at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 73 (see Plate V); also same data, No. 646. General Distribution: On sandy beaches throughout the tropics and subtropics of both hemispheres.

586. *Ipomœa lacteola* House.

*Ipomœa calophylla* WRIGHT, in Grisebach, Catalogus Plantarum Cubensium, 1866, p. 204. Not Fenzl. 1845.

*Ipomœa lacteola* HOUSE, Annals of the New York Academy of Sciences, XVIII, 1908, p. 229.

House lists Cuba and the Isle of Pines under the distribution of this species.

587. *Ipomœa tiliacea* (Willdenow) Choisy.

*Convolvulus tiliaceus* WILLDENOW, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, I, 1809, p. 203.

*Convolvulus fastigiatus* ROXBURGH, Hortus Bengalensis, 1814, p. 13.

*Ipomœa fastigiata* SWEET, Hortus Britannicus, Ed. I, 1828, p. 288.

*Ipomœa tiliacea* CHOISY, in DeCandolle, Prodrômus Systematis Regni Vegetabilis, IX, 1845, p. 375.

*Ipomœa Batatas* var. *fastigiata* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 442.

*Ipomœa gracilis* HOUSE, Annals of the New York Academy of Sciences, XVIII, 1908, p. 248.

Near Nueva Gerona, December 22, 1903, *A. H. Curtiss*, No. 249; along stream at Keenan's, south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 172. General Distribution: The Florida Keys, the Bahamas, the West Indies, and continental tropical America south to Bolivia, Peru, and Brazil.

588. *Ipomœa Batatas* (Linnæus) Lamarck. BATATA. SWEET POTATO.

*Convolvulus Batatas* LINNÆUS, Species Plantarum, 1753, p. 154.

*Ipomœa Batatas* LAMARCK, Encyclopédie Méthodique, Botanique, I, 1791, p. 465.

*Batatas edulis* CHOISY, Mémoires de la Société de Physique et d'Histoire Naturelle de Genève, VI, 1833, p. 53.

Northern part of the island, *Blain*, No. 99 (Millsпах). General Distribution: Commonly cultivated and often escaped from cultivation in the West Indies and tropical America, but possibly native only to the tropics of the Old World. (See Cook & Collins, "Economic Plants of Porto Rico," Contributions from the U. S. National Herbarium, VIII, 1903, p. 168.)

589. *Ipomœa tenuissima* Choisy.

*Ipomœa tenuissima* CHOISY, in DeCandolle, Prodrômus Systematis Naturalis Regni Vegetabilis, IX, 1845, p. 376.

Near Nueva Gerona, May 12, 1904, *A. H. Curtiss*, No. 495. General Distribution: Southern Florida, Cuba, the Isle of Pines, and Hispaniola.

590. *Ipomœa sagittata* Poiret.

*Convolvulus speciosus* WALTER, Flora Caroliniana, 1788, p. 93. Not Linnæus, filius, 1781.

*Ipomœa sagittata* POIRET, Voyage en Barbarie, II, 1789, p. 122.

*Ipomœa speciosa* HALLIER, FILIUS, Botanische Jahrbücher, XVIII, 1894, p. 143. Not Persoon, 1805.

Lowlands along the river at Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 675. General Distribution: North Carolina to Florida and Texas, Bermuda, the Bahamas, Cuba, the Isle of Pines; Spain and Barbary.

591. *Ipomœa quinquefolia* Linnæus.

*Ipomœa quinquefolia* LINNÆUS, Species Plantarum, 1753, p. 162; Grisebach, Flora of the British West Indian Islands, 1861, p. 468.

*Convolvulus quinquefolius* LINNÆUS, Systema Naturæ, Ed. X, II, 1759, p. 923.

*Merremia quinquefolia* HALLIER, FILIUS, in Engler, Botanische Jahrbücher, XVI, 1893, p. 552.

Near Nueva Gerona, February 28 and April 17, 1904, *A. H. Curtiss*, No. 378. General Distribution: The West Indies, and from Mexico to Venezuela, Brazil, and Peru.

592. *Ipomœa carolina* Linnæus.

*Ipomœa carolina* LINNÆUS, Species Plantarum, 1753, p. 160.

*Ipomœa heptaphylla* GRISEBACH, Memoirs of the American Academy of Arts and Sciences, VIII, 1868, p. 527. Not Voigt, 1845.

On river bank along the Majagua River north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 422. General Distribution: The Bahamas, Cuba, and the Isle of Pines.

593. *Pharbitis acuminata* (Vahl) Choisy.

*Convolvulus acuminatus* VAHL, Symbolæ Botanicæ, III, 1794, p. 26.

*Ipomœa cathartica* POIRET, in Lamarck, Encyclopédie Méthodique, Botanique, IV, 1816, p. 633.

*Pharbitis cathartica* CHOISY, in DeCandolle, Prodromus Systematis Naturalis Regni Vegetabilis, IX, 1845, p. 342.

*Pharbitis acuminata* CHOISY, *op. cit.*, p. 348.

*Ipomœa jamaicensis* var. *glabrata* GRISEBACH, Flora of the British West Indian Islands, 1861, p. 474.

*Ipomœa Vahliana* HOUSE, Annals of the New York Academy of Sciences, XVIII, 1908, p. 204.

Climbing over bushes back of the sandy beach, near base of Mt. Colombo, May 14, 1910, *O. E. Jennings*, Nos. 260 & 271. General Distribution: The Bermudas, the Bahamas, Florida, the West Indies, Mexico, and Central America.

594. *Jacquemontia tamnifolia* (Linnæus) Grisebach.*Ipomœa tamnifolia* LINNÆUS, Species Plantarum, 1753, p. 162.*Thyella tamnifolia* RAFINESQUE, Flora Telluriana, IV, 1836, p. 84.*Jacquemontia tenuifolia* GRISEBACH, Flora of the British West Indian Islands, 1861, p. 474.

Near Los Indios, November 4, 1912, *G. A. Link*. General Distribution: From South Carolina to Arkansas and south through the West Indies and tropical continental America.

595. *Jacquemontia verticillata* (Linnæus) Urban.*Ipomœa verticillata* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 924.*Convolvulus verticillatus* LINNÆUS, Species Plantarum, I, Ed. II, 1762, p. 220.*Convolvulus micranthus* ROEMER & SCHULTES, Systema Vegetabilium, IV, 1819, p. 276.*Jacquemontia verticillata* URBAN, Symbolæ Antillanæ, III, 1902, p. 339.(See Urban, *l. c.*, for various other synonyms.)

Near Nueva Gerona, January 5, 1904, *A. H. Curtiss*, No. 273. General Distribution: The Bahamas, Cuba, the Isle of Pines, Jamaica, Hispaniola, St. Vincent, and Trinidad.

## Family HYDROPHYLLACEÆ.

596. *Nama nigricaulis* (Wright) Kuntze.*Hydrolea nigricaulis* WRIGHT, in Grisebach, Catalogus Plantarum Cubensium, 1866, pp. 207-208.*Nama nigricaulis* O. KUNTZE, Revisio Generum Plantarum, 1891, p. 435.

Near Nueva Gerona, December 12, 1903, *A. H. Curtiss*, No. 222. General Distribution: Cuba and the Isle of Pines.

## Family BORRAGINACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Woody plants with leaves reaching 10 cm. or more in length.

Leaves obovate-oblong to elliptic, about one-half as wide as long, apex rounded, obtuse to very abruptly repand-acuminate. . . . . 597. *Cordia Collococca*.

Leaves less than half as wide as long.

Flowers about 20 mm. long. . . . . 599. *Cordia gerasacanthoides*.

Flowers less than 10 mm. long. . . . . 601. *Tournefortia bicolor*.

Herbaceous or woody plants with leaves less than 10 cm. long.

Leaves somewhat fleshy, densely silky-tomentose, linear-spatulate, 3-8 cm. long. . . . . 600. *Tournefortia gnaphalodes*.

Leaves not as above.

Shrub with ovate leaves and flowers in dense globose heads.

598. *Cordia globosa*.

Shrubby vine with ovate or lance-oblong leaves, 2-6 cm. long; twigs rusty pubescent; flowers in widely branching cymes.

602. *Tournefortia volubilis*.

Mostly annuals, or herbaceous perennials.

Spikes mostly solitary, 1-3 dm. long; leaf-blades 2-10 cm. long, about half as wide. . . . . 604. *Heliotropium indicum*.

Spikes much shorter.

Leaf-blades 3-8 by 1.5-2.5 mm., oblong, flowers mostly apparently solitary and axillary. . . . . 607. *Heliotropium antillanum*.

Leaf-blades spatulate to oblong or oval, 1-3 cm. long; flowers in slender scorpioid spikes. . . . . 605. *Heliotropium inundatum*.

Leaf-blades succulent, linear to lance-obovate, 1.5-4 cm. long; flowers in simple or forked scorpioid spikes; glabrous.

603. *Heliotropium Curassavicum*.

Stems woody prostrate with erect branches; leaves 1-1.5 by 0.2-0.4 cm., narrow-lanceolate; flowers in a simple (or 2-forked) strongly circinate often reversed spike. . . . . 606. *Heliotropium reversifolium*.

### 597. *Cordia Collococca* Linnaeus.

*Cordia Collococca* LINNÆUS, Species Plantarum, Ed. II, I, 1762, p. 274.

*Cordia elliptica* BELLO, Anales de la Sociedad Española de Historia Natural, X, 1881, p. 297, no. 550. Not Swartz.

*Lithocardium Collococca* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 438.

Near Nueva Gerona, February 25 and April 2, 1904, *A. H. Curtiss*, No. 369; a bushy tree about 40 feet in height, at base of the ridge at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 121. General Distribution: Throughout the West Indies and tropical South America.

### 598. *Cordia globosa* (Jacquin) Humboldt, Bonpland, & Kunth. COPILLO (Porto Rico).

*Varronia globosa* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 14.

*Cordia globosa* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, III, 1818, p. 76.

*Cordia dasycephala* HUMBOLDT, BONPLAND, & KUNTH, l. c., Herbarium Willdenow, no. 4544; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 481.

*Cordia bullata* DECANDOLLE, Prodrromus Systematis Naturalis Regni Vegetabilis, IX, 1845, p. 496. Not *Lantana bullata* L.

Near Nueva Gerona, December 20, 1903, *A. H. Curtiss*, No. 247; bushy shrub about 5 feet high, base of Casas Mts., May 5, 1910, *O. E. Jennings*, No. 34; small tree at base of Bibijagua ridge, May 7, 1910, *O. E. Jennings*, No. 118; on savanna south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 188. General Distribution: From

southern Florida and the Bahamas south through the West Indies and continental tropical America.

599. ***Cordia gerasacanthoides*** Humboldt, Bonpland, & Kunth.

*Cordia gerasacanthoides* HUMBOLDT, BONPLAND, & KUNTH, *Nova Genera et Species Plantarum*, III, 1818, p. 69; GRISEBACH, *Flora of the British West Indian Islands*, excluding synonyms, 1861, p. 481.

" . . . in insula Pinorum," 1831, *A. H. Lanier* (A. Richard); near Nueva Gerona, February 26, 1904, *A. H. Curtiss*, No. 370. General Distribution: Cuba, the Isle of Pines, Jamaica, Mexico, and Central America (Hemsley).

600. ***Tournefortia gnaphalodes*** (Linnæus) Robert Brown.

*Heliotropium gnaphalodes* LINNÆUS, *Systema Naturæ*, Ed. X, 1759, p. 913.

*Tournefortia gnaphalodes* ROBERT BROWN, *Prodromus Floræ Novæ-Hollandiæ et Insulæ Van Diemen*, 1810, p. 496; GRISEBACH, *Flora of the British West Indian Islands*, 1861, p. 483.

"Sandy beach at Pedernales Point, Isle of Pines (1429), where it forms dense masses" (Millspaugh); a densely bushy shrub along the beach at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 110. General Distribution: Along seashores from the Bermudas, Bahamas, Florida, and Mexico, south through the West Indies and tropical continental America.

601. ***Tournefortia bicolor*** Swartz.

*Tournefortia bicolor* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 40; GRISEBACH, *Flora of the British West Indian Islands*, 1861, p. 483.

*Tournefortia levigata* LAMARCK, *Illustrations des Genres*, *Encyclopédie Méthodique*, I, 1791, p. 416.

Along the river bank at Los Indios, May 19, 1910, *O. E. Jennings*, No. 419. General Distribution: Throughout the West Indies and continental tropical America as far as Argentina.

602. ***Tournefortia volubilis*** Linnæus.

*Tournefortia volubilis* LINNÆUS, *Species Plantarum*, 1753, p. 140; GRISEBACH, *Flora of the British West Indian Islands*, 1861, p. 484.

*Messerschmidia volubilis* ROEMER & SCHULTES, *Systema Vegetabilium*, IV, 1819, p. 541.

*Tournefortia ferruginea* GRISEBACH, *Flora of the British West Indian Islands*, 1861, p. 484. Not Lamarck.

A slender clambering shrub about 15 feet in height, between Bogar-

ona and Caleta Grande, May 22, 1910, *O. E. Jennings*, No. 486. Northern part of the island, *Blain*, No. 42 (Millspaugh). General Distribution: Southern Florida, the Bahamas, the West Indies, Yucatan, and South America.

603. ***Heliotropium Curassavicum* Linnæus.**

*Heliotropium Curassavicum* LINNÆUS, Species Plantarum, 1753, p. 130; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 486.

Northern part of the island, *Blain*, No. 84 (Millspaugh); on sandy beach at Bibijagua, May 7, 1910, *O. E. Jennings*, Nos. 71 & 80. General Distribution: Widely distributed, especially upon shore sands, throughout the tropics, extending north in America to the Gulf States and up to Virginia, and on the Pacific Coast.

604. ***Heliotropium indicum* Linnæus.**

*Heliotropium indicum* LINNÆUS, Species Plantarum, 1753, p. 130; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 485.

*Helioophytum indicum* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, IX, 1845, p. 556.

On dry savanna west of Nueva Gerona (a weed), May 10, 1910, *O. E. Jennings*, No. 32; near magnesia spring at Sante Fé, May 26, 1910, *O. E. Jennings*, No. 604. General Distribution: Along roadsides and in waste places from Virginia to Illinois and south through the tropics and subtropics. Probably naturalized from the tropics of the Old World.

605. ***Heliotropium inundatum* Swartz.**

*Heliotropium inundatum* SWARTZ, Prodromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 40; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 485.

*Heliotropium cinereum* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, III, 1818, p. 89, Pl. 206.

*Lisianthus chelonoides* STAHL, Estudios Sobre la Flora de Puerto-Rico, VI, 1888, p. 280, not Linnæus, filius.

Near Nueva Gerona, February 2 and 24, 1904, *A. H. Curtiss*, No. 324. General Distribution: In low grounds from Louisiana to California, south through tropical continental America; the Bahamas, the Greater Antilles, Guadeloupe, and Trinidad.

606. ***Heliotropium reversifolium* (Wright, herbarium name) Millspaugh.**

*Heliotropium reversifolium* MILLSPAUGH, Field Columbian Museum, Botanical Series I, 1900, pp. 433-434.

"At San Francisco, four leagues from Sante Fé, June (58, 85)," José Blain (Millspaugh, *l. c.*). General Distribution: Known only from the type-locality.

607. *Heliotropium antillanum* Urban.

*Heliotropium antillanum* URBAN, Symbolæ Antillanæ, IV, 1910, p. 528.

*Heliotropium parviflorum* GRISEBACH, Catologus Plantarum Cubensium, 1866, p. 212. Not *Schleidenia parviflora* DeCandolle.

Near Nueva Gerona, March 8, 1904, *A. H. Curtiss*, No. 390. General Distribution: Porto Rico, Cuba, and the Isle of Pines.

Family VERBENACEÆ.

KEY TO THE SPECIES ENUMERATED.

Leaves deltoid-ovate, 19–20 cm. long and wide, long petioled.

615. *Clerodendron fragrans* var. *pleniflora*.

Leaves oblong to oblanceolate-obovate, tapering at base, often emarginate at apex, smooth, up to 15 cm. long and 5 cm. wide. . . . . 612. *Citharexylum caudatum*.

Leaves not as above.

Leaves leathery, 3–8 cm. long, obtuse, minutely whitish canescent beneath, oblong; maritime (mangrove). . . . . 616. *Avicennia nitida*.

Leaves ovate-oblong or elliptic, acute to acuminate, mostly 10–20 cm. long, rusty-tomentose beneath. . . . . { 613. *Petitia domingensis*.  
614. *Petitia Poeppigii*.

Leaves not as above.

Flowers embedded in excavations in the long, thickened, terminal rachis.

611. *Abena jamaicensis*.

Flowers in peduncled congested heads or spikes.

Leaves strigillose, spatulate, serrate above the middle, 1–3 cm. long; spikes becoming cylindric, 1 cm. long by 5 mm. thick.

610. *Lippia nodiflora* var. *reptans*.

Leaves rigid-pubescent, crenate or crenate-serrate nearly to the base; spikes not becoming cylindric.

Flower-heads bracted but not involucrate; leaves deltoid-ovate, blades nearly as wide as long. . . . . 608. *Lantana Camara*.

Flower-heads involucrate; leaf-blades from suborbicular to oval and twice as long as wide. . . . . 609. *Lantana involucrata*.

608. *Lantana Camara* Linnæus.

*Lantana Camara* LINNÆUS, Species Plantarum, 1753, p. 627.

*Lantana crocea* JACQUIN, Plantarum Rariorum Horti Cæsarei Schœnbrunnensis Descriptiones, etc., IV, 1804, Pl. 473.

A low shrub on the beach at Siguaneya City, May 21, 1910, *O. E. Jennings*, No. 458. General Distribution: The Florida Keys, the



Bahamas, the West Indies, continental tropical America, and introduced into the Old World tropics.

609. **Lantana involucrata** Linnæus.

*Lantana involucrata* LINNÆUS, Centuria Plantarum, II, 1756, p. 22.

*Lantana odorata* LINNÆUS, Systema Naturæ, Ed. XII, 1767, p. 418.

Northern part of the island, *Blain*, No. 142 (Millsaugh); Pedernales Point, February 16, 1899, *C. F. Millsaugh*, No. 1417 (Millsaugh); on beach at Sigüanea City, May 21, 1910, *O. E. Jennings*, No. 461. General Distribution: The Bahamas, the Bermudas (introduced), southern Florida, the West Indies, Mexico and Central America, and the Galapagos Islands.

610. **Lippia nodiflora** variety **reptans** (Humboldt, Bonpland, & Kunth)  
O. Kuntze.

*Lippia reptans* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, II, 1817, p. 263.

*Lippia nodiflora* var. *reptans* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 508.

On the savanna near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 14; on strand at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 97; in recently-cleared lowland north of Nueva Gerona, May 8, 1910, *O. E. Jennings*, No. 146. General Distribution: The Bahamas, the West Indies, and the continental American tropics.

*Blain*, No. 79, collected in the northern part of the island has been referred by Millsaugh to *Lippia nodiflora*.

611. **Abena jamaicensis** (Linnæus) Hitchcock.

*Verbena jamaicensis* LINNÆUS, Species Plantarum, 1753, p. 19.

*Valerianodes jamaicensis* MEDICUS, Philosophische Botanik mit Kritischen Bemerkungen, I, 1789, p. 178.

*Stachytarpheta jamaicensis* VAHL, Enumeratio Plantarum, I, 1804, p. 206.

*Abena jamaicensis* HITCHCOCK, Annual Report of the Missouri Botanical Garden, IV, 1893, p. 117.

On sandy beach at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 72; open field on Keenan's estate, south of Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 175. General Distribution: The Bermudas, the Bahamas, southern Florida, the West Indies, and continental tropical America south to Guiana; tropics of Asia and Africa.

612. *Citharexylum caudatum* Linnæus.

*Citharexylum caudatum* LINNÆUS, Species Plantarum, II, Ed. II, 1763, p. 872.

*Citharexylum surrectum* GRISEBACH, Flora of the British West Indian Islands, 1861, p. 497, excluding specimens from Antigua.

*Citharexylum Berterii* SPRENGEL, Systema Vegetabilium, II, 1825, p. 763; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 498.

(For various other synonyms see Schultz, in Urban, Symbolæ Antillanæ, VI, 1909, pp. 57-59.)

Near Nueva Gerona, May 26, 1904, *A. H. Curtiss*, No. 515; swampy margin of pool at western base of Caballos Mts., May 9, 1910, *O. E. Jennings*, No. 167. General Distribution: The Bahamas, Cuba (common), the Isle of Pines, Jamaica (common), Hispaniola, Porto Rico, and Mexico (Urban).

613. *Petitia domingensis* Jacquin.

*Petitia domingensis* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 12; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 501.

*Citharexylum melanocarpum* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 91.

*Citharexylum panniculatum* GAERTNER, De Fructibus et Seminibus Plantarum, I, 1788, p. 270, Pl. 56.

A rather common shrub on the wooded slope of Caballos Mts., collected there on May 12, 1910, *O. E. Jennings*, Nos. 659, 660, & 676. General Distribution: The Bahamas, Cuba, the Isle of Pines, Jamaica, Cayman, Hispaniola, Porto Rico, and St. Croix.

614. *Petitia Poeppigii* Schauer.

*Petitia Poeppigii* SCHAUER, in DeCandolle, Prodrum Systematis Naturalis Regni Vegetabilis, XI, 1847, p. 639.

Reported by Millspaugh on the basis of a specimen collected in the northern part of the island by *Blain*, No. 18. General Distribution: Cuba and the Isle of Pines.

This may belong to the same species as the preceding.

615. *Clerodendron fragrans* Venturi variety *pleniflora* Schauer.

*Clerodendron fragrans* var. *pleniflora* SCHAUER, in DeCandolle Prodrum Systematis Naturalis Regni Vegetabilis, XI, 1847, p. 666.

Near Nueva Gerona, March 30, 1904, *O. E. Jennings*, No. 431; near Nueva Gerona, June 12, 1912, *G. A. Link*. General Distribu-

tion: Rather widely distributed through the West Indies as well as through the tropics of continental America and the Old World.

616. **Avicennia nitida** Jacquin. BLACK MANGROVE. WHITE MANGROVE.

*Avicennia nitida* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Dedit, 1760, p. 25.

*Avicennia officinalis* var. *nitida* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 502.

Near Nueva Gerona, May 3, 1904, *A. H. Curtiss*, No. 312; at rear margin of sandy strand at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 115; on strand, back of which is a mangrove swamp, along Colombo Bay, northeast of Nueva Gerona, May 14, 1910, *O. E. Jennings*, No. 254; forming a large part of the innermost mangrove swamp-forest near the mouth of the Nuevas River, May 16, 1910, *O. E. Jennings*, No. 693. General Distribution: Along coastal borders, especially where sandy, from the Bermudas, southern Florida, Mississippi, and Texas, south through the Bahamas, the West Indies, and continental tropical America; also in tropical Africa.

The Black Mangrove (Mangle blanco, Mangle bobo.—Urban) forms a large part of the landward extension of the mangrove border around the lower shores of the island. It becomes a good-sized tree, sometimes fifty or sixty feet in height, but mostly smaller. Specimen number 115 was about twenty feet in height. The flowers are a pale yellow in color. The bark is used for tanning, and the wood is quite durable when placed in wet soil.

## Family LABIATÆ.

### KEY TO THE SPECIES ENUMERATED.

Flowers massed in dense globose heads.

Heads sessile, 4 cm. or more in diameter, enclosing the stem.

617. *Leonotis nepetifolia*.

Heads smaller, pedunculate.

Leaves 5–15 cm. long, tapering below into a more or less distinct slender petiole.

Leaves ovate-oblong; floral bracts shorter than the calyx and inconspicuous.....624. *Mesosphaerum capitatum*.

Leaves narrow, linear-oblong; floral bracts longer than the calyx and conspicuous, even in fruit.....623. *Mesosphaerum Hollandianum*.

Leaves usually subsessile; linear-lanceolate; floral bracts twice as long as the head.....625. *Mesosphaerum actinocephalum*.

Leaves ordinarily less than 4 cm. long.

Leaves lance-linear, sessile, clasping. . . . 627. *Mesosphærum uliginosum*.

Leaves spatulate to oblong, attenuate at the base.

626. *Mesosphærum capitellatum*.

Leaves broadly ovate to orbicular, truncate or subcordate at the base.

622. *Mesosphærum minutifolium*.

Flowers axillary and in more or less spicate racemes.

Leaves broadly rounded or more or less cordate at base.

Leaves less than 2 cm. long; racemes rather lax; calyx glandular-pubescent.

618. *Salvia serotina*.

Leaves mostly 4-8 cm. long; racemes rather dense; calyx not glandular-pubescent. . . . . 621. *Mesosphærum pectinatum*.

Leaves more or less tapering at base.

Leaves oblong-ovate, usually 10-15 cm. long; fruiting calyx reflexed and with a wide rounded upper lobe. . . . . 620. *Ocimum gratissimum*.

Leaves widely triangular-ovate, usually less than 7 cm. long; fruiting calyx not strongly reflexed, the upper lobe ovate and shortly bristle-tipped.

619. *Salvia setosa*.

Leaves ovate, at base cuneate, about 2.5-4 cm. long; fruiting calyx not reflexed, upper lip entire and blunt. . . . *Salvia occidentalis* (See No. 619).

### 617. *Leonotis nepetifolia* (Linnæus) Robert Brown.

*Phlomis nepetæfolia* LINNÆUS, Species Plantarum, 1753, p. 586.

*Leonotis nepetæfolia* ROBERT BROWN, Prodromus Floræ Novæ-Hollandiæ et Insulæ Van Diemen, 1810, p. 504; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 492.

Along the side of a small stream in cultivated ground, Keenan's estate, Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 170. General Distribution: Tropics of both hemispheres, extending north in America as far as the Bahamas, the Bermudas (introduced), and the southeastern United States north to Tennessee.

### 618. *Salvia serotina* Linnæus.

*Salvia serotina* LINNÆUS, Mantissa Plantarum, 1767, p. 25.

*Salvia dominica* VAHL, Enumeratio Plantarum, I, 1805, p. 233. Not Linnæus.

Near Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, Nos. 494 & 601. General Distribution: Florida, Cozumel Island, Yucatan, and the West Indies rather generally.

### 619. *Salvia setosa* Fernald.

*Salvia privoides* A. GRAY, in Watson, Proceedings of the American Academy of Arts and Sciences, XXI, 1848, p. 435. Not Bentham.

*Salvia setosa* FERNALD, Proceedings of the American Academy of Arts and Sciences, XXXV, 1900, pp. 493-494.

Near Nueva Gerona, May 1, 1904, *A. H. Curtiss*, No. 474. General Distribution: Northwestern Mexico and the Isle of Pines.

*Salvia occidentalis* Swartz is to be expected in the Isle of Pines. It occurs commonly in tropical and subtropical America, extending north as far as Vera Cruz and peninsular Florida. It has leafy stems; blue corolla; leaf-blades ovate, acute or short acuminate, the petioles winged by the decurrent blade; calyx at maturity about 3.5 mm. long.

620. **Ocimum gratissimum** Linnæus.

*Ocimum gratissimum* LINNÆUS, Species Plantarum, 1753, p. 832.

Near magnesia springs, Sante Fé, May 26, 1910, *O. E. Jennings*, No. 584. General Distribution: Native to the East Indies and southeastern Asia, now rather widely distributed as a weed in the tropics and subtropics.

621. **Mesosphærum pectinatum** (Linnæus) Kuntze.

*Nepeta pectinata* LINNÆUS, Systema Naturæ, Ed. X, II, 1796, p. 1096.

*Hyptis pectinata* POITEAU, Annales du Muséum d'Histoire Naturelle, Paris, VII, 1806, p. 474, Pl. 30; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 489.

*Hyptis spicata* BELLO, Anales de la Sociedad Española de Historia Natural, X, 1881, p. 303, no. 635. Not Poiteau.

*Hyptis polystachya* STAHL, Estudios Sobre la Flora de Puerto-Rico, VI, 1888, p. 195. Not Humboldt, Bonpland, & Kunth.

*Mesosphærum pectinatum* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 525.

*Ballota parviflora* SESSÉ & MOÇINO, Flora Mexicana, Ed. II, 1894, p. 136.

Near Nueva Gerona, December 26, 1903, *A. H. Curtiss*, No. 257. General Distribution: From Florida and the Bahamas south through the West Indies and continental tropical America; also in the tropics of the Old World.

622. **Mesosphærum minutifolium** (Grisebach) Jennings, comb. nov.

*Hyptis minutifolia* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 213.

Near Nueva Gerona, December 17, 1903, and January 12, 1904, *A. H. Curtiss*, Nos. 238 & 285. General Distribution: Western Cuba and the Isle of Pines.

623. **Mesosphærum Hollandianum** Jennings, sp. nov. (PLATE XXV.)

Somewhat shrubby, apparently perennial at the base, about one meter in height; stems erect, branched, glabrous or scantily puberulent

above, more or less castaneous, quadrangular; leaves for the most part linear-oblong, 5-11 cm. long, 5-10 mm. wide, sometimes 2 cm. wide, glabrous, paler below, on both sides glandular-punctate, the margin remotely crenulate, towards the base often recurved, the apex somewhat obtuse to rounded, gradually attenuate at the base into a short margined petiole, the upper decreasing in size, the mid-vein impressed above, prominent underneath, the lateral nerves few, remote, anastomosing before reaching the margin; flowers aggregated into axillary pedunculate heads; peduncles 2.5-4.5 cm. long, rather rigid, from the base somewhat incurved-erect, the lower somewhat shorter than the subtending leaf, the upper longer; bracts oblong-lanceolate, often somewhat dilated apically, rather obtuse, longer than the head, paler at the base, ciliate, at maturity strongly reflexed; calyx 4-5 mm. long, tube 2-2.5 mm. long, campanulate, at the base and especially at the middle somewhat incano-pilose, minutely glandular-punctate, the lobes rather erect, lance-subulate, ciliate, about 2.5 mm. long, subequal, at maturity 6-8 mm. long; corolla about 7-9 mm. long, outside sparsely and very shortly spreading-pilose, the upper half bilabiate, the lips very unequal, scarcely expanded, the upper lip barely 1 mm. long, its lobes broadly ovate, apically rounded, the lower lip 3.5-4 mm. long, its median lobe rounded, emarginate, deeply cucullate, the margin minutely erose, the lateral lobes one-half shorter, obliquely ovate, obtuse; stamens inserted on the throat, slightly shorter than the corolla, anthers all fertile, reniform; the style smooth, shortly 2-lobed, the lobes oblong; nutlets about 1 mm. long, dark brown (almost black), lustrous, oval.

*Planta suffruticosa, basi verisimiliter perennans, plus minusve 1 m. alta; caulibus erectis, ramosis, glabris vel superne parcissime puberulentis, plus minusve castaneis, quadrangulatis; foliis plerisque lineari-oblongis, 5-11 cm. longis, 5-10 cm. latis, interdum latioribus usque ad 2 cm. latis, glabris, subtus pallidioribus, utrinque glanduloso-punctulatis, margine remote crenulatis, inferne sæpe recurvis, apice obtusiusculis vel rotundatis, basi sensim in petiolum breve marginatum attenuatis, superioribus sensim decrescentibus, nervo medio supra impresso, subtus prominentibus, nervis lateralibus paucis, remotis, ante marginem anastomosantibus; floribus in capitula axillaris pedunculata aggregatis; pedunculis 2.5-4.5 cm. longis, rigidiusculis, e basi incurvo-erectiusculus, inferioribus quam folium subtendens aliquanto brevioribus, superioribus longioribus; bracteis oblongo-lanceolatis,*

apice sæpe paulo dilatatis, obtusiusculis, capitulo longioribus, ad basin pallidioribus, margine ciliatis, maturatis valde reflexis; calyce 4-5 mm. longo, tubo 2-2.5 mm. longo, campanulato, basi et præsertim parte media paulo incano-pilosulo, minute glanduloso-punctulato, lobis subrectis, lanceolato-subulatis, ciliatis, ca. 2.5 mm. longis, subæqualibus, maturato 6-8 mm. longo; corolla ca. 7-9 mm. longa, extrinsecus parce brevissime patenti-pilosula, in parte  $1/2$  superiore bilabiata, labiis valde inæqualibus, parum expansis, labio superiore vix 1 mm. longo, lobis late ovatis, apice rotundatis, labio inferiore 3.5-4 mm. longo, lobo medio rotundato, emarginato, valde cucullato, margine minute eroso, lobis lateralibus medio  $1/2$  brevioribus, oblique ovatis obtusis; staminibus fauci insertis, corolla paulo brevioribus, antheris omnibus fertilibus, reniformibus; stylo lævi, apice breviter bilobo, lobis oblongis; nuculis ca. 1 mm. longis, atro-fuscis, nitidis, ovalibus.

*Type*.—Scrubby woods southwest of Bibijagua, May 7, 1910, O. E. Jennings, No. 86. Specimen in the herbarium of the Carnegie Museum. Of the same species is also No. 264, A. H. Curtiss, "West Indian Plants." Near Nueva Gerona, January 1, 1904. The latter specimen was distributed as *Mesosphærum rugosum* (Linnæus) Pollard.

*Mesosphærum Hollandianum* is most closely related to *M. rugosum* (Linnæus) Pollard (*Hyptis radiata* Willdenow), a rather common plant of wet places and swamps from North Carolina to Florida and Texas and by various authors identified and reported for localities southward in continental tropical America as far as Colombia. *M. Hollandianum* differs, however, from the continental species in the very much narrower and blunter and more remotely crenate leaves, the plant much more nearly glabrous, and the bracts and calyx-lobes practically glabrous, but decidedly, although minutely, ciliate. *M. angustifolium* is to be regarded probably as having been derived by isolation from *M. rugosum*.

This species has been named in honor of Dr. W. J. Holland, the Director of the Carnegie Museum, to whom much credit is due for his support and encouragement of the studies of the natural history of the Isle of Pines.

*Hyptis* (1786) has been adopted by the International Congress in place of *Mesosphærum* (1756), contrary to the principle of priority, hence the name of the species described above would be, according to the International Rules of Botanical Nomenclature, **Hyptis Hollandiana**.

624. **Mesosphærum capitatum** (Jacquin) O. Kuntze.

*Hyptis capitata* JACQUIN, Icones Plantarum Rariorum, I, 1781-1786, p. 11, Pl. 114;

GRISEBACH, Flora of the British West Indian Islands, 1861, p. 488.

*Mesosphærum capitatum* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 525.

Near Nueva Gerona, March and April, 1904, *A. H. Curtiss*, No. 417.

General Distribution: Generally distributed through the West Indies and continental tropical America; also in the Malayan Archipelago (introduced ?).

625. **Mesosphærum actinocephalum** (Grisebach) O. Kuntze.

*Hyptis actinocephala* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 212.

*Mesosphærum actinocephalum* O. KUNTZE, Revisio Generum Plantarum, 1891, p. 526.

Northern part of the island, *Blain*, No. 26 (Millsbaugh). General Distribution: Western Cuba and the Isle of Pines.

626. **Mesosphærum capitellatum** Jennings, sp. nov. (PLATE XXVI.)

Plant more or less incano-tomentose; branches virgate, obtusely 4-angled; leaves spatulate-obovate or oblong-obovate, at the base gradually narrowed into a very short margined petiole, at the apex obtuse or rounded, the upper margin serrulate, more or less incano-tomentose on both sides, paler underneath, on the upper surface reticulate and with strongly impressed nerves, 1-2.5 cm. long, 5-11 mm. wide; flower-bearing nodes distant (2-3 cm.); leaves of the inflorescence 1-1.5 cm. long; peduncles slender, 5-9 mm. long; heads globose, densely many-flowered, about 6-7 mm. in diameter; bracts linear-subulate, 1-1.5 mm. long, laxly tomentose; calyx about 2.2 mm. long, in fruit 3.5 mm. long, the tube obconic, strongly recurved at the apex, laxly pilose, the calyx-lobes triangular, subequal, strongly incrassate-subulate at the apex, usually subhamate, minutely more or less glandular-puberulent, 1 mm. long; corolla about 3 mm. long, very shortly pilose outside, the upper one-third bilabiate, the anterior lobe strongly cucullate, narrow, the lateral lobules oblique, ovate, and obtuse, the posterior lobes wide and broadly rounded; stamens inserted in the throat, prominently exerted, the anthers almost round; style smooth, apically very shortly bilobate; the seeds oval, about 0.7 mm. long, 3-4 mm. thick, minutely verruculose, yellowish brown.

Planta plus minusve minute incano-tomentosis; ramis virgatis,



obtuse 4-angulosis; foliis spathulato-obovatis vel oblongo-obovatis, ad basin sensim in petiolum brevissimum marginatum angustatis, apice obtusis vel rotundatis, margine superne serrulatis, utrinque plus minusve incano-tomentosis, subtus pallidioribus, supra valde impresso-nervosis et reticulatis, 1-2.5 cm. longis, 5-11 mm. latis; nodis floriferis distantibus (2-3 cm.); foliis floriferis 1-1.5 cm. longis; pedunculis gracilibus, 5-9 mm. longis; capitulis globosis, dense multifloris, ca. 6-7 mm. diametro; bracteis lineari-subulatis, 1-1.5 mm. longis, laxe tomentosis; calyce ca. 2.2 mm. longo, fructifero 3.5 mm. longo, tubo obconico, apice valde recurvo, laxe piloso, lobis triangularis, subæqualibus, apice incrassato-subulatis, subhamatis, minute glanduloso-puberulis, 1 mm. longis; corolla ca. 3 mm. longa, extrinsecus brevissime pilosula, in parte  $\frac{1}{3}$  superiore bilabiata, lobo antico cucullato, angustato, lobis lateralibus oblique ovatis, obtusis, lobis posticis latis, late rotundatis; staminibus fauci insertis, prominente exsertis, antheris subrotundis; stylo lævi, apice brevissime bilobo; seminibus ovalibus, ca. 0.7 mm. longis, 3-4 mm. latis, minute verruculosis, flavido-brunneis.

*Type*.—Near Nueva Gerona, Isla de Pinos, W. I., January 19, 1904, A. H. Curtiss, "West Indian Plants," No. 301. Specimen in the herbarium of the Carnegie Museum.

This species belongs to the section *Cyrta* Bentham (under *Hyptis*) and is most closely related to the Brazilian species *Mesosphærum clavelliferum* (Bentham) O. Kuntze and *M. microphyllum* (Pohl) O. Kuntze. The fruiting heads of *M. clavelliferum*, however, are stated as being 1.5 cm. or more in diameter, nearly three times the dimension of the Isle of Pines plant. The leaves of *M. microphyllum* differ from the plant from the Isle of Pines in that they are hardly 7 or 8 mm. long, and there is a further difference in that the peduncles of the former species are two or three times as long as the heads. The writer has had access to but few specimens from this large and difficult genus, but a careful comparison of the various descriptions available would leave little doubt of the specific distinctness of the plant from the Isle of Pines.

To those botanists who abide by the *Nomina Conservanda* of the International Rules of Botanical Nomenclature this plant should be known as ***Hyptis capitellata***.

627. *Mesosphærum uliginosum* (St. Hilaire) O. Kuntze.

*Hyptis uliginosa* ST. HILAIRE, in Bentham, *Labiatarum Genera et Species*, 1832-1834, p. 81.

*Hyptis eriocauloides* A. RICHARD, in Sagra, *Historia Fisica, Politica y Natural de la Isla de Cuba*, XI, 1850, p. 157. (Through a typographical error this was published as "*Hyptis criocauloides*.")

*Mesosphærum uliginosum* O. KUNTZE, *Revisio Generum Plantarum*, 1891, p. 526.

"Crescit in insula Pinorum (*Isla de Pinos*)"—A. Richard, *l. c.*; near Nueva Gerona, January 19, 1904, *A. H. Curtiss*, No. 302. General Distribution: Cuba, the Isle of Pines, and South America.

## Family SOLANACEÆ.

## KEY TO THE SPECIES ENUMERATED.

Fruit a berry, enclosed in a much inflated papery calyx... 628. *Physalis angulata*.  
Fruit not so enclosed.

An erect annual with very large ovate or lance-ovate leaves and red flowers  
4-6 cm. long; odor strong... 639. *Nicotiana Tabacum*.  
Not as above.

Leaves borne in two's, often unequal in size; corolla white or pale blue, about  
5 mm. long... 631. *Solanum antillarum*.

Leaves not borne in two's.

No spines or strong prickles on either branches or leaves.

Slender-stemmed herbs.

Corolla about 1 cm. long, with very slender cylindrical tube.

640. *Schwenkia americana*.

Corolla-tube tubinate... 630. *Solanum nigrum* var. *americanum*.

Shrubby; leaves ovate to ovate-lanceolate, 1-3 cm. long; corolla  
white, nearly rotate... 629. *Capsicum frutescens*.

Shrubby; leaves oblong to lance-oblong, 5-12 cm. long; corolla 11-13  
mm. long, with a gradually dilated tube... 638. *Cestrum diurnum*.

Branches and leaves more or less spiny.

Leaves 1-4 cm. long, angulate toothed, amply armed with yellowish  
spines... 633. *Solanum chamæacanthum*.

Leaves large, 10-25 cm. long, ovate, pale tomentose beneath, entire.

632. *Solanum verbascifolium*.

Leaves angulate-lobed; branches armed with short recurved spines  
with wide flattened bases.

Petioles distinct, 1-2 cm. long... 637. *Solanum Houstonii*.

Petioles very short or none, base of leaf long-tapering.

636. *Solanum jamaicense*.

Leaves entire, or sometimes somewhat angulate toothed; branches  
armed with slender rather straight spines.

Spines 2-10 mm. long, at base 0.5-1 mm. wide; calyx-lobes  
acuminate... 634. *Solanum bahamense*.

Spines 1.5-6 mm. long, at base 1.5-3 mm. wide; calyx-lobes rather  
obtuse... 635. *Solanum racemosum*.

628. *Physalis angulata* Linnæus.

*Physalis angulata* LINNÆUS, Species Plantarum, 1753, p. 183; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 436.

*Physalis Linkiana* DUNAL, in DeCandolle, Prodrômus Systematis Naturalis Regni Vegetabilis, XIII (1), 1852, p. 448, as to specimens Guadeloupe, not Nees; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 436.

Northern part of the island, *Blain*, No. 126 (Millspaugh). General Distribution: The Bahamas, West Indies, and tropical regions generally.

629. *Capsicum frutescens* Linnæus.

*Capsicum frutescens* LINNÆUS, Species Plantarum, 1753, p. 189; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 436.

*Capsicum annuum* var. *frutescens* O. KUNTZE, Revisio Generum Plantarum, II, 1891, p. 449.

"Old garden spot at Pedernales Point, Isle of Pines (1423)." (Millspaugh, *Field Columbian Museum, Botanical Series*, II, 1900, p. 96.) General Distribution: From southern Florida and the Bahamas south through the West Indies and continental tropical America; also in the tropics of the Old World.

630. *Solanum nigrum* variety *americanum* (Miller) O. E. Schulz.

*Solanum americanum* MILLER, Gardener's Dictionary, Ed. VIII, 1768, no. 5, in part.

*Solanum nodiflorum* DUNAL, Histoire Naturelle, Médicale, et Économique des Solanum, etc., 1813, p. 151; GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 188. Not Jacquin.

*Solanum nigrum* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 188. Not Linnæus.

*Solanum nigrum* var. *nodiflorum* A. GRAY, Synoptical Flora of North America, II (1), 1886, p. 228.

(For various other synonyms see Schulz, in Urban, *Symbolæ Antillanæ*, VI, 1909, pp. 161-162.)

Pedernales Point, February 16, 1899, *C. F. Millspaugh*, No. 1444 (Millspaugh). General Distribution: The Bahamas, the West Indies, Mexico, Costa Rica, Venezuela, and Guiana.

631. *Solanum antillarum* O. E. Schulz.

*Solanum triste* LUNAN, Hortus Jamaicensis, II, 1814, p. 10; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 437 (excluding synonyms and specimens Siebold), and Catalogus Plantarum Cubensium, 1866, p. 189. Not Jacquin.

*Solanum diphyllum* LUNAN, Hortus Jamaicensis, II, 1814, p. 9. Not Linnæus.

*Solanum nudum* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, XI, 1850, p. 122. Not Humboldt, Bonpland, & Kunth.

*Solanum antillarum* O. E. SCHULZ, in Urban, *Symbolæ Antillanæ*, VI, 1909, pp. 164-166.

Near Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 602. General Distribution: Cuba, the Isle of Pines, Jamaica, Porto Rico, Hispaniola, St. Vincent, and Grenada.

632. ***Solanum verbascifolium* Linnæus.**

*Solanum verbascifolium* LINNÆUS, *Species Plantarum*, 1753, p. 184; GRISEBACH, *Flora of the British West Indian Islands*, 1861, p. 438; Small, *Flora of the South-eastern U. S.*, Ed. II, 1913, p. 990.

Near Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 485; base of Casas Mts., May 5, 1910, *O. E. Jennings*, Nos. 606 & 639. General Distribution: Southern Florida, the Bahamas, the West Indies, Yucatan, and the tropics of Africa, Asia, and Australia.

The specimens collected at Caleta Grande were woody and about eight feet in height.

633. ***Solanum chamæacanthum* Grisebach.**

*Solanum chamæacanthum* GRISEBACH, *Catalogus Plantarum Cubensium*, 1866, p. 190.

In sand along beach north of Nueva Gerona, May 14, 1910, *O. E. Jennings*, No. 250. General Distribution: Western Cuba and the Isle of Pines.

A prostrate prickly plant with white and somewhat reflexed corolla-lobes.

634. ***Solanum bahamense* Linnæus.**

*Solanum bahamense* LINNÆUS, *Species Plantarum*, 1753, p. 188; Grisebach, *Flora of the British West Indian Islands*, 1861, p. 440 (var. *a*).

*Solanum igneum* GRISEBACH, *l. c.*, as to Cuba, and *Catalogus Plantarum Cubensium*, 1866, p. 189.

Near Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 495. Flowers bluish: "Scrublands near Pedernales Point, Isle of Pines, 1445" (Millspaugh). General Distribution: The Bahamas, Cuba, the Isle of Pines, Jamaica, Porto Rico, Hispaniola; also in southern Florida and Mexico (?).

The specimens seen from the Isle of Pines are in some respects transitional to *Solanum racemosum* Jacquin, which takes the place of *S. bahamense* in the Lesser Antilles.

635. ***Solanum racemosum* Jacquin.**

*Solanum racemosum* JACQUIN, *Enumeratio Plantarum Quas in Insulis Caribæis Detexit*, 1760, p. 15; GRISEBACH, *Flora of the British West Indian Islands*, 1861, p. 439, in part.

*Solanum bahamense* EGGERS, Flora of the St. Croix and Virgin Islands, Bulletin of the U. S. National Museum, XIII, 1879, p. 77, no. 591, in part. Not Linnæus.

"Stony scrubland at Pedernales Point, Isle of Pines (1415)." (Millspaugh). General Distribution: From St. Thomas, St. Croix, and St. Jan, south through the Lesser Antilles, according to Schulz, thus indicating from the distribution that Millspaugh's plant is probably the same thing as the one the writer collected at Caleta Grande, eight or ten miles further to the southeast, and which is here placed provisionally under *Solanum bahamense* Linnæus.

### 636. *Solanum jamaicense* Miller.

*Solanum jamaicense* MILLER, Gardener's Dictionary, Ed. VIII, 1768, no. 17; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 441.

*Solanum brevipilum* DUNAL, Histoire Naturelle, Médicale et Économique des Solanum, etc., 1813, p. 191, Pl. 21.

*Solanum heterotrichum* DUNAL, *op. cit.*, p. 192, Pl. 20.

*Solanum cuneifolium* DUNAL, *op. cit.*, p. 193, Pl. 22.

(For other synonyms see Schulz, in Urban, Symbolæ Antillanæ, VI, 1909, p. 232.)

Near Nueva Gerona, December 25, 1903, *A. H. Curtiss*, No. 258. General Distribution: The Greater Antilles, St. Thomas, Martinique, Grenada; Costa Rica, Colombia, Guiana, Brazil.

### 637. *Solanum Houstonii* Dunal.

*Solanum quercifolium* MILLER, Gardener's Dictionary, Ed. VIII, 1768, no. 16. Not Linnæus.

*Solanum Houstonii* DUNAL, Histoire Naturelle, Médicale et Économique des Solanum, etc., 1813, p. 243.

*Solanum scabrum* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 189, var. Not Vahl.

Near Nueva Gerona, April 11, 1904, *A. H. Curtiss*, No. 440. General Distribution: Cuba, the Isle of Pines, Grand Cayman, and Mexico.

### 638. *Cestrum diurnum* Linnæus.

*Cestrum diurnum* LINNÆUS, Species Plantarum, 1753, p. 191, excluding synonyms in part; GRISEBACH, Flora of the British West Indian Islands, 1861, p. 444, and Catalogus Plantarum Cubensium, 1866, p. 190.

*Cestrum fastigiatum* JACQUIN, Plantarum Rariorum Horti Cesarei Schoenbrunnensis Descriptiones, etc., III, 1798, p. 44, Pl. 330.

(For other synonyms see Schulz, in Urban, Symbolæ Antillanæ, VI, 1909, pp. 261-262.)

Near Nueva Gerona, December 23, 1903, and January 7, 1904, *A. H. Curtiss*, No. 251; a weed in the hotel yard at Nueva Gerona,

May 5, 1910, *O. E. Jennings*; in open savanna near Nueva Gerona, May 13, 1910, *O. E. Jennings*, No. 240. General Distribution: Cuba, the Isle of Pines, Santo Domingo, Porto Rico, Mexico, and naturalized in Florida and Texas.

As found in the Isle of Pines this plant is a shrub reaching a height of at least ten feet, with white, sweet-scented flowers and black shining berries.

639. ***Nicotiana Tabacum* Linnæus.** TOBACCO.

*Nicotiana Tabacum* LINNÆUS, Species Plantarum, 1753, p. 180.

"Apparently indigenous in scrubland at Pedernales Point, Isle of Pines (1435)" (Millspaugh). General Distribution: Native to tropical America and now cultivated and escaped widely through the tropics.

640. ***Schwenkia americana* Linnæus.**

*Schwenkia americana* LINNÆUS, Genera Plantarum, Ed. VI, p. 567.

Near Nueva Gerona, March 12, 1904, *A. H. Curtiss*, No. 401. General Distribution: Cuba (Grisebach), the Isle of Pines, Yucatan (Millspaugh), Brazil.

Family SCROPHULARIACEÆ.

KEY TO THE SPECIES ENUMERATED.

Leaves one cm. or more long.

Calyx-tube longer than its lobes.

Corolla salver-form; the capsule mostly included in the calyx.

647. *Buchnera elongata*.

Corolla more or less campanulate; capsule not very much enclosed in the calyx.....645. *Agalinis albida*.

Calyx-tube very short or practically none.

Pedicels straight, 3-6 mm. long; corolla about 3 mm. wide.

644. *Scoparia dulcis*.

Pedicels often finally strongly recurved; corollas much larger.

Stems somewhat pubescent below, essentially glabrous towards the summit.....641. *Angelonia cubensis*.

Stems viscid-pubescent.....642. *Angelonia salicariifolia*.

Leaves less than one cm. long.

Corolla several times longer than the calyx; anther-bearing filaments 2.

643. *Ilysanthes* sp.

Corolla little longer than the calyx; anther-bearing filaments 4.

646. *Monniera Monniera*.

Corolla-tube about twice the length of the calyx. . . . 649. *Gerardia pinetorum*.

641. *Angelonia cubensis* B. L. Robinson.

*Angelonia cubensis* B. L. ROBINSON, in Urban, *Symbolæ Antillanæ*, II, 1901, pp. 458-459.

Near Nueva Gerona, April 26, 1904, *A. H. Curtiss*, No. 465. General Distribution: Western Cuba and the Isle of Pines.

642. *Angelonia salicarifolia* Humboldt & Bonpland.

*Angelonia salicarifolia* HUMBOLDT & BONPLAND, *Plantæ Equinoxiales*, 1809, p. 92, Pl. 108; GRISEBACH, *Flora of the British West Indian Islands*, 1861, p. 431.

"Crescit in insula Pinorum (*Isla de Pinos*)," 1831, *A. H. Lanier*. (A. Richard, in Sagra, "Historia Fisica, Politica y Natural de la Isla de Cuba," XI, 1859, p. 152). General Distribution: Western Cuba (?), Isle of Pines, Hispaniola, Trinidad, and South America.

643. *Ilysanthes* sp.

*Ilysanthes Curtissii* BRITTON. (Herbarium name, unpublished.)

Near Nueva Gerona, February 25, 1904, *A. H. Curtiss*, No. 367. Distributed in Curtiss's *West Indian Plants* as *Ilysanthes Curtissii* but probably referable to *I. alterniflora* (Wright) Urban.

644. *Scoparia dulcis* Linnæus.

*Scoparia dulcis* LINNÆUS, *Species Plantarum*, 1753, p. 116.

In everglade meadow at mouth of Nuevas River, May 16, 1910, *O. E. Jennings*, No. 288. General Distribution: Tropical regions of both hemispheres, extending northward in America to the Bahamas, Florida, Georgia, and Texas.

645. *Agalinis albida* Britton & Pennell.

*Agalinis albida* BRITTON & PENNELL, *Bulletin of the Torrey Botanical Club*, XLII, 1915, pp. 391-392.

"Isle of Pines: Managua (*Palmer & Riley 1102*)."—Britton & Pennell, *l. c.* General Distribution: "Wet, grassy, pineland, western Cuba, the Isle of Pines, and in Jamaica."—Britton & Pennell, *l. c.*

*Gerardia Domingensis* Sprengel has been reported for the Isle of Pines on the basis of *Blain*, No. 32 (Millspaugh), but very probably that specimen is to be referred to the recently described *Agalinis albida*.

646. *Monniera Monniera* (Linnæus) Britton.

*Gratiola Monniera* LINNÆUS, *Centuria Plantarum*, II, 1756, p. 120.

*Herpestis Monniera* HUMBOLDT, BONPLAND, & KUNTH, *Nova Genera et Species Plantarum*, II, 1817, p. 366.

*Bacopa Monniera* WETTSTEIN, in Engler & Prantl, *Natürliche Pflanzenfamilien*, IV (3b), 1891, p. 77.

*Monniera Monniera* BRITTON, *Memoirs Torrey Botanical Club*, V, 1894, p. 292.

Between Bogarona and Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 474. General Distribution: On banks and shores, Maryland to Florida and Texas, the Bahamas, Bermudas, West Indies, and the tropics and subtropics generally.

647. *Buchnera elongata* Swartz.

*Buchnera elongata* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 92; GRISEBACH, *Flora of the British West Indian Islands*, 1861, p. 428.

Near Nueva Gerona, March 5, 1904, *A. H. Curtiss*, No. 386; dry savanna east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 55; same locality, May 14, 1910, *O. E. Jennings*, No. 247. General Distribution: In pine-lands and savannas from South Carolina to Florida and Texas, the Bahamas, and in the West Indies reported from Cuba, the Isle of Pines, Jamaica, Porto Rico, and Hispaniola; also South America.

648. *Gerardia*\* sp.

Near Caleta Grande, "South Coast," on soil derived from coralline limestone, May 22, 1910, *O. E. Jennings*, No. 493.

649. *Gerardia*\* *pinetorum* Britton & Wilson. (PLATE XXVII.)

*Gerardia pinetorum* BRITTON & WILSON, in Britton, *Studies of West Indian Plants*, VIII, *Bulletin of the Torrey Botanical Club*, XLIII, 1916, p. 466.

Acaulescent plants with perennial erect rhizomes reaching a maximum of 1 cm. in length; roots tuberous-thickened; leaves forming a rosette, hirsute, oblong, at the apex obtuse or rounded, 1-1.5 cm. long, 5-8 mm. wide, whitish hirsute or subglabrous, whitish glandular, subcrenate, somewhat narrowed at the base, the petiole 1-1.5 cm. long; spikes terminal, about 7-8 cm. high, sparsely whitish pubescent, whitish glandular, few-flowered, the bracts lance-subulate, 4-5 mm. long, ciliate, the bracteoles similar, about 1.5 mm. long; calyx cleft deeply, 2.5 mm. long, minutely ciliate and glandular; tube of the corolla about 5 mm. long, about 1 mm. in diameter, cylindrical, the lobes obovate, obtuse, the posterior ones about 7 mm. long, 4 mm. wide, not connate, the anterior one 8 mm. long and 6 mm. wide, the lateral ones about 8 mm. long and 5 mm. wide, the whole corolla

\**Gerardia tuberosa* Linnæus, the type of the genus, is one of the Acanthaceæ. See p. 259.



when dry lilac-colored; filaments about 0.5 mm. long, inserted in the throat of the corolla; anthers included, 1 mm. long, the apex recurved; style about 4 mm. long, widened at the apex; pollen grains about  $23\text{--}25\ \mu$  in diameter, and about  $40\ \mu$  long; capsule unknown.

*Type*.—Growing in the white sand of the pine-barrens at Los Indios, May 21, 1910, No. 456, O. E. Jennings. Specimen in the Herbarium of the Carnegie Museum.

The type consists of but two specimens, collected in flower, and, unfortunately, none of the capsules were mature. The plants were growing near the stations for *Stenandrium droseroides*, but they differ from that species markedly in the much larger flowers of a totally different color. The two species are quite similar in general appearance.

### Family BIGNONIACEÆ.

#### KEY TO THE SPECIES ENUMERATED.

Leaves simple.

Leaves practically or entirely smooth above.

Petioles slender, about 1 cm. long; corolla-tube not more than 1.5 cm. long.

655. *Catalpa punctata*.

Leaves spatulate, tapering to a subsessile base; corolla-tube 3 or 4 cm. long.

656. *Crescentia Cujete*.

Leaves minutely scaly above.

Petioles 3–4 mm. long; corolla-tube 3.5–5 cm. long.

650. *Tabebuia lepidophylla*.

Petioles rigid, 5–15 mm. long; corolla-tube 3–4 cm. long.

651. *Tabebuia rigida*.

Leaves digitately compound.

Leaflets one to three.

Leaflets dull on both sides, minutely scaly above. . . 652. *Tabebuia geronensis*.

Leaflets smooth and shining above. . . . . 653. *Tabebuia Curtissii*.

Leaflets five. . . . . 654. *Tabebuia pentaphylla*.

#### 650. *Tabebuia lepidophylla* (A. Richard) Greenman.

*Bignonia lepidophylla* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, XI, 1850, p. 101, and XII, Pl. 59.

*Tabebuia lepidophylla* GREENMAN, in Combs, Transactions of the St. Louis Academy of Science, VII, 1898, p. 451.

"Crescit in insula Pinorum (*Isla de Pinos*), ubi collegit clar. Lanier." (A. Richard, *l. c.*); near Nueva Gerona, April 11 and 23, 1904, A. H. Curtiss, No. 441; a shrub about eight feet high with rather slender scraggly habit, and with the leaves clustered towards the ends of the branches, among palmettoes on the savanna near Nueva Gerona,

May 5, 1910, *O. E. Jennings*, No. 6. General Distribution: Known only from the Isle of Pines. Closely related species occur in Western Cuba.

This is one of the commonest of the sparsely branched, round-headed low trees or shrubs which grow scattered about on the savannas in the northern part of the island where the soil consists of the "Mal Pais" gravel. Its constant companions are *Curatella americana*, *Byrsonima crassifolia*, and the palmettoes, especially *Acælorraphe Wrightii*.

651. ***Tabebuia rigida* Urban.**

*Tabebuia rigida* URBAN, Symbolæ Antillanæ, I, 1899, p. 404.

Northern part of the island, *Blain*, No. 173 (Millspaugh); pine-barrens south of Sante Fé, May 25, 1910, *O. E. Jennings*, No. 549. General Distribution: Porto Rico and the Isle of Pines.

Although the distribution as given above does not seem reasonable, the characters given by Urban for his species agree very closely with the specimen from the Isle of Pines. The writer's field-notes have this to say regarding the color of the flowers: "Fls. rose-pink, with darker markings, and shading to cream-color in the throat."

652. ***Tabebuia geronensis* Britton.**

*Tabebuia geronensis* BRITTON, Bulletin of the Torrey Botanical Club, XLII, 1915, p. 375.

"Nueva Gerona, Isle of Pines, Cuba (*A. H. Curtiss*, May, 1904)" Britton, *l. c.* Known only from the type-locality.

653. ***Tabebuia Curtissii* Britton.**

*Tabebuia Curtissii* BRITTON, Bulletin of the Torrey Botanical Club, XLII, 1915, p. 375.

"Nueva Gerona, Isle of Pines, Cuba (*A. H. Curtiss*, May, 1904)" Britton, *l. c.* Known only from the type-locality.

654. ***Tabebuia pentaphylla* (Jussieu) Hemsley.**

*Tecoma pentaphylla* JUSSIEU, Genera Plantarum, 1789, p. 139.

*Tabebuia pentaphylla* HEMSLEY, in Biologia Centrali-Americana, II, 1881-1882, p. 495.

In the interior of the "South Coast" peninsula, where it forms, on the thin soil derived from coralline limestone, a considerable part of the brushy chaparral over considerable areas, May 22, 1910, *O. E. Jennings*, Nos. 484 and 516. General Distribution: The West Indies

and continental tropical America. A closely related species is the *Tabebuia bahamensis* of Cuba and the Bahamas. (See Britton, *Bulletin of the Torrey Botanical Club*, XLII, 1915, p. 379.)

655. **Catalpa punctata** Grisebach.

*Catalpa punctata* GRISEBACH, *Catalogus Plantarum Cubensium*, 1866, p. 192.

A weak shrub about eight feet high, near Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 507. General Distribution: Western Cuba and the Isle of Pines.

656. **Crescentia Cujete** Linnæus. CALABASH.

*Crescentia Cujete* LINNÆUS, *Species Plantarum*, 1753, p. 626.

Near Nueva Gerona, January 26, 1904, *A. H. Curtiss*, No. 311; from tree in Nueva Gerona, May, 1910, *O. E. Jennings* (fruit). General Distribution: Key West, Florida, Bermuda (introduced), and quite generally over the West Indies and continental tropical America.

A very peculiar tree with the leaves fascicled along the few branches and the hard-shelled round fruits mainly borne on the stems and larger branches. The wood of the tree is tough and flexible, while the hard shells of the fruits are used for cups, dippers, and receptacles of various kinds. The tree is not often seen excepting around the towns, where it is a common tree along the stone fences, walls, etc., there apparently mostly naturalized from seeds carelessly thrown about when the shells were being cleaned out.

Family GESNERIACEÆ.

657. **Gesneria acuminata** Urban.

*Conradia humilis* A. RICHARD, in Sagra, *Historia Fisica, Politica y Natural de la Isla de Cuba*, XI, 1850, p. 71, in part.

*Pentarhaphia humilis* HANSTEIN, *Linnæa*, XXXIV, 1865, p. 294, in part.

*Conradia pumila* MILLSPAUGH, *Field Columbian Museum, Botanical Series*, I, 1900, p. 434.

*Gesneria acuminata* URBAN, *Symbolæ Antillanæ*, I, 1900, p. 479.

Northern part of the island, *Blain*, No. 50 (Millspaugh, *l. c.*); at edge of rocks along water, Los Indios River, May 18, 1910, *O. E. Jennings*, No. 363; near magnesia spring at Sante Fé, May 26, 1910, *O. E. Jennings*, No. 581. General Distribution: Cuba and the Isle of Pines.

## Family LENTIBULARIACEÆ.

## KEY TO THE SPECIES ENUMERATED.

- Terrestrial herbs with erect filiform leaves. . . . . 658. *Pinguicula filifolia*.  
 More or less completely aquatic herbs with finely-dissected leaves bearing bladders.  
     Flowers one cm. or more across. . . . . 659. *Utricularia spirandra*.  
     Flowers about 5 mm. in diameter. . . . . 660. *Utricularia obtusa*.

658. *Pinguicula filifolia* Wright.

*Pinguicula filifolia* WRIGHT, in Grisebach, *Catalogus Plantarum Cubensium*, 1866, p. 162.

Near Nueva Gerona, December 19, 1903, *A. H. Curtiss*, No. 243; in large patches on acid soil (white sand and gravel) in pine-barrens one mile north of Los Indios, May 18, 1910. Flowers blue, *O. E. Jennings*, No. 386; near Los Indios, November 4, 1912, *G. A. Link*. General Distribution: Western Cuba and the Isle of Pines.

The specimens from the Isle of Pines indicate that the species has a flowering period of considerable duration, *i. e.*, from November to May.

659. *Utricularia spirandra* Wright.

*Utricularia spirandra* WRIGHT, in Grisebach, *Catalogus Plantarum Cubensium*, 1866, p. 161.

In the Majagua River at Los Indios, May 19, 1910, *O. E. Jennings*, No. 396. General Distribution: Cuba and the Isle of Pines.

660. *Utricularia obtusa* Swartz.

*Utricularia obtusa* SWARTZ, *Prodromus Descriptionum Vegetabilium Indiæ Occidentalis*, 1788, p. 14.

At edge of shallow pond about two miles east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 67. General Distribution: Cuba and through the West Indies to Trinidad and continental tropical America.

## Family ACANTHACEÆ.

## KEY TO THE SPECIES ENUMERATED.

- Rosette-plants; the bracts of the inflorescence not imbricate, flowers white, less than 1 cm. in diameter. . . . . 662. *Stenandrium droseroides*.  
 Branched annuals, not in rosettes.  
     Bracts large and imbricated; leaves ovate. . . . . 661. *Blechum Brownei*.  
     Bracts subulate, not imbricated.  
         Calyx glandular-pubescent, 5-7 mm. long. . . . . 664. *Justicia Rugeliana*.  
         Calyx not glandular, 1.5 mm. long. . . . . 663. *Justicia diversifolia*.  
     Outer bracts spatulate or linear-spatulate, not conspicuously imbricate.  
         665. *Diapedium assurgens*.

661. **Blechum Brownei** Jussieu.

*Ruellia Blechum* SWARTZ, *Observationes Botanicae Quibus Plantae Indiae Occidentalis, etc.*, 1791, p. 243.

*Blechum Brownei* JUSSIEU, *Annales du Muséum d'Histoire Naturelle, Paris*, IX, 1807, p. 270; GRISEBACH, *Flora of the British West Indian Islands*, 1861, p. 453.

In field at Sante Fé, May 25, 1910, *O. E. Jennings, No. 615*. General Distribution: From the Bahamas and Mexico widely distributed south through the West Indies and continental tropical America.

662. **Stenandrium droseroides** Nees.

*Stenandrium droseroides* NEES, in DeCandolle, *Prodromus Systematis Naturalis Regni Vegetabilis*, XI, 1847, p. 284.

Northern part of the island, *Blain, No. 11* (Millspaugh); in pine-barrens east of Los Indios, May 18, 1910, *O. E. Jennings, No. 351*; abundant but growing singly in the pine-barrens north of Los Indios near the Majagua River, May 19, 1910, *O. E. Jennings, No. 399*. General Distribution: Cuba and the Isle of Pines.

A low rosette plant with a short erect subterranean rhizome and roots bearing fusiform tuberous thickenings, and growing rather commonly on the sandy soil of the pine-barrens at Los Indios. The flowers are white with a minute crimson eye. The corolla is somewhat two-lipped, the two narrower upper lobes being connate to about one-half their length. Considering the variation of the specimens in size, number of flowers, length of floral bracts, leaves, hairs, etc., as well as the fact that the specimens have tuberous roots, it appears doubtful if consistent differences can be established between the three species *Stenandrium tuberosum* (Linnæus) Urban (*S. rupestre* Nees), *S. acuminatum* Urban, and *S. droseroides* Nees. If these plants should prove to be synonymous the species would bear the name *Stenandrium tuberosum* (Linnæus) Urban, = *Gerardia tuberosa* Linnæus. Nos. 648 and 649, p. 254, should follow No. 662, according to recent usage.

663. **Justicia diversifolia** Jennings, sp. nov. (PLATE XXVIII.)

Herbaceous, sparsely and minutely hispidulous; stem creeping or ascending, the maximum 2 dm. long, sub-angled, cystolithigerous; leaves entire, very shortly petioled, the lower broadly obovate or oblong, obtuse, at the base mostly acuminate, the upper linear, 2-4 cm. long, 1-2 mm. wide, somewhat obtuse; spikes terminalibus, simple or sparingly branched, secund, laxly few-flowered (4-7), pedunculate; bracts and bracteoles subulate, 1-2 mm. long, minutely hispidulous;

calyx lobes 5, minutely hispidulous, lance-subulate, about 1.5 mm. long; limb of the corolla at first minutely glandular pubescent, finally almost glabrous, the tube glabrous, 2 mm. long, the upper lip 3 mm. long, bidentate, the lower 3 mm. long, 3-lobed, white, spotted with purple, the middle lobe largest, about 1 mm. long; filaments about 1.5 mm. long; the locules of the anther superposed, about 0.3 mm. long, oblong, the upper more or less completely horizontal; pollen grains about  $20\mu \times 30\mu$ ; style 3.5 mm. long.

Planta herbacea, sparse minute hispidulosa, caule repente vel ascendente, usque ad 2 dm. longo, subangulato, cystolithigero; foliis margine integris, brevissime petiolatis, inferioribus late obovatis vel oblongis, obtusis, basi plerumque acuminatis, superioribus linearibus, 2-4 cm. longis, 1-2 mm. latis, obtusiusculis; spicis terminalibus, simplicibus vel subramosis, secundis, laxifloris, paucifloris (4-7), pedunculatis; bracteis bracteolisque subulatis 1-2 mm. longis, minute hispidulosis; calycis laciniis 5, minute hispidulosis, lanceolato-subulatis, ca. 1.5 mm. longis; corollæ limbo extra minute glanduloso-puberulo, demum glabriusculo, tubo glabro, 2 mm. longo, labio supero 3 mm. longo, bidentato, infero albo, purpureo-maculato, 3 mm. longo, trilobo, lobio medio majore, ca. 1 mm. longo; filamentis ca. 1.5 mm. longis; antherarum loculis superpositis, ca. 0.3 mm. longis, oblongis, supero horizontali; pollinis granulis ca.  $20\mu$  diametro,  $30\mu$  longis; stylo 3.5 mm. longo.

*Type*.—Damp bank of arroyo, Sante Fé, May 25, 1910, O. E. Jennings, No. 533. Specimen in the herbarium of the Carnegie Museum.

This species is most nearly related to *Justicia reptans* Swartz, but differs very strikingly in the suddenly elongated upper leaves, the uppermost or next uppermost pair being the longest, some of the lowermost being almost orbicular.

#### 664. *Justicia Rugeliana* (Grisebach) Lindau.

*Dianthera Rugeliana* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 196.

*Dianthera glandulosa* GRISEBACH, *op. cit.*, p. 197.

*Justicia Rugeliana* LINDAU, Symbolæ Antillanæ, II, 1900, p. 244.

"On old garden spot at Pedernales Point, Isle of Pines (1438)" Millspaugh. General Distribution: Northern and western Cuba and the Isle of Pines.

665. *Diapedium assurgens* (Linnæus) Kuntze.

*Justicia assurgens* LINNÆUS, Systema Naturæ, Ed. X, 1759, p. 850.

*Dicliptera assurgens* JUSSIEU, Annales du Museum d'Histoire Naturelle, Paris, IX, 1807, p. 269.

*Diapedium assurgens* O. KUNTZE, Revisio Generum Plantarum, 1891, p. 485.

Between Bogarona and Caleta Grande, May 22, 1910, O. E. Jennings, No. 526. General Distribution: Florida, the Bahamas, the West Indies, Mexico, and south to Colombia.

Family RUBIACEÆ.

KEY TO THE SPECIES ENUMERATED.

Ovules numerous in each cell of the fruit.

Fruit a dry capsule, or at least dry.

Flowers single or in decussate cymes or panicles.

Seeds wingless.

Lobes of the corolla valvate; fruit dry, two-celled; herbs; peduncles usually filiform, axillary.

Stems hirsute; leaves short-petioled, ovate to oblong, 0.5-2.5 cm. long.....668. *Oldenlandia uniflora*.

Stems glabrous; leaves lanceolate to lance-linear, 2.5-6 cm. long, corolla lobes half as long as the tube. 666. *Oldenlandia herbacea*.

Stems glabrous or glabrescent; leaves lanceolate or linear, about 2-3 cm. long; corolla lobes as long as the tube.

667. *Oldenlandia corymbosa*.

Lobes of the corolla imbricate; capsules two-celled; stipules between the petioles.

Leaves fleshy, furrowed on the back; stipules sheathing; low shrubs with solitary sessile flowers. 669. *Rachicallis americana*.

Leaves not fleshy; stipules not sheathing; shrubs (or trees) with flowers in paniculate or simple cymes or clusters.

Leaves oblong-ovate to obovate, the upper 3-4 cm. wide.

671. *Rondeletia correifolia*.

Leaves narrowly oblong to oblong-oblancheolate, 8-18 mm. wide.....670. *Rondeletia calcicola*.

Seeds winged, flat; stipules between the petioles.

672. *Exostema ellipticum*.

Flowers in dense rounded heads.

673. *Cephalanthus occidentalis* var. *salicifolius*.

Fruit fleshy.

Corolla-lobes valvate.

Creeping or trailing herbs with the flowers glomerate on a long axillary peduncle.....675. *Coccocypselum nummularifolium*.

Scandent shrubs with the flowers in rather slender terminal racemes.

674. *Gonzalea leptantha*.

Corolla-lobes imbricate or twisted; shrubs or trees with intrapetiolar stipules.

Corolla-lobes twisted.

Flowers perfect; ovules immersed in the central placenta.

Flowers subsessile, axillary, 1-3 per axil; shrubs; leaves less than 10 cm. long.....676. *Randia mitis*.

Flowers in few-flowered terminal corymbs; trees; leaves 10-25 cm. long.....677. *Genipa americana*.

Flowers diœcious.

Stipules soon deciduous leaving a ring-like scar just at upper edge of leaf-scars; flowers in fascicled, terminal clusters.

678. *Amaioua fagifolia*.

Stipules persistent, 1-2 cm. long; flowers sessile, the pistillate single, terminal, staminate several.....679. *Alibertia edulis*.

Corolla-lobes imbricate, tube narrowly cylindrical, crimson, more than 1 cm. long.

Cymes rather wide spreading.....680. *Hamelia patens*.

Cymes rather compactly erect.....681. *Hamelia erecta*.

Ovules solitary in each cell of the fruit.

Flowers in dense rounded heads.

673. *Cephalanthus occidentalis* var. *salicifolius*.

Flowers not in dense rounded heads.

Ovules pendulous.

Filaments more or less adnate to the corolla-tube.

Fruit drupe-like, not springing apart.

Calyx finally deciduous; stigma capitate.

682. *Guettarda calyptata*.

Calyx persistent; stigma 2-3-lobed.....683. *Antirrhæa tenuiflora*.

Fruit dry, springing apart into two long narrow lobes.

Fruit sparingly pubescent.....685. *Machaonia trifurcata*.

Fruit essentially glabrous.....684. *Machaonia littoralis*.

Filaments free from the corolla-tube except at the very base; climbing shrubs.....686. *Chiococca alba*.

Ovules not pendulous.

Corolla-lobes twisted or imbricate; low shrubs with 3-whorled thickish-linear revolute leaves.....687. *Strumpfia maritima*.

Corolla-lobes valvate.

Ovule or seed attached at the base of the carpel.

Ovary 2- (or more) loculed, septa thick.

Corolla straight (*Psychotria*).

Leaf-blades glabrous or essentially so.

Corolla 2.5-3 mm. long; calyx glabrous, bracts shorter than the calyx.....690. *Psychotria undata*.

Corolla 7-8 mm. long; calyx finely puberulous, bracts shorter than the calyx.....691. *Psychotria revoluta*.

Bracts longer than the corolla.

688. *Psychotria involucrata*.

Leaf-blades puberulent, at least on the veins beneath.



- Peduncle usually less than 5 cm. long, and finely pubescent.....689. *Psychotria pubescens*.  
 Peduncle more than 5 cm. long, glabrous or almost so.  
 692. *Psychotria Sauvallei*.  
 Corolla swollen at the base on one side (*Palicourea*).  
 Panicle pyramidal, widely spreading, glabrous.  
 693. *Palicourea crocea*.  
 Panicle narrowly contracted, rather densely glandular-puberulent.....694. *Palicourea elongata*.  
 Ovary 1-loculed, septa thin; stipules rounded, shorter than their elongated awn.....695. *Faramea occidentalis*.  
 Ovule or seed attached to the lateral wall of the carpel.  
 Shrubs or trees; stipules undivided; fruit a fleshy syncarp.  
 696. *Morinda Roioi*.  
 Herbs, the stipules divided or laciniate.  
 Fruit separating into indehiscent carpels with firm walls.  
 Leaves ciliate, 1.5-3 cm. long.  
 Stem strongly angled, very soon glabrous.  
 697. *Diodia rigida*.  
 Stem less strongly angled, whitish pilose.  
 698. *Diodia ciliata*.  
 Leaves little or not at all ciliate; stem glabrous.  
 699. *Diodia arenicola*.  
 The carpel walls breaking open at maturity.  
 Capsule septicidal, both carpels ventrally dehiscent (*Borreria*).  
 Leaves lanceolate to elliptic-lanceolate, up to 1 cm. wide by 2.5-4 cm. long.  
 Calyx-teeth about as long as the fruit.  
 702. *Borreria ocimoides*.  
 Calyx-teeth minute, much shorter than the fruit.  
 701. *Borreria laevis*.  
 Leaves smaller and linear or quite narrow.  
 Flowers in dense terminal heads up to 7-9 mm. in diameter.....700. *Borreria podocephala*.  
 Flowers in smaller heads, up to 5 or 6 mm. in diameter.....704. *Borreria pygmæa*.  
 Flowers subsolitary, axillary.  
 703. *Borreria strumpfoides*.  
 Capsule splitting around the middle (circumscissile), the upper part falling away.  
 705. *Mitracarpum depauperatum*.

666. **Oldenlandia herbacea** DeCandolle.

*Hedyotis commutata* SCHULTES, Mantissa ad Systema Vegetabilium, III, 1827, p. 134.

*Oldenlandia herbacea* DECANDOLLE, Prodrômus Systematis Naturalis Regni Vegetabilis, IV, 1830, p. 425.

*Hedyotis herbacea* SESSÉ & MOÇINO, Flora Mexicana, II, Ed., 1894, p. 20.

Near Nueva Gerona, December 10, 1903, and April 28, 1904, *A. H. Curtiss*, Nos. 221 & 471. General Distribution: Widely distributed through the West Indies and the tropics.

667. ***Oldenlandia corymbosa* Linnæus.**

*Oldenlandia corymbosa* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 119.

Northern part of the island, *Blain*, No. 9 (Millspaugh). General Distribution: A weed, widely distributed in the tropics and closely related to *O. herbacea* DeCandolle.

668. ***Oldenlandia uniflora* Linnæus.**

*Oldenlandia uniflora* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 119.

*Hedyotis glomerata* MICHAUX, Flora Boreali-Americana, I, 1803, p. 83.

Near Nueva Gerona, May 1, 1904, *A. H. Curtiss*, No. 473; "Crescit in insula Pinorum (*Isla de Pinos*)," 1831, *A. H. Lanier* (A. Richard, in Sagra, *Historia Fisica, Politica y Natural de la Isla de Cuba*, XI, 1859, p. 15). General Distribution: Cuba, the Isle of Pines, Jamaica, Porto Rico, and South America. Also in the United States from New York to Florida and Texas.

669. ***Rachicallis americana* (Jacquin) Hitchcock.**

*Hedyotis americana* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 12.

*Rachicallis rupestris* DECANDOLLE, Prodrômus Systematis Naturalis Regni Vegetabilis, IV, 1830, p. 434.

*Rachicallis americana* HITCHCOCK, Report Missouri Botanical Garden, IV, 1893, p. 92.

Small shrub on coralline strand at Caleta Grande, May 22, 1910, *O. E. Jennings*, No. 511 (flowers yellow); Pedernales Point, February 16, 1899 (Millspaugh, *Field Columbian Museum, Botanical Series*, II, 1900, p. 101). General Distribution: Rather widely distributed on the coasts of the Bermudas, Bahamas, and the West Indies.

670. ***Rondeletia calcicola* Britton.**

*Rondeletia calcicola* BRITTON, Studies of West Indian Plants, VIII, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 467.

"Wooded limestone plain, Coe's Camp, Ensenada de Siguanea (*Britton & Wilson 14842*)."—Britton, *l. c.*

671. **Rondeletia correifolia** Grisebach.

*Rondeletia correifolia* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 129.

Near Nueva Gerona, December 8, 1903, and March 2, 1904, *A. H. Curtiss*, No. 214; low ground along river south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 203a; Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 600; northern part of the island, *Blain*, Nos. 153, 163 (Millspaugh). General Distribution: Western Cuba and the Isle of Pines.

The original description says of the corolla: "corolla tomentosa breviter exserta." In the Curtiss specimen, however, the corolla has a tube about 12-15 mm. long, protruding from a calyx of only about 6-8 mm. in length. Otherwise the specimens agree with the description very well.

672. **Exostema ellipticum** Grisebach.

*Exostema ellipticum* GRISEBACH, Memoirs American Academy of Arts and Sciences, VIII, 1862, p. 504.

Northern part of the island, *Blain*, No. 12 (Millspaugh). General Distribution: Cuba and the Isle of Pines.

673. **Cephalanthus occidentalis** var. **salicifolius** (Humboldt & Bonpland) Gray.

*Cephalanthus salicifolius* HUMBOLDT & BONPLAND, Plantes Equinoxiales, 1808, Pl. 98.

*Cephalanthus occidentalis* var. *salicifolius* GRAY, Synoptical Flora of North America, I, 1886, p. 29.

Northern part of the island, *Blain*, No. 89 (Millspaugh). General Distribution: Mexico, Cuba, and the Isle of Pines.

674. **Gonzalea leptantha** A. Richard.

*Gonzalea leptantha* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, XI, 1850, p. 16.

Near Nueva Gerona, January 26 and April 24, 1904, *A. H. Curtiss*, No. 313. General Distribution: Cuba and the Isle of Pines.

675. **Coccocypselum nummulariæfolium** Chamisso & Schlechtendal.

*Coccocypselum nummulariæfolium* CHAMISSE & SCHLECHTENDAL, Linnæa, IV, 1829, p. 145.

Near Nueva Gerona, January 9, 1904, *A. H. Curtiss*, No. 282; between Los Indios and La Cañada Mts., May 18, 1910, *O. E. Jen-*

*nings*, No. 352; probably near Columbia, February–March, 1910, *Jared F. Shafer* (fruit ripe). General Distribution: Southern Mexico, Brazil, Guiana, Trinidad, Cuba, and the Isle of Pines.

676. ***Randia mitis* Linnæus.**

*Randia mitis* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 213.

*Gardenia randia* var. *mitis* SWARTZ, Flora Indiæ Occidentalis, 1797, p. 528.

*Randia latifolia* var. *mitis* DECANDOLLE, Prodrômus Systematis Naturalis Regni Vegetabilis, IV, 1828, p. 385.

Between Bogarona and Caleta Grande, South Coast, May 22, 1910, *O. E. Jennings*, No. 488. General Distribution: Probably well distributed in the West Indies along with *Randia aculeata* Linnæus, of which species it may be merely a thornless and somewhat wider-leaved form.

677. ***Genipa americana* Linnæus. JAGUA. GENIP TREE.**

*Genipa americana* LINNÆUS, Systema Naturæ, Ed. X, II, 1759, p. 931.

A specimen collected somewhere in the northeastern quarter of the island, probably near Columbia, in February, 1910, by Dr. J. F. Shafer. General Distribution: Quite generally distributed in the West Indies and in tropical South America.

The species is a forest tree reaching a height of fifty feet or more. It is frequently cultivated for the sake of the fruit, which often reaches a length of four or five inches and is much used in some places in making a refreshing drink. The fruit is sometimes eaten but is not very highly esteemed, being said to contain a large amount of tannic acid.

678. ***Amaioua fagifolia* Desfontaines.**

*Amaioua fagifolia* DESFONTAINES, Mémoires du Muséum d'Histoire Naturelle, Paris, VI, 1820, p. 14, t. 5.

Near Nueva Gerona, February 23 (fruit) and April 11 (flowers) 1904, *A. H. Curtiss*, No. 363. General Distribution: West Indies and continental tropical America.

679. ***Alibertia edulis* A. Richard.**

*Genipa edulis* L. C. RICHARD, Actes de la Société d'Histoire Naturelle de Paris, 1792, p. 107.

*Alibertia edulis* A. RICHARD, Mémoires de la Société d'Histoire Naturelle de Paris, V, 1830, p. 234, Pl. 21, fig. 1.

*Gardenia edulis* POIRET, Encyclopédie Méthodique, Supplementa in Dictionnaire de Botanique, II, p. 708.

Near Nueva Gerona, February 11, 1904, *A. H. Curtiss*, No. 338.

General Distribution: Southern Mexico to Guiana, and Brazil; the Isle of Pines and Cuba.

680. **Hamelia patens** Jacquin.

*Hamelia patens* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 16.

Pedernales Point, February 16, 1899, *C. F. Millspaugh*, No. 1412 (Millspaugh). General Distribution: Florida, Bahamas, the West Indies, southward to Peru and Brazil.

681. **Hamelia erecta** Jacquin.

*Hamelia erecta* JACQUIN, Stirpium Americanarum Historia, 1763, p. 71.

Along the bank of the upper part of the Los Indios River, May 18, 1910, *O. E. Jennings*, No. 673. General Distribution: Northern South America and the West Indies.

This species is by some botanists regarded as a variety of the more widely distributed *Hamelia patens* Jacquin, the main differential characters between the two species being the more spreading cymes of *patens* and the erect cymes of *erecta*.

682. **Guettarda calyptrata** A. Richard.

*Guettarda calyptrata* A. RICHARD, in Sagra, Historia Fisica, Política y Natural de la Isla de Cuba, XI, 1850, p. 21, Pl. 46.

Near Nueva Gerona, May 20, 1904, *A. H. Curtiss*, No. 504; northern part of the island, *Blain*, No. 147 (Millspaugh). General Distribution: Western Cuba and the Isle of Pines.

683. **Antirrhoea tenuiflora** Urban.

*Antirrhoea tenuiflora* URBAN, Symbolæ Antillanæ, I, 1900, p. 438.

Along bank of river at Sante Fé, May 24, 1910, *O. E. Jennings*, No. 564. General Distribution: Western Cuba and the Isle of Pines.

The specimens were taken from a shrub about seven feet high, with 4-merous, salver-form, lemon-yellow flowers.

684. **Machaonia trifurcata** Urban.

*Machaonia cymosa* GRISEBACH, Flora of the British West Indian Islands, 1861, p. 348, as to Cuban specimens. See BRITTON, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 453.

*Machaonia trifurcata* URBAN, Symbolæ Antillanæ, V, 1908, p. 512.

Northern part of the island, *Blain*, No. 44 (Millspaugh). General Distribution: Cuba, the Isle of Pines, and Jamaica.

685. *Machaonia littoralis* Britton.

*Machaonia littoralis* BRITTON, Studies of West Indian Plants, VIII, Bulletin of the Torrey Botanical Club, XLIII, 1916, pp. 452, 453.

"Coastal thickets, vicinity of Siguanea, Isle of Pines, Cuba (Britton & Wilson 14942)."—Britton, *l. c.* Collected during the spring of 1916. The species is known only from this locality.

686. *Chiococca alba* (Linnæus) Hitchcock.

*Lonicera alba* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 175.

*Chiococca racemosa* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 917.

*Chiococca alba* HITCHCOCK, Report of the Missouri Botanical Garden, IV, 1893, p. 94.

A small tree about ten feet high, Sante Fé, May 25, 1910, *O. E. Jennings*, No. 568. General Distribution: From Bermuda and southern Florida south through the West Indies and tropical continental America. Berries pure white.

687. *Strumpfia maritima* Jacquin.

*Strumpfia maritima* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 28.

"Plentiful on maritime rocks in the zone of spray, where it grows from the driest crevices, Pedernales Point, Isle of Pines."—Mills-paugh, *Field Columbian Museum, Botanical Series*, II, 1900, p. 102. General Distribution: On sandy or rocky coasts, in the Bahamas, and rather widely distributed in the West Indies.

688. *Psychotria involucrata* Swartz.

*Psychotria involucrata* SWARTZ, Prodrömus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 45.

*Psychotria tribracteata* C. WRIGHT, in Grisebach, Catalogus Plantarum Cubensium, 1866, p. 137.

Bank of the Majagua River north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 414. General Distribution: Western Cuba and the Isle of Pines, Jamaica, Porto Rico, Trinidad, and from Guatemala to Brazil and Peru.

689. *Psychotria pubescens* Swartz.

*Psychotria pubescens* SWARTZ, Prodrömus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 44.

*Psychotria Berteriana* BELLO, Anales de la Sociedad Española de Historia Natural, I, 1881, p. 281, n. 397, not DeCandolle.

Along upper Los Indios River, May 18, 1910, *O. E. Jennings*, No. 687; bank of stream near magnesia springs, Sante Fé, May 26, 1910, *O. E. Jennings*, No. 575. General Distribution: The Bahamas, Cuba, the Isle of Pines, Porto Rico, Hispaniola, Jamaica, St. Thomas, St. Kitts, Mexico, and Central America.

A scraggly shrub about five feet in height, with greenish-yellow flowers.

690. ***Psychotria undata* Jacquin.**

*Psychotria undata* JACQUIN, *Plantarum Rariorum Horti Cæsarei Schœnbrunnensis Descriptiones*, etc., III, 1798, p. 5, Pl. 260.

*Psychotria lanceolata* NUTTALL, *American Journal of Science*, Ser. I, V, 1822, p. 290, not Sauvalle.

*Psychotria oligotricha* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, IV, 1830, p. 514.

*Psychotria portoricensis* DECANDOLLE, *op. cit.*, p. 515.

On soil derived from coralline limestone, near Caleta Grande, May 22, 1910, *O. E. Jennings*, No. 478; same locality and date, No. 522; Pedernales Point, February 16, 1899, *C. F. Millspaugh* (Millspaugh). General Distribution: From the Bermudas and Florida south through the West Indies, and in Central America, Colombia, and Venezuela.

Flowers light yellow or cream-colored.

691. ***Psychotria revoluta* P. DeCandolle.**

*Psychotria revoluta* P. DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, IV, 1830, p. 517.

*Guettarda resinosa* A. RICHARD, in *Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba*, XI, 1850, p. 21. Not Persoon.

*Psychotria tubulosa* A. RICHARD, *op. cit.*, p. 27.

*Psychotria coronata* GRISEBACH, *Memoirs American Academy of Arts and Sciences*, Ser. II, VIII, 1862, p. 508.

*Uragoga tubulosa* G. MAZA, *Anales Sociedad Española de Historia Natural*, Ser. II, III, 1894, p. 293.

In dry savanna among palmettoes, near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 10; along arroyo east of Los Indios, May 18, 1910, *O. E. Jennings*, No. 348; northern part of the island, *Blain*, Nos. 15, 28, 154, 183 (Millspaugh); also 1831, *A. H. Lanier* (A. Richard, *l. c.*). General Distribution: Cuba and the Isle of Pines.

The flowers are white.

692. ***Psychotria Sauvallei* Urban.**

*Faramea erythrocarpa* GRISEBACH, *Catalogus Plantarum Cubensium*, 1866, p. 134. Not *Psychotria erythrocarpa* Schlechtendal.

*Psychotria laurifolia* SAUVALLE, Flora Cubana, 1869, n. 1074, p. 69 (in part).  
Not Swartz.

*Psychotria Sauvallei* URBAN, Symbolæ Antillanæ, VII, 1913, pp. 454-455.

Near Nueva Gerona, January 12, and June, 1904, *A. H. Curtiss*, No. 287. General Distribution: Cuba and the Isle of Pines.

Urban (*l. c.*) regards the Cuban plants as the typical form of the species, specimens from the Isle of Pines being larger as to leaves and length of peduncles.

693. ***Palicourea crocea*** (Swartz) Roemer & Schultes.

*Psychotria crocera* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 44.

*Palicourea crocea* ROEMER & SCHULTES, Systema Vegetabilium, V, 1819, p. 193.

*Palicourea coccinea* DECANDOLLE, Prodrum Systematis Naturalis Regni Vegetabilis, IV, 1830, p. 529.

A shrub four feet in height, flowers red, along bank of river at Los Indios, May 19, 1910, *O. E. Jennings*, No. 413. General Distribution: Greater Antilles, Dominica, Martinique, Grenada, Trinidad, Colombia, Bolivia.

694. ***Palicourea elongata*** Britton & Wilson.

*Palicourea elongata* BRITTON & WILSON, in Britton, Studies of West Indian Plants, VIII, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 468.

In arroyo, in pine-barrens near Los Indios, May 17, 1910, *O. E. Jennings*, No. 332; "Arroyo, Las Tunas (*Britton & Wilson 14749*, type); Arroyo, vicinity of San Pedro (*Britton & Wilson 15785*)" Britton, *l. c.* The Britton & Wilson collections were made in the spring of 1916. General Distribution: In arroyos, southern and central parts of the Isle of Pines.

695. ***Faramea occidentalis*** (Linnæus) A. Richard.

*Ixora occidentalis* LINNÆUS, Systema Naturæ, Ed. X, II, 1759, p. 893.

*Coffea occidentalis* JACQUIN, Enumeratio Plantarum Quas in Insulis Caribæis Detexit, 1760, p. 16.

*Ixora americana* LINNÆUS, I, Ed. II, 1762, p. 160. In part.

*Faramea odoratissima* DECANDOLLE, Prodrum Systematis Naturalis Regni Vegetabilis, IV, 1830, p. 496.

*Faramea occidentalis* A. RICHARD, Mémoires de la Société d'Histoire Naturelle de Paris, V, 1834, p. 176.

Northern part of the island, *Blain*, No. 19 (Millspaugh). General Distribution: Throughout the West Indies, and from Mexico through Central America to northern South America.



696. *Morinda Roioc* Linnæus.

*Morinda Roioc* LINNÆUS, Species Plantarum, I, Ed. I, 1753, p. 176.

A clambering shrub resembling a *Lonicera*, on side of ridge at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 125; in everglade meadow at mouth of Nuevas River, May 16, 1910, *O. E. Jennings*, No. 285; in swampy ground along river south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 213; shrubby, about ten feet in height, between Bogarona and Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 518; northern part of the island, *Blain*, No. 146 (Mills-paugh); Pedernales Point, February 16, 1899, *C. F. Mills-paugh*, No. 1411 (Mills-paugh). General Distribution: Southern Florida, Greater Antilles, and from Central America to Brazil.

697. *Diodia rigida* Chamisso & Schlechtendal.

*Diodia rigida* CHAMISSE & SCHLECHTENDAL, Linnæa, III, 1828, p. 341.

*Spermacoce rigida* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, III, 1818, p. 342.

Near Nueva Gerona, December 26, 1903, *A. H. Curtiss*, No. 256. General Distribution: The West Indies and South America as far as Uruguay.

698. *Diodia ciliata* Britton & Wilson.

*Diodia ciliata* BRITTON & WILSON, in Britton, Studies of West Indian Plants, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 467.

"In white sand, vicinity of Los Indios (*Britton & Wilson 15347*)" Britton, *l. c.* This specimen was collected in the spring of 1916. Other specimens, formerly identified by the writer as *Diodia rigida*, but probably belonging rather to *Diodia ciliata* are as follows: Cultivated ground south of Nueva Gerona on Keenan's estate, May 9, 1910, *O. E. Jennings*, No. 165; dry savanna south of Sante Fé, May 25, 1910, *O. E. Jennings*, No. 542; near Nueva Gerona, June 12, 1912, *G. A. Link*; and Los Indios, November 4, 1912, *G. A. Link*. This species is known only from the Isle of Pines and is evidently mainly limited to the areas of white sand and to dry portions of the savanna. It is perhaps too closely related to *Diodia rigida*, if the writer properly understands the two species.

699. *Diodia arenicola* Britton & Wilson.

*Diodia arenicola* BRITTON & WILSON, in Britton, Studies of West Indian Plants, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 467.

"Along arroyo, Los Indios, Isle of Pines (*O. E. Jennings* 355 in part, type); vicinity of Los Indios (*Britton & Wilson* 15812)."—Britton, *l. c.* The specimen first mentioned was collected along an arroyo near the headwaters of the Los Indios River, near the Cañada Mts., May 18, 1910; the Britton & Wilson specimen was collected in the spring of 1916. The species is known only from the Los Indios region, Isle of Pines.

700. *Borreria podocephala* DeCandolle.

*Borreria podocephala* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, IV, 1830, p. 542.

*Spermacoce podocephala* GRAY, *Synoptical Flora of North America*, I, 1886, p. 34.

Near Nueva Gerona, January 6, 1904, *A. H. Curtiss*, No. 295; Fields at Los Indios, May 19, 1910, *O. E. Jennings*, No. 425; field, Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 670; northern part of the island, *Blain*, No. 56 (Millsbaugh). General Distribution: From southern Florida, Texas, and Mexico, south through the West Indies.

701. *Borreria lævis* (Lamarck) Grisebach.

*Spermacoce lævis* LAMARCK, *Illustrations des Genres*, 1791, no. 1435, Pl. 94, fig. 2.

*Borreria Wydleriana* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, IV, 1830, p. 535.

*Borreria lævis* GRISEBACH, *Abhandlungen d. Königlichen Gesellschaft Wiss. Göttingen*, VII, 1857, p. 231, no. 723.

In park at the magnesia springs, Sante Fé, May 26, 1910, *O. E. Jennings*, No. 571. General Distribution: Widely distributed as a weed in the Bermudas, the Bahamas, the West Indies, and the continental American tropics.

702. *Borreria ocimoides* (Burmamn, Filius) DeCandolle.

*Spermacoce ocymoides* BURMANN, FILIUS, *Flora Indica*, 1768, p. 34.

*Borreria parviflora* G. F. W. MEYER, *Primitæ Floræ Essequiboensis*, 1818, p. 83.

*Borreria ocimoides* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, IV, 1830, p. 544.

*Spermacoce parviflora* HEMSLEY, *Biologia Centrali-Americana*, II, 1881, p. 59. (Urban.)

Near Nueva Gerona, January 17, 1904, *A. H. Curtiss*, No. 296; moist bank of the Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 407. General Distribution: Common, as a weed, from Cuba and Mexico, south through the West Indies and continental tropical America to northern Argentina.

703. *Borreria strumphioides* C. Wright.

*Borreria strumphioides* C. WRIGHT, in Grisebach, *Catalogus Plantarum Cubensium*, 1866, p. 142.

On sandy plain near the Sigüanea hills, May 21, 1910, *O. E. Jennings*, No. 457. General Distribution: Western Cuba and the Isle of Pines.

704. *Borreria pygmæa* (C. Wright) Spruce & K. Schumann.

*Spermacoce pygmæa* C. WRIGHT, in Sauvalle, *Flora Cubana*, 1868, p. 72.

*Borreria pygmæa* SPRUCE & K. SCHUMANN, in Martius, *Flora Brasiliensis*, VI, (6), 1888, p. 58.

Dry savanna east of Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 25. General Distribution: Cuba and the Isle of Pines.

705. *Mitracarpum depauperatum* Britton & Wilson.

*Mitracarpum depauperatum* BRITTON & WILSON, in Britton, *Studies of West Indian Plants*, VIII, Bulletin of the Torrey Botanical Club, XLIII, 1916, pp. 467, 468.

"Dry white sand, central districts; type from near Los Indios (*Britton & Wilson 1917*)."—Britton, *l. c.*

Family CUCURBITACEÆ.

Leaves subcordate-roundish, angled or slightly lobed; stamens 5.

706. *Fevillea cordifolia*.

Leaves not roundish or else deeply lobed; stamens mostly 3.

Anthers straight or not much curved.....707. *Melothria guadalupensis*.

Anthers contorted or U-shaped.....708. *Momordica Charantia*.

706. *Fevillea cordifolia* Linnæus.

*Fevillea cordifolia* LINNÆUS, *Species Plantarum*, 1753, p. 1013.

Northern part of the island, *Blain*, No. 119 (Millspaugh). General Distribution: Cuba, the Isle of Pines, Jamaica, Hispaniola, Porto Rico, Guadeloupe, Martinique, Trinidad, and the tropics of South America.

707. *Melothria guadalupensis* (Sprengel) Cogniaux.

*Bryonia guadalupensis* SPRENGEL, *Systema Vegetabilium*, III, 1826, p. 15.

*Melothria pervaga* GRISEBACH, *Flora of the British West Indian Islands*, 1860, p. 289.

*Melothria guadalupensis* COGNIAUX, in DeCandolle, *Monographiæ Phanerogamarum*, III, 1881, p. 580.

Along bank of the Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 416; near Nueva Gerona, June 3, 1912,

*G. A. Link.* General Distribution: The Bahamas and the West Indies, generally; Mexico, Venezuela, and Guiana.

708. **Momordica Charantia** Linnæus. BALSAM APPLE.

*Momordica Charantia* LINNÆUS, Species Plantarum, 1753, p. 1009.

Near magnesia springs, Sante Fé, May 26, 1910, *O. E. Jennings*, No. 577; near Nueva Gerona, June 3, 1912, *G. A. Link.* General Distribution: Tropics and subtropics of both hemispheres; in America extending north to Florida and the Bahamas. Probably introduced into America from the Old World.

Family CAMPANULACEÆ.

709. **Isotoma longiflora** (Linnæus) Presl.

*Lobelia longiflora* LINNÆUS, Species Plantarum, 1753, p. 930.

*Isotoma longiflora* PRESL, Prodrömus Monographiæ Lobeliacearum, Abhandlungen der Königlich-Böhmische Gesellschaft der Wissenschaften, 1836, p. 42.

Along bank of arroyo between Los Indios and the Cañada Mts., May 18, 1910, *O. E. Jennings*, No. 349. General Distribution: Rather general in the West Indies.

A rather striking plant with the general aspect of an Evening Primrose (*Ænothera*) but with white flowers with a slender corolla-tube reaching a length of six inches. The flowers were quite strongly sweet-scented when collected.

Family GOODENIACEÆ.

710. **Scævola Plumierii** (Linnæus) Vahl.

*Lobelia Plumierii* LINNÆUS, Species Plantarum, 1753, p. 929.

*Scævola Lobelia* MURRAY, Linnæi Systema Vegetabilium, Ed. XIII, 1774, p. 178.

*Scævola Plumierii* VAHL, Symbolæ Botanica, II, 1791, p. 36.

A low plant on the strand at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 113. General Distribution: Tropical regions of both hemispheres, extending north in America to Florida, the Bahamas, and the Bermudas.

Family COMPOSITÆ.

KEY TO THE SPECIES ENUMERATED.

None of the perfect flowers bilabiate.

Stigmatic lines not extending above the middle of the stigmas.

Stigmas filiform or subulate, hispidulous. . . . . (Tribe I. *Vernoniæ*)

Stigmas more or less club-shaped, papillose-puberulent.

(Tribe II. *Eupatoriæ*)

Stigmatic lines extending to the tips of the stigmas or to the appendages.

- Anther-sacs tailed at the base..... (Tribe IV. *Inuleæ*)
- Anther-sacs not tailed at the base.

Receptacle naked.

Bracts of the involucre well imbricated.

Stigmas of the perfect flowers with terminal appendages.

(Tribe III. *Astereæ*)

Stigmas of the perfect flowers with truncate or hairy or papillose tips..... (Tribe V. *Heleniææ*)

Bracts of the involucre little imbricated, except when broad outer ones overlap the inner..... (Tribe VII. *Senecioneæ*)

Receptacle chaffy..... (Tribe VI. *Heliantheæ*)

All flowers, or at least the perfect ones, bilabiate..... (Tribe VIII. *Mutisieæ*)

#### Tribe I. VERNONIÆÆ.

Heads discoid; the flowers all perfect and tubular, never yellow. Branches of the style long, terete, filiform, minutely bristly-hairy all over. Leaves alternate or rarely whorled, never opposite.

Heads not condensed into glomerules.

Pappus consisting of a thickened ring without bristles.

711. *Sparganophorus Vaillantii*.

Pappus double; with inner hair-like bristles and outer shorter scales or bristles.

712. *Lachnorhiza piloselloides*.

Heads few-flowered, condensed into glomerules.

Pappus 1-2-serial, of scaly bristles dilated at the base.

Cauline leaves linear, 2-4 cm. long, 1 mm. broad, entire.

714. *Elephantopus arenarius*.

Cauline leaves larger, oblong, somewhat crenate-serrate.

713. *Elephantopus mollis*.

Pappus 1-serial, unequal, with several of the stouter bristles bent towards the summit..... 715. *Distreptus spicatus*.

#### Tribe II. EUPATORIÆÆ.

Heads discoid; the flowers all tubular and perfect, never yellow. Branches of the style thickened upward or club-shaped, uniformly minutely pubescent; stigmatic lines indistinct.

Anthers without appendages..... 716. *Phania matricarioides*.

Anthers appendaged.

Pappus none (abortive)..... 717. *Alomia ageratoides*.

Pappus consisting of a series of nearly free more or less laciniate-tipped scales.

718. *Ageratum maritimum*.

Pappus consisting of hairs or bristles.

Involucre of more than 4 bracts, 5- (or more) flowered.

Leaves finely dissected..... 720. *Eupatorium capillifolium*.

Leaves entire or repand-toothed..... 719. *Eupatorium villosum*.

Involucre mostly of 4 bracts, sometimes with an outer short one (*Mikania*).

Leaves entire, dentate or incised-lobed..... 721. *Mikania scandens*.

Leaves tripartite up to trifoliate.

Leaves 3-partite, the intermediate lobe lance-ovate to lanceolate, gradually acuminate.....722. *Mikania ranunculifolia*.

Leaves trisected to three-foliolate, the intermediate lobe lanceolate to sub-linear.....723. *Mikania corydalifolia*.

### Tribe III. ASTEREÆ.

Heads discoid or radiate, the rays pistillate. Anthers not tailed at base. Branches of the style of the perfect flowers flat, smooth up to end of marginal stigmatic lines, then above this more or less hairy. Leaves alternate. Receptacle with no chaff.

Ray-flowers longer than the involucre and disk-flowers.

Bracts of the involucre in three or more series; rays oblong; scapes simple.

724. *Aster Grisebachii*.

Bracts of the involucre in two or three series; rays linear; scapose stems slender and mostly branched.

Basal leaves mostly 2-4 cm. long, spatulate, narrowed to the base but not distinctly petiolate.....725. *Erigeron cuneifolius*.

Basal leaves with blades 1-2 cm. long, the petioles purple, very slender, and 2-4 times as long as the blades.....726. *Erigeron purpuripes*.

Ray-flowers shorter than the head or flowers without well-marked ligule; erect, branching stems with the leaves lyrate and more or less pinnately lobed, especially the lower ones.....727. *Conyza lyrata*.

### Tribe IV. INULEÆ.

Heads discoid, the pistillate flowers mostly filiform and truncate. Anthers sagittate-tailed at base. Style branches with obtuse or truncate mostly naked tips. Pappus capillary or none.

Style-branches tapering and hairy outside for a good portion of their length.

Leafy stemmed plants (*Pluchea*).

Perennial plants.

Stems woody; leaves entire.....728. *Pluchea odorata*.

Stems herbaceous; leaves serrate.....729. *Pluchea fœtida*.

Annuals.

Involucres 3-4 mm. wide by 3.5-5 mm. high.

730. *Pluchea purpurascens*.

Involucres 5-7 mm. wide by 6-8 mm. high....731. *Pluchea camphorata*.

Leaves in a basal rosette.....732. *Sachsia polycephala*.

Style-branches truncate, with an apical tuft of hairs.

733. *Gnaphalium purpureum*.

### Tribe V. HELENIEÆ.

Heads radiate or discoid; often yellow. Anthers not tailed. Receptacle naked. Stigmas truncate or with hairy tips. Bracts of the involucre usually well imbricated.

Plant tissues usually without oil-glands.

Bracts of the involucre appressed, flowers numerous, corymbose.

750. *Flaveria linearis*.

Involucral bracts spreading or reflexed, flowers single on a scape.

751. *Helenium scaposum*.

Plant tissues with oil glands in leaves and involucre bracts; flowers small, in cymes.

Pappus scales uniformly setiform. . . . . 752. *Pectis elongata*.

Pappus scales irregularly broadly scale-like to basally scale-like and upwardly bristle-form. . . . . 753. *Pectis Swartziana*.

Tribe VI. HELIANTHÆ.

Heads radiate or discoid. Involucre usually not scarious. Receptacle chaffy (none in *Pinillosia* and *Heptanthus*). Anthers not caudate. Pappus never capillary.

No chaff on receptacle.

Pistillate flowers without corolla. . . . . 734. *Pinillosia Berterii*.

Pistillate flowers with corolla.

Leaf-blades glabrous above or merely puberulent.

735. (*Heptanthus cochlearifolius*).

Leaf-blades pubescent on both surfaces. . . . 735. *Heptanthus ranunculoides*.

Chaff present on receptacle.

Marginal flowers pistillate with tubular or obsolete corollas; disk-flowers perfect but unfruitful.

Heads with two kinds of flowers. . . . . 738. *Iva cheiranthifolia*.

Heads either all pistillate or all staminate. . . . . 739. *Ambrosia hispida*.

Ray-flowers fertile and ligulate, disk-flowers sterile.

Achene cylindric or angled. . . . . 736. *Acanthospermum humile*.

Achene compressed parallel to the involucre scales.

737. *Parthenium Hysterophorus*.

Disk-flowers fertile.

Pappus consisting of scales or a crown of stiff retrorsely barbed bristles.

Achenes not compressed, or, if so, laterally.

Inner involucre scales enveloping the achenes of the ray-flowers.

740. *Enydra sessilis*.

Inner involucre scales flat.

Chaff awn-like. . . . . 741. *Eclipta alba*.

Chaff broad, sometimes enclosing the flowers, but never the ripe fruit.

Disk-achenes 4-5-angled, or rarely laterally compressed.

Pappus obsolete. . . . . 742. *Isocarpha divaricata*.

Pappus consisting of a short irregular or toothed crown.

Ray-flowers pistillate, fertile.

Shrubs with acutely 4-angled achenes.

743. *Borrchia arborescens*.

Herbaceous with achenes not at all or only obtusely angled. . . . . 744. *Wedelia trilobata*.

Ray-flowers unfertile or obsolete.

745. *Eleutheranthera ruderalis*.

Pappus of easily deciduous short, thin bristles.

746. *Melanthera angustifolia*.

Achenes strongly compressed parallel to the involucre scales.

748. *Bidens leucantha*.

Pappus consisting of plumose bristles. . . . . 749. *Tridax procumbens*.

## Tribe VII. SENECEONEÆ.

Heads radiate or discoid. Involucre little or not at all imbricated. Anthers without tails. No chaff on receptacle, or occasionally present. Pappus capillary. Receptacle with chaffy scales; involucre somewhat imbricate; half-shrubby herb with leaves partly trifid. . . . . 754. *Neurolæna lobata*.  
 Receptacle naked; involucre 1-seriate; annual herbs.

Heads whitish; stem erect, leaves sessile at the tapering base.

755. *Erechtites hieracifolia*

Heads purplish; stem weak; lower leaves lyrate, the upper sagittate, clasping the stem. . . . . 756. *Emilia sonchifolia*.

## Tribe VIII. MUTISIEÆ.

Heads various, usually some of the flowers with bilabiate corollas; anthers long-tailed at base; receptacle naked; style branches in the hermaphrodite flowers not appendaged and usually very short; scapose herbs with tufted radical leaves. whitish-canescant below. . . . . 757. *Chaptalia dentata*,

711. *Sparganophorus Vaillantii* Crantz.

*Sparganophorus Vaillantii* CRANTZ, Institutiones Rei Herbariæ, I, 1766, p. 261.

*Ethulia sparganophora* LINNÆUS, Species Plantarum, II, Ed. II, 1763, p. 1171.

*Struchium sparganophorum* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 366.

Near Nueva Gerona, May 1, 1904, *O. E. Jennings*, No. 478. General Distribution: The West Indies, continental tropical America from Cuba and southern Mexico to Brazil; and tropical Africa.

712. *Lachnorhiza piloselloides* A. Richard.

*Lachnorhiza piloselloides* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, XI, 1850, p. 34.

*Vernonia piloselloides* HOFFMANN, in Engler & Prantl, Die Natürlichen Pflanzenfamilien, IV (V), 1894, p. 126.

Described by A. Richard (*l. c.*), from specimens collected by A. H. Lanier; northern part of the island, *Blain*, No. 83 (Millspaugh); swamp north of Nueva Gerona, May 8, 1910, *O. E. Jennings*, No. 138. Flowers noted as "flesh-pink." General Distribution: The Isle of Pines.

*Note*.—" *Lachnorhiza asteroides* DC." is in the printed list of plants collected in the Isle of Pines by A. H. Curtiss. The writer has not seen this specimen, but ventures to think that the plant is *L. piloselloides* A. Rich.

713. *Elephantopus mollis* Humboldt, Bonpland, & Kunth.

*Elephantopus mollis* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, IV, 1820, p. 26.



*Elephantopus scaber* BELLO, Anales de la Sociedad Española de Historia Natural, X, 1881, p. 283, no. 418. Not Linnaeus.

Near Nueva Gerona, January 12, 1904, *A. H. Curtiss*, No. 286. General Distribution: From Cuba and Lower California to South America.

714. ***Elephantopus arenarius*** Britton & Wilson.

*Elephantopus arenarius* BRITTON & WILSON, in Britton, Studies of West Indian Plants, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 468.

"White sand, vicinity of Los Indios (*Britton & Wilson 14206*)" Britton, *l. c.* Collected in the spring of 1916. Known only from the type locality.

715. ***Distreptus spicatus*** (Jussieu) Cassini.

*Elephantopus spicatus* JUSSIEU, Histoire des Plantes de la Guiane Francaise, II, 1775, p. 808.

*Pseudoelephantopus spicatus* ROHR, Skrivter Naturhistorie-Selskab, Kjöbenhavn, II, 1792, p. 213.

*Distreptus spicatus* CASSINI, Dictionnaire des Sciences Naturelles, XIII, 1819, p. 367.

*Elephantopus glaber* SESSÉ & MOÇINO, Flora Mexicana, II, 1894, p. 197.

Near Nueva Gerona, December 14, 1903, *A. H. Curtiss*, No. 225. General Distribution: The West Indies and continental tropical America from central Mexico to South America.

716. ***Phania matricarioides*** (Lessing) Grisebach.

*Ageratum matricarioides* LESSING, Synopsis Generum Compositarum, 1832, p. 155.

*Phania matricarioides* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 145.

Near Nueva Gerona, December 17, 1903, *A. H. Curtiss*, No. 239; "Crescit in *Isla de Pinos*," 1831, *A. H. Lanier*.—Reported by A. Richard, in Sagra, "Historia Física, Política y Natural de la Isla de Cuba," XI, 1850, pp. 37, 38, under the name *Phania arbutifolia* DeCandolle. General Distribution: Cuba and the Isla of Pines.

717. ***Alomia ageratoides*** Humboldt, Bonpland, & Kunth.

*Alomia ageratoides* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, IV, 1823, p. 151.

Isle of Pines, evidently Pedernales Point, February 16, 1899, *C. F. Millspaugh*, No. 1437. General Distribution: Southern Mexico and the Isle of Pines.

718. ***Ageratum maritimum*** Humboldt, Bonpland, & Kunth (?).

*Ageratum maritimum* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, IV, 1820, p. 150.

Forming low mats on the beach at Sigüanea City, May 21, 1910, *O. E. Jennings*, No. 459. General Distribution: Cuba, the Isle of Pines, and South America.

719. ***Eupatorium villosum* Swartz.**

*Eupatorium villosum* SWARTZ, Prodrum Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 111.

Shrub about four feet high, in sand near the coast, north of Nueva Gerona, May 14, 1910, *O. E. Jennings*, No. 251; near Nueva Gerona, June, 1904, *G. A. Link*. General Distribution: Southern Florida, the Bahamas, Cuba, the Isle of Pines, Cayman, and Jamaica.

720. ***Eupatorium capillifolium* (Lamarck) Small.**

*Artemisia capillifolia* LAMARCK, Encyclopédie Méthodique, Botanique, I, 1783, p. 267.

*Eupatorium fœniculaceum* WILLDENOW, Species Plantarum, III, 1804, p. 1750.

*Eupatorium capillifolium* SMALL, Memoirs of the Torrey Botanical Club, V, 1894, p. 311.

Northern part of the island, *Blain*, No. 103 (Millsпах); "Among the coast shrubbery at Pedernales Point." (*Millsпах*, No. 1410, *Millspaugh*, Field Columbian Museum, Botany, II, 1900, p. 105). General Distribution: Virginia to Florida, Cuba, and the Isle of Pines.

721. ***Mikania scandens* (Linnæus) Willdenow.**

*Eupatorium scandens* LINNÆUS, Species Plantarum, II, Ed. I, 1753, p. 836.

*Mikania scandens* WILLDENOW, Species Plantarum, III, 1804, p. 1743.

*Mikania pubescens* MUHLENBERG, Catalogus Plantarum Americæ Septentrionalis, 1813, p. 71.

*Mikania orinocensis* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, IV, 1820, p. 134.

*Mikania* spp. *cissampelina*, *Sieberiana*, *batatifolia*, *tamoides*, *congesta*, DECANDOLLE, Prodrum Systematis Naturalis Regni Vegetabilis, V, 1836, pp. 195-197.

*Willoughbya cissampelina* and *scandens* O. KUNTZE, Revisio Generum Plantarum, I, 1891, pp. 371-372.

Swampy woods at west base of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 266. General Distribution: Common, and quite variable in form, from Canada to Argentina.

722. ***Mikania ranunculifolia* A. Richard.**

*Mikania ranunculifolia* A. RICHARD, in Sagra, Historia Física, Política y Natural de la Isla de Cuba, XI, 1850, p. 45.

*Willoughbya ranunculifolia* MILLSPAUGH, Field Columbian Museum, Botany, II, 1900, p. 106.

This species is known only from the Isle of Pines. The type collection was made by A. H. Lanier about 1831 and the locality given by A. Richard (*l. c.*) is "Insula Pinorum (*isla de Pinos*).". It has been since collected as follows: Pedernales Point, February 16, 1899, *C. F. Millspaugh*, No. 1421; near Nueva Gerona, April 8, 1904, *A. H. Curtiss*, No. 439; north of Caleta Grande, South Coast, May 22, 1910, *O. E. Jennings*, No. 603; near Nueva Gerona, June 10, 1912, *G. A. Link*.

723. *Mikania corydalifolia* Grisebach.

*Mikania corydalifolia* GRISEBACH, Memoirs of the American Academy of Arts and Sciences, VIII, 1862, p. 512.

*Eupatorium Borregoianum* MAZA, Anales Sociedad Española Historia Natural, XIX, 1890, p. 270.

*Willoughbya corydalifolia* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 372.

Swamp southwest of Bibijagua, May 7, 1910, *O. E. Jennings*, No. 89. General Distribution: Western Cuba and the Isle of Pines.

724. *Aster Grisebachii* Britton.

*Haplopappus marginatus* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 149. Not *Aster marginatus* Humboldt, Bonpland, & Kunth.

*Aster Grisebachii* BRITTON, Bulletin of the Torrey Botanical Club, XLI, 1914, p. 14.

Near Nueva Gerona, March 13, 1904, *A. H. Curtiss*, No. 404 (issued in "West Indian Plants" as *Aplopappus marginatus* Grisebach); forming small mats on the white sand in the pine-barrens at Los Indios, May 17, 1910, *O. E. Jennings*, Nos. 311 and 318. General Distribution: Pinar del Rio, Cuba, and the Isle of Pines.

See photograph, Plate XVI, taken by O. E. Jennings, in the pine-barrens one mile northeast of Los Indios, May 17, 1910.

725. *Erigeron cuneifolius* P. DeCandolle.

*Erigeron jamaicensis* SWARTZ, Observationes Botanicae Quibus Plantae Indiae Occidentalis, 1791, p. 305, Pl. VIII, fig. II. Not Linnæus.

*Erigeron cuneifolius* P. DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, V, 1836, p. 288.

Near Nueva Gerona, April 17, 1904, *A. H. Curtiss*, No. 446; in gravelly soil north of Los Indios, May 18, 1910, *O. E. Jennings*, No. 388; in pine-barrens near the Majagua River, north of Los Indios, May 19, 1910, *O. E. Jennings*, No. 401; dry savanna south of Sante Fé, May 25, 1910, *O. E. Jennings*, No. 547. General Distribution: Cuba, the Isle of Pines, Jamaica, Hispaniola, Porto Rico, St. Thomas, and St. Jan.

726. *Erigeron purpuripes* Britton & Wilson.

*Erigeron purpuripes* BRITTON & WILSON, in Britton, Studies of West Indian Plants, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 468.

"In white sand, vicinity of Los Indios (*Britton & Wilson 14207*)" Britton, *l. c.* Collected in the spring of 1916. Known only from the Isle of Pines.

727. *Conyza lyrata* Humboldt, Bonpland, & Kunth.

*Conyza lyrata* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, IV, 1820, p. 70.

Near Nueva Gerona, March 17, 1904, *A. H. Curtiss, No. 419*; in recently-cleared low ground, north of Nueva Gerona, May 8, 1910, *O. E. Jennings, No. 134*. General Distribution: The West Indies, and from Nicaragua to Ecuador.

728. *Pluchea odorata* (Linnæus) Cassini.

*Conyza odorata* LINNÆUS, Systema Naturæ, Ed. X, II, 1759, p. 1213. Excluding Plumier's plant with serrate leaves.

*Pluchea odorata* CASSINI, Dictionnaire des Sciences Naturelles, XLII, 1826, p. 3.

Pedernales Point, February 16, 1899, *C. F. Millspaugh, No. 1414* (Millspaugh). General Distribution: From Bermuda, the Bahamas, and Florida, southward through the West Indies, and from Mexico to Venezuela.

729. *Pluchea fœtida* (Linnæus) DeCandolle.

*Baccharis fœtida* LINNÆUS, Species Plantarum, 1753, p. 861.

*Baccharis viscosa* WALTER, Flora Caroliniana, 1788, p. 202.

*Pluchea bifrons* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, V, 1836, p. 45.

*Pluchea fœtida* DECANDOLLE, *op. cit.*, p. 452.

On low ground along the river south of Nueva Gerona, May 12, 1910, *O. E. Jennings, No. 636*. General Distribution: Swamps, from New Jersey south to Florida and Texas, and in the West Indies.

730. *Pluchea purpurascens* (Swartz) DeCandolle.

*Conyza purpurascens* SWARTZ, Prodromus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 112.

*Pluchea purpurascens* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, V, 1836, p. 452.

In rich soil in low recently-cleared land north of Nueva Gerona, May 8, 1910, *O. E. Jennings, No. 144*; "Crescit in insula Pinorum

(*isla de Pinos*).”—A. Richard, in Sagra, “Historia Física, Política y Natural de la Isla de Cuba,” XI, 1850, p. 48. General Distribution: From Florida, Bermuda, and the Bahamas, south through the West Indies, and from Georgia to Texas and Central America. Also western Africa.

731. ***Pluchea camphorata*** (Linnæus) DeCandolle.

*Erigeron camphoratum* LINNÆUS, Species Plantarum, II, Ed. II, 1763, p. 1212.

*Conyza marilandica* MICHAUX, Flora Boreali-Americana, II, 1803, p. 126.

*Pluchea camphorata* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, V, 1836, p. 451.

Opens, at Pedernales Point, February 16, 1899, *C. F. Millspaugh*, No. 1440 (Millspaugh). General Distribution: In salt marshes from Massachusetts to Florida, Texas, Mexico, and the West Indies.

732. ***Sachsia polycephala*** Grisebach.

*Sachsia polycephala* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 151.

Northern part of the island, *Blain*, No. 38 (Millspaugh); in rich soil in low recently-cleared ground north of Nueva Gerona, May 8, 1910, *O. E. Jennings*, No. 145; near Nueva Gerona, March 11, 1904, *A. H. Curtiss*, No. 400. General Distribution: Western Cuba and the Isle of Pines.

733. ***Gnaphalium purpureum*** Linnæus. CUDWEED.

*Gnaphalium purpureum* LINNÆUS, Species Plantarum, 1753, p. 854.

Near Nueva Gerona, February 17, and March 7, 1904, *A. H. Curtiss*, No. 349. General Distribution: Maine to Kansas, Texas, Florida, Bermuda, the Isle of Pines, Jamaica, and Mexico. This is probably the basis for Urban's record for the Isle of Pines for *Gnaphalium indicum* Linnæus, but the blunt inner scales would seem to indicate *Gnaphalium purpureum*.

734. ***Pinillosia Berterii*** (Sprengel) Urban.

*Tetranthus Berterii* SPRENGEL, Systema Vegetabilium, III, 1826, p. 459.

*Pinillosia tetranthoides* P. DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, V, 1836, p. 528.

*Pinillosia Berterii* URBAN, Symbolle Antillanæ, V, 1907, p. 251.

Upper course of the Los Indios River, along the damp bank, May 18, 1910, *O. E. Jennings*, No. 654. General Distribution: Cuba, Santo Domingo, and the Isle of Pines.

735. **Heptanthus ranunculoides** Grisebach.

*Heptanthus ranunculoides* GRISEBACH, Catalogus Plantarum Cubensium, 1866, p. 148.

*Heptanthus cochlearifolius* WRIGHT, in Sauvalle, Flora Cubana, 1869, no. 1218, p. 79, in part.

Northern part of the island, *Blain*, No. 57 (Millsbaugh). General Distribution: Western Cuba and the Isle of Pines.

736. **Acanthospermum humile** (Swartz) DeCandolle.

*Melampodium humile* SWARTZ, Prodrumus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 114.

*Centrospermum humile* LESSING, Synopsis Generum Compositarum, 1832, p. 217.

*Acanthospermum humile* DECANDOLLE, Prodrumus Systematis Naturalis Regni Vegetabilis, V, 1836, p. 522.

Near Nueva Gerona, February 22, 1904, *A. H. Curtiss*, No. 361. General Distribution: Sandy shores and around seaports of southeastern U. S., the West Indies, and Central and South America.

737. **Parthenium Hysterophorus** Linnæus.

*Parthenium Hysterophorus* LINNÆUS, Species Plantarum, II, Ed. I, 1753, p. 988.

Near Nueva Gerona, May 22, 1904, *A. H. Curtiss*, No. 509; weed in roadway at Sante Fé, May 26, 1910, *O. E. Jennings*, No. 641. General Distribution: From the Bermudas and Florida southwards through the West Indies, and from Alabama and Texas through tropical continental America.

738. **Iva cheiranthifolia** Humboldt, Bonpland, & Kunth.

*Iva cheiranthifolia* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, IV, 1820, p. 276.

Along the coralline strand at Caleta Grande, South Coast, May 22, 1910, *O. E. Jennings*, No. 489. General Distribution: Cuba and the Isle of Pines.

739. **Ambrosia hispida** Pursh.

*Ambrosia hispida* PURSH, Flora Americæ Septentrionalis, 1814, p. 743.

*Ambrosia crithmifolia* DECANDOLLE, Prodrumus Systematis Naturalis Regni Vegetabilis, V, 1836, p. 525.

Reported for Pedernales Point, February 16, 1899, by *C. F. Millsbaugh* (*Field Columbian Museum, Botany*, II, 1900, p. 106. General Distribution: Florida, the West Indies, and Yucatan.

740. **Enydra sessilis** (Swartz) P. DeCandolle.

*Eclipta sessilis* SWARTZ, Prodomus Descriptionum Vegetabilium Indiæ Occidentalis, 1788, p. 114.

*Enydra sessilis* P. DECANDOLLE, Prodomus Systematis Naturalis Regni Vegetabilis, V, 1836, p. 637.

Near Nueva Gerona, May 1, 1904, *A. H. Curtiss*, No. 477; in low clearing north of Nueva Gerona, May 8, 1910, *O. E. Jennings*, No. 141. General Distribution: The Greater Antilles, Brazil, Uruguay, and Paraguay.

741. **Eclipta alba** (Linnæus) Hasskarl.

*Verbesina alba* LINNÆUS, Species Plantarum, II, Ed. I, 1753, p. 902.

*Eclipta erecta* LINNÆUS, Mantissa Plantarum, II, 1771, p. 286.

*Eclipta procumbens* MICHAUX, Flora Boreali-Americana, II, 1803, p. 129.

*Eclipta alba* HASSKARL, Plantæ Javanicæ Rariores, 1848, p. 528.

In black mucky soil at west base of Mt. Colombo, May 14, 1910, *O. E. Jennings*, No. 263. General Distribution: From the Bermudas, New York, and Nebraska, south through the West Indies and continental warmer parts of America; also in warmer parts of the Old World. This is a weedy plant, but it grows only in wet places.

742. **Isocarpha divaricata** Benth.

*Isocarpha divaricata* BENTHAM, Voyage of the "Sulphur" Round the World, Botany, 1844, p. 110, Pl. 41.

Near Nueva Gerona, December 19, 1903, *A. H. Curtiss*, No. 246. General Distribution: The Isle of Pines, Guatemala, Nicaragua, Colombia, and Peru.

743. **Borrichia arborescens** (Linnæus) P. DeCandolle.

*Buphthalmum arborescens* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1227.

*Borrichia arborescens* DECANDOLLE, Prodomus Systematis Naturalis Regni Vegetabilis, V, 1836, p. 489.

On strand at Bibijagua, May 7, 1910, *O. E. Jennings*, No. 114; on coralline strand at Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings*, No. 490. General Distribution: From Bermuda and southern Florida south through the West Indies, and in Yucatan.

744. **Wedelia trilobata** (Linnæus) Hitchcock.

*Silphium trilobatum* LINNÆUS, Systema Naturæ, II, Ed. X, 1759, p. 1233.

*Wedelia carnosa* L. C. RICHARD, Systema Vegetabilium, III, 1826, p. 581, excluding synonyms.

*Wedelia trilobata* HITCHCOCK, Report of the Missouri Botanical Garden, IV, 1893, p. 99.

*Stemmodontia trilobata* SMALL, Flora of the Southeastern U. S., 1903, p. 1262.

(For various other synonyms see Schultz, in Urban's *Symbolæ Antillanæ*, VII, 1911, pp. 96-97.)

Near Nueva Gerona, May 24, 1904, *A. H. Curtiss*, No. 512; in swampy place along river south of Nueva Gerona, May 12, 1910, *O. E. Jennings*, No. 207; near Nueva Gerona, June 10, 1912, *G. A. Link*. General Distribution: Widely distributed from the Bahamas and Florida through the West Indies, and from Honduras to Colombia.

**745. *Eleutheranthera ruderalis* (Swartz) Schultz.**

*Melampodium ruderale* SWARTZ, Flora Indiæ Occidentalis, III, 1806, p. 1372.

*Ogiera ruderalis* GRISEBACH, Memoirs of the American Academy of Arts and Sciences, VIII, 1862, p. 513.

*Eleutheranthera ruderalis* SCHULTZ, Botanische Zeitung, XXIV, 1866, pp. 165, 239.

Near Nueva Gerona, May 8, 1904, *A. H. Curtiss*, No. 488; on pine-barrens at Los Indios, May 19, 1910, *O. E. Jennings*, Nos. 393, 394 (flowers yellow). General Distribution: From the Bahamas south through the West Indies, and from Panama to Brazil.

**746. *Melanthera angustifolia* A. Richard.**

*Melanthera angustifolia* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, XI, 1850, p. 54.

Described by A. Richard from specimens from the Isle of Pines (*l. c.*), collected by A. H. Lanier; fragmentary specimen from low spot in savanna near Nueva Gerona, May 5, 1910, *O. E. Jennings*, No. 15. General Distribution: So far as known to the writer the species is known only from the Isle of Pines, but it is perhaps best regarded as a variety of the *Melanthera lanceolata* Benthams, reported from Florida, Mexico, and some of the West Indies.

**747. *Melanthera* sp.**

In swampy spot in savanna east of Nueva Gerona, May 6, 1910, *O. E. Jennings*, No. 48.

**748. *Bidens leucantha* (Linnæus) Willdenow.**

*Coreopsis leucantha* LINNÆUS, Species Plantarum, II, Ed. II, 1763, p. 1282.

*Bidens leucanthus* WILLDENOW, Species Plantarum, III, 1803, p. 1719.

*Bidens pilosus* var. *leucanthus* O. KUNTZE, Revisio Generum Plantarum, I, 1891, p. 322.



Near Caleta Grande, on coralline-limestone soil, May 22, 1910, *O. E. Jennings, No. 497*. General Distribution: From the Bermudas, Florida, and Mexico, south through tropical America.

749. ***Tridax procumbens*** Linnæus.

*Tridax procumbens* LINNÆUS, Species Plantarum, II, Ed. I, p. 900.

Creeping on sand at the upper edge of the strand north of Nueva Gerona, May 14, 1910, *O. E. Jennings, No. 252*. General Distribution: From Florida and Mexico south through the West Indies and tropical continental America to northern South America.

750. ***Flaveria linearis*** Lagasca.

*Flaveria linearis* LAGASCA, Genera et Species Plantarum Quæ aut Novæ Sunt aut Nondum Recte Cognoscuntur, 1816, p. 33.

*Flaveria maritima* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, IV, 1820, p. 285.

*Selloa nudata* NUTTALL, American Journal of Science, V, 1822, p. 300.

*Flaveria tenuifolia* NUTTALL, Journal of the Academy of Natural Sciences, Philadelphia, VII, 1834, p. 81.

*Gymnosperma nudatum* DECANDOLLE, Prodromus Systematis Naturalis Regni Vegetabilis, V, 1836, p. 312.

On coralline strand, Caleta Grande, "South Coast," May 22, 1910, *O. E. Jennings, No. 503*. General Distribution; Florida, the Bahamas, Cuba, the Isle of Pines, and Yucatan.

751. ***Helenium scaposum*** Britton.

*Helenium scaposum* BRITTON, Studies of West Indian Plants, VIII, Bulletin of the Torrey Botanical Club, XLIII, 1916, p. 469.

In white sand of the pine-barrens, Los Indios, May 19, 1910, *O. E. Jennings, No. 429*; type from near Sigüanea, *Britton & Wilson, 14346*, spring, 1916. General Distribution: In the white sand of the pine-barrens in the west-central part of the Isle of Pines.

752. ***Pectis elongata*** Humboldt, Bonpland, & Kunth.

*Pectis elongata* HUMBOLDT, BONPLAND, & KUNTH, Nova Genera et Species Plantarum, IV, 1820, p. 262, t. 392.

*Pectis floribunda* A. RICHARD, in Sagra, Historia Fisica, Politica y Natural de la Isla de Cuba, XI, 1850, p. 36.

*Pectis ciliaris* A. RICHARD, *l. c.*, not Linnæus.

*Pectis Plumieri* GRISEBACH, Flora of the British West Indian Islands, 1861, p. 378, excluding synonym Plumier.

*Pectis tenella* HITCHCOCK, Report Missouri Botanical Garden, IV, 1893, p. 101, not DeCandolle.

Near Nueva Gerona, December 14, 1903, *A. H. Curtiss*, No. 227. General Distribution: Cuba, the Isle of Pines, Haiti, Jamaica, and from Guatemala to Peru and Brazil.

753. **Pectis Swartziana** Lessing.

*Pectis Swartziana* LESSING, *Linnæa*, VI, 1831, p. 711, excluding synonym Swartz. *Pectis Bonplandiana* DECANDOLLE, *Prodromus Systematis Naturalis Regni Vegetabilis*, V, 1836, p. 99, in part.

*Pectis pratensis* C. WRIGHT, in Sauvalle, *Flora Cubana*, 1870, no. 1301, p. 81.

*Pectis linifolia* O. KUNTZE, *Revisio Generum Plantarum*, III, 1898, p. 166, not Linnæus.

Near Nueva Gerona, March 15, 1904, *A. H. Curtiss*, No. 413. General Distribution: Cuba, the Isle of Pines, Haiti, Jamaica, and from Mexico to Bolivia.

754. **Neurolæna lobata** (Linnæus) R. Brown.

*Conyza lobata* LINNÆUS, *Species Plantarum*, Ed. I, 1753, p. 862.

*Neurolæna lobata* R. BROWN, *Transactions of the Linnean Society of London*, XII, 1817, p. 120.

Near Nueva Gerona, March 13, 1904, *A. H. Curtiss*, No. 403. General Distribution: Widely distributed in the West Indies and from Mexico to Guiana and Ecuador.

755. **Erechtites hieracifolia** (Linnæus) Rafinesque. FIRE-WEED.

*Senecio hieracifolius* LINNÆUS, *Species Plantarum*, II, Ed. I, 1753, p. 866.

*Erechtites hieracifolia* RAFINESQUE, *Florula Ludoviciana*, ex DeCandolle, *Prodromus Systematis Naturalis Regni Vegetabilis*, VI, 1837, p. 294.

In an old field near Pedernales Point, February 16, 1899, *C. F. Millspaugh*, No. 1418; on white sand in the pine-barrens, Los Indios, May 17, 1910, *O. E. Jennings*, No. 322. General Distribution: In open woods, clearings, and burned-over places from Newfoundland and northwestern Canada south to Argentina.

756. **Emilia sonchifolia** (Linnæus) P. DeCandolle.

*Cacalia sonchifolia* LINNÆUS, *Species Plantarum*, II, Ed. I, 1753, p. 835.

*Senecio sonchifolius* MOENCH, *Supplementum ad Methodum*, etc., 1802, p. 231.

*Emilia sonchifolia* P. DECANDOLLE, *Prodromus Systematis Regni Vegetabilis*, VI, 1837, p. 302.

A weed in cultivated soil, Keenan's estate, Nueva Gerona, May 9, 1910, *O. E. Jennings*, No. 155. General Distribution: Tropics of both hemispheres; north in America as far as the Bahamas.

757. *Chaptalia dentata* (Linnæus) Cassini.

*Tussilago dentata* LINNÆUS, Species Plantarum, II, Ed. II, 1763, p. 1213.

*Chaptalia dentata* CASSINI, Dictionnaire des Sciences Naturelles, XXVI, 1803, p. 124.

*Tussilago albicans* SWARTZ, Flora Indiæ Occidentalis, III, 1806, p. 1348.

*Leria albicans* P. DECANDOLLE, Annales du Muséum d'Histoire Naturelle, Paris, XIX, 1812, p. 68.

In pine-barrens near the Majagua River, north of Los Indios, May 19, 1910, O. E. Jennings, No. 402. General Distribution: The Bahamas, Cuba, the Isle of Pines, Jamaica, Porto Rico, and Hispaniola.

EXPLANATION OF PLATES XVII-XXVIII.

PLATE XVII.

FIGS. A-D. *Kalmiella aggregata* Small. A, flowering branch natural size. B, flower.  $\times 3\frac{1}{2}$ . C, stamen.  $\times 3\frac{1}{2}$ . D, pistil.  $\times 3\frac{1}{2}$ .

FIGS. E-H. *Pæpalanthus alsinoides* var. *minimus* Jennings, var. nov. E, flowering branch natural size. F, flower and the subtending floral bract.  $\times 10\frac{1}{2}$ . G, outer bract of flower head.  $\times 14$ . H, hair from the flower.  $\times 85$ . All figures are from the type specimen.

PLATE XVIII.

*Epidendrum obcordatum* Jennings, sp. nov. Whole plant and one detached leaf, both  $\times \frac{5}{9}$ . Figured from the type specimen.

PLATE XIX.

*Epidendrum brevifolium* Jennings, sp. nov. Whole plant, with the upper parts of the two flowering branches detached and shown separately.  $\times \frac{5}{9}$ . Figured from the type specimen.

PLATE XX.

*Bauhinia caribæa* Jennings, sp. nov. Flowering branch with the pod nearly mature.  $\times \frac{8}{9}$ . Flower in its natural position and fully expanded.  $\times 3$ . Figured from the type specimen.

PLATE XXI.

*Acisanthera glandulifera* Jennings, sp. nov. Large and small plants.  $\times \frac{3}{4}$ . Flower.  $\times 2\frac{1}{2}$ . Expanded calyx, enclosing a ripe capsule.  $\times 4$ . Anther, showing the two long basal spurs.  $\times 5$ . Seed, showing the tuberculate, ridged, and glandular-punctate surface.  $\times 15$ . All figures are from the type specimens.

PLATE XXII.

*Tamonea tomentosa* var. *auriculata* Jennings, var. nov. Leaf with the tip restored according to the usual shape in the species.  $\times \frac{5}{9}$ . Flowering branch.  $\times \frac{5}{9}$ . Flower in fully expanded condition.  $\times 2\frac{1}{2}$ . Petal, showing irregular outline and stellate tomentum.  $\times 2\frac{1}{2}$ . Stamen.  $\times 2\frac{1}{2}$ . All figures are from the type specimen.

## PLATE XXIII.

*Tamonea androsæmifolia* (Grisebach) Jennings, comb. nov. Flowering branch.  $\times \frac{5}{8}$ . No. 321, O. E. Jennings. Los Indios, May 17, 1910.

## PLATE XXIV.

*Pachyanthus longifolius* Jennings, sp. nov. Flowering branch.  $\times \frac{5}{9}$ . Figured from the type specimen.

## PLATE XXV.

*Mesosphaerum hollandianum* Jennings, sp. nov. Whole plant.  $\times \frac{7}{16}$ . Flower fully expanded.  $\times 3\frac{3}{4}$ . Calyx, as it appears when the seeds are mature.  $\times 3\frac{3}{4}$ . Seed.  $\times 7\frac{1}{2}$ . Pollen grain, much magnified. All figures are from the type specimen.

## PLATE XXVI.

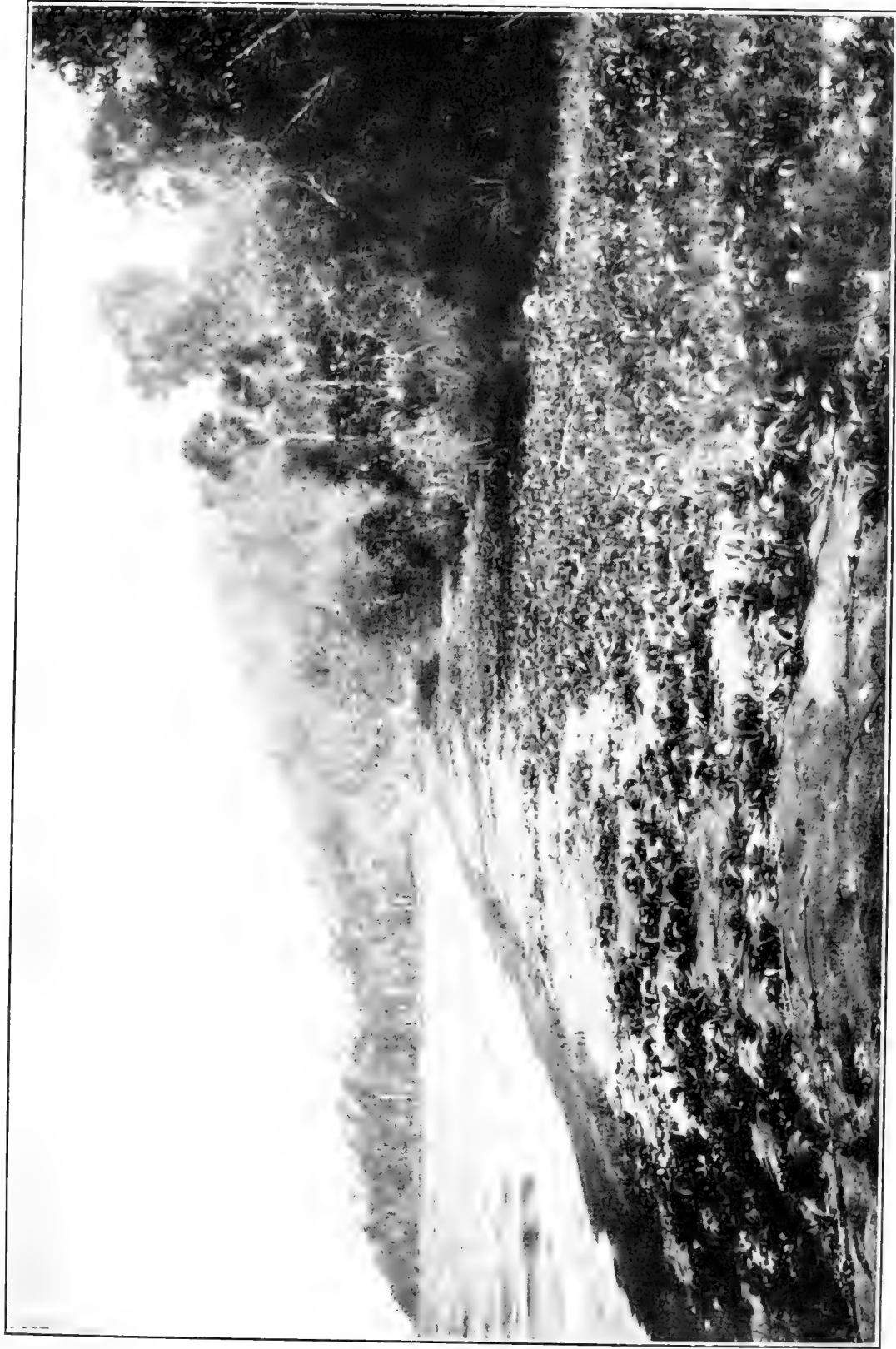
*Mesosphaerum capitellatum* Jennings, sp. nov. Flowering branch with the apical part broken over.  $\times \frac{9}{16}$ . Fully expanded flower.  $\times 6\frac{1}{3}$ . Calyx at the time when the seeds are mature.  $\times 6\frac{1}{3}$ . All figures are from the type specimen.

## PLATE XXVII.

*Gerardia pinetorum* Britton & Wilson. Flowering plant.  $\times 1\frac{1}{2}$ . Anther.  $\times 20$ . Pollen grain, much enlarged. All figures are from the type specimen.

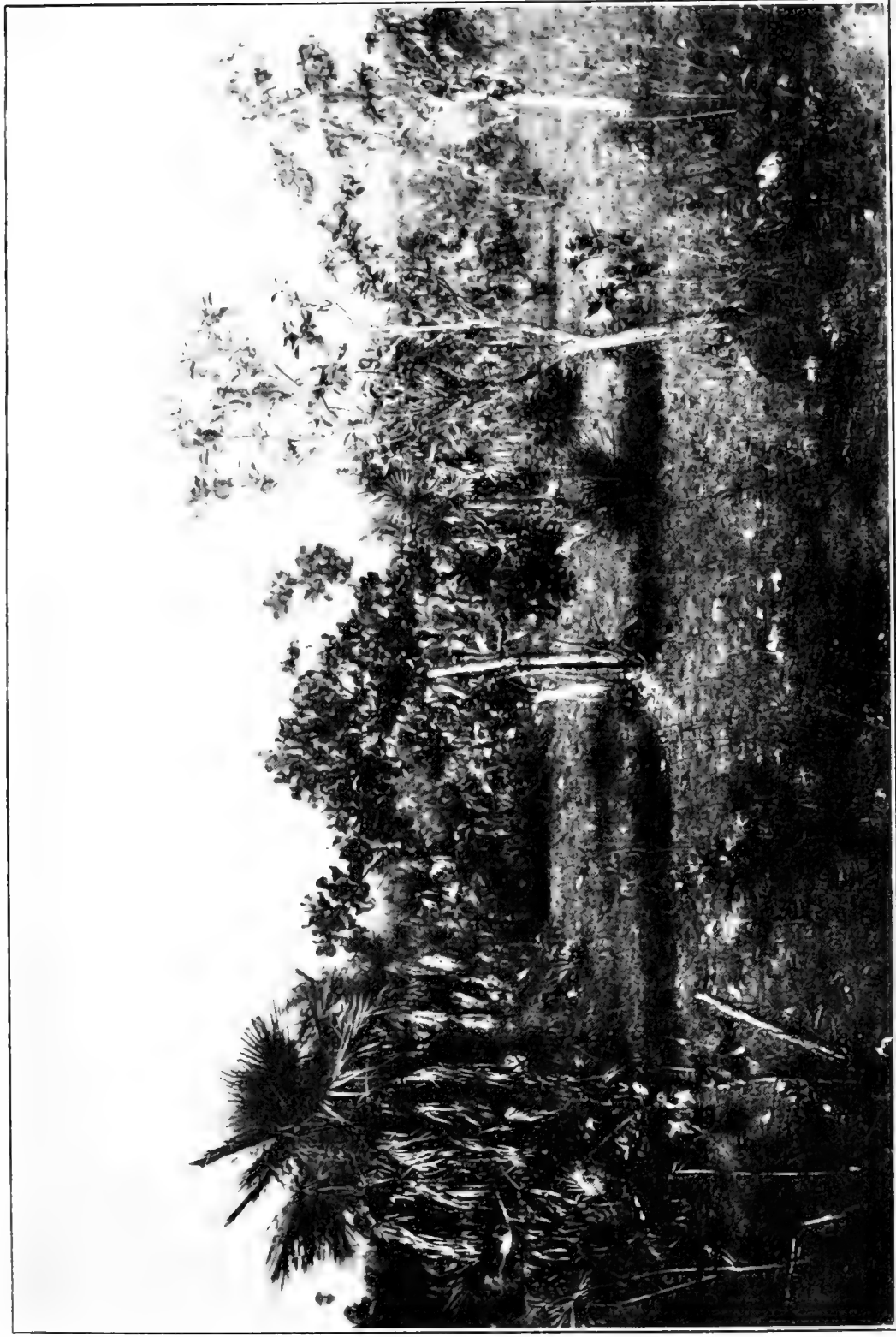
## PLATE XXVIII.

*Justicia diversifolia* Jennings, sp. nov. Flowering plant.  $\times \frac{3}{4}$ . Calyx and subtending bracts at the time of maturity of the seeds.  $\times 5$ . Corolla, as seen from above.  $\times 5$ . Pollen grain, much enlarged. All figures are from the type specimen.



*Ipomæa pes-caprae* on the strand at Bibijagua. Coconut palms back of strand in middle distance.  
Photograph by O. E. Jennings, May 7, 1910.





Savanna near Nueva Girona. Two shrubs in right foreground, *Brysonima crassifolia*; shrub in center, *Curatella americana*; in left foreground and in distance, *Acclorraphe Wrightii*. Photographed May 5, 1910.

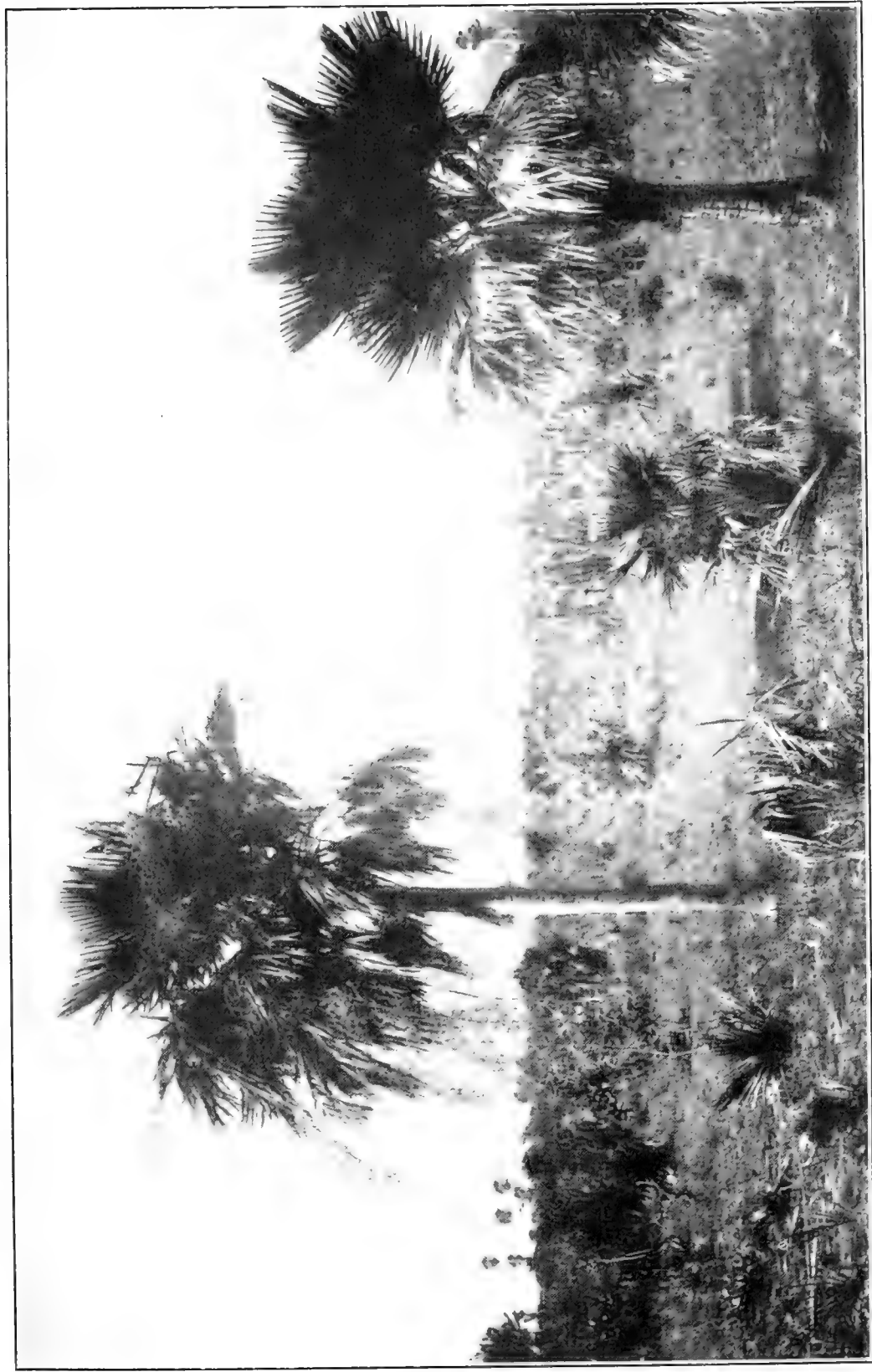






*Coccothrinax Miraguano*. Star Palm. Height about twenty feet.  
Near Nuevas River, north of McKinley; photographed May 16, 1910.

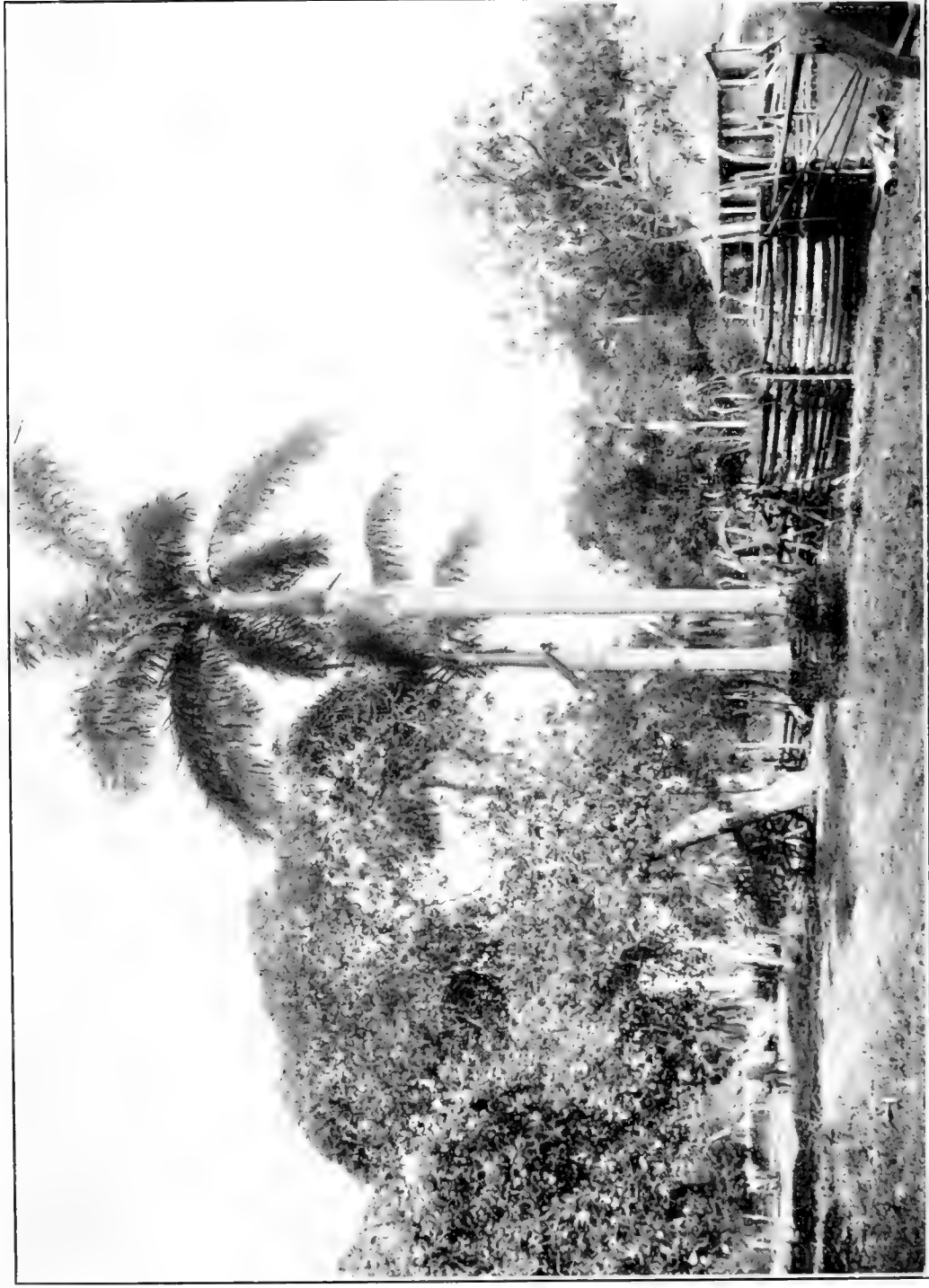




*Copernicia Curtisii*. In open savanna near Nueva Gerona; trees in background mainly *Acalorrapha Wrightii*.

Photographed by O. E. Jennings, May 5, 1910.





Royal Palm (*Roystonea regia*), about two miles east of Nueva Gerona. Cashew trees (*Anacardium occidentale*) in left foreground; India-rubber tree (*Ficus elastica*) near house. Photograph by O. E. Jennings, May 7, 1910.



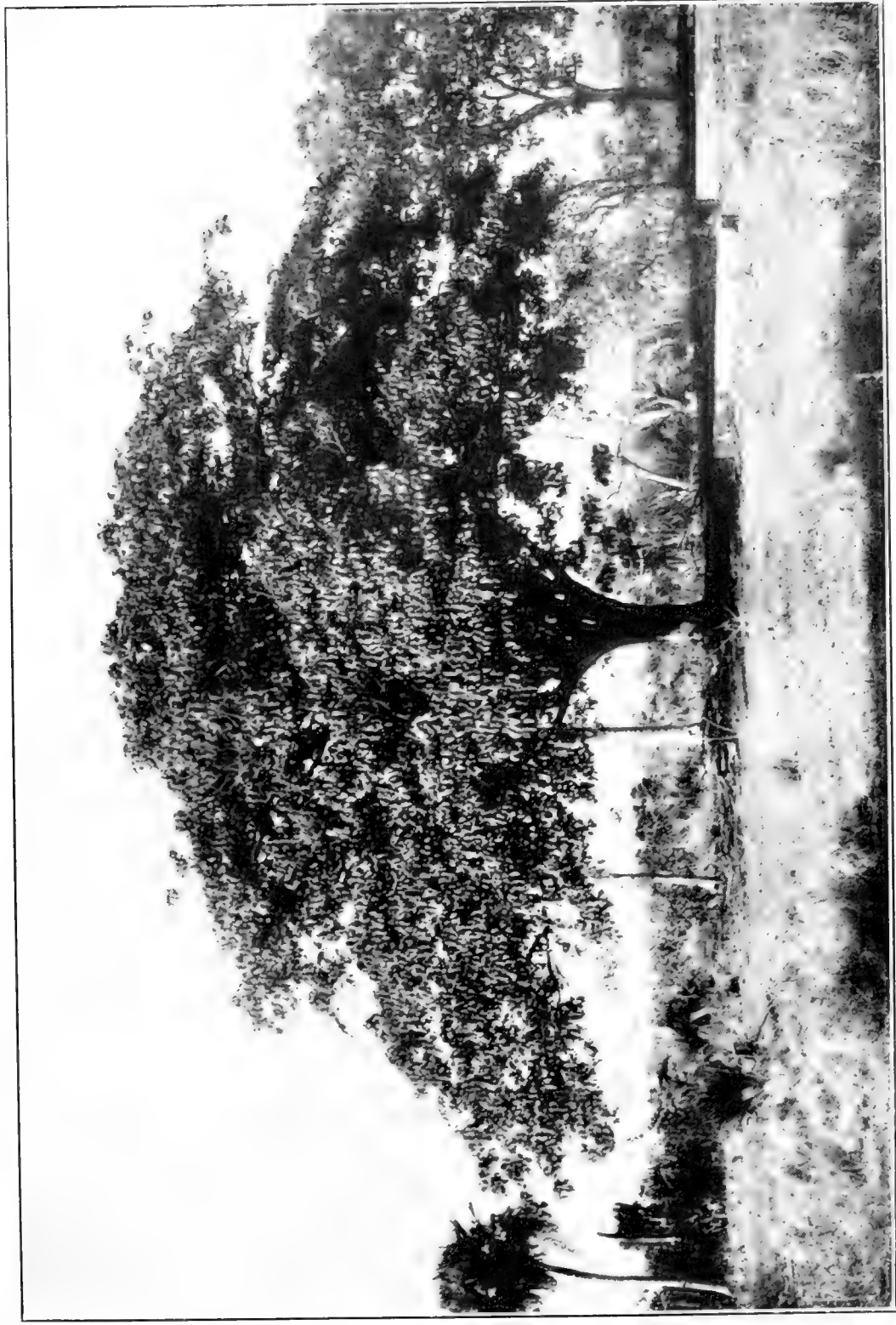


*Epidendrum brevifolium*, sp. nov., on stem of *Paurotis Wrightii*.

Photograph by O. E. Jennings, May 17, 1910, at Los Indios. Specimen No. 314.

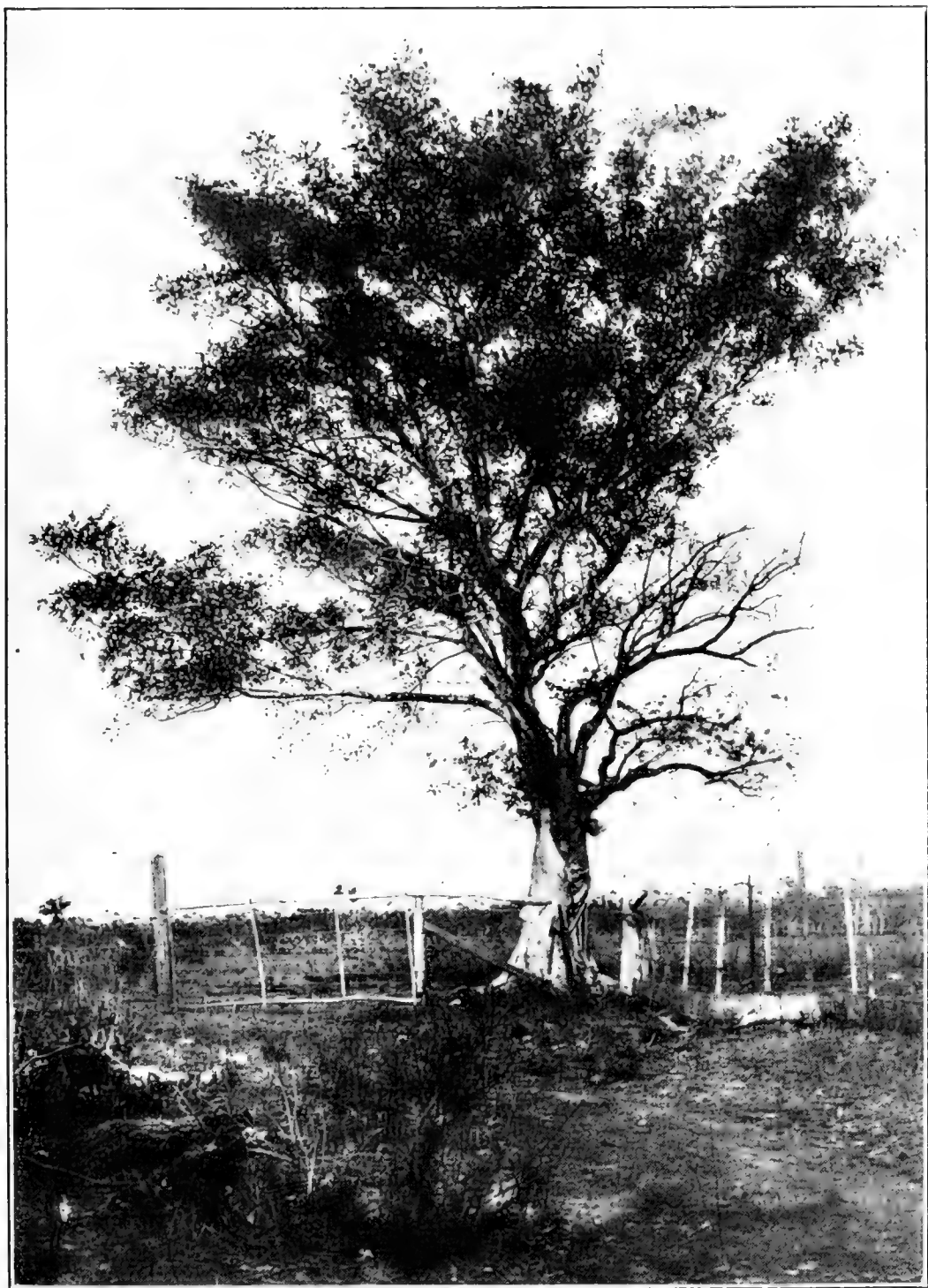






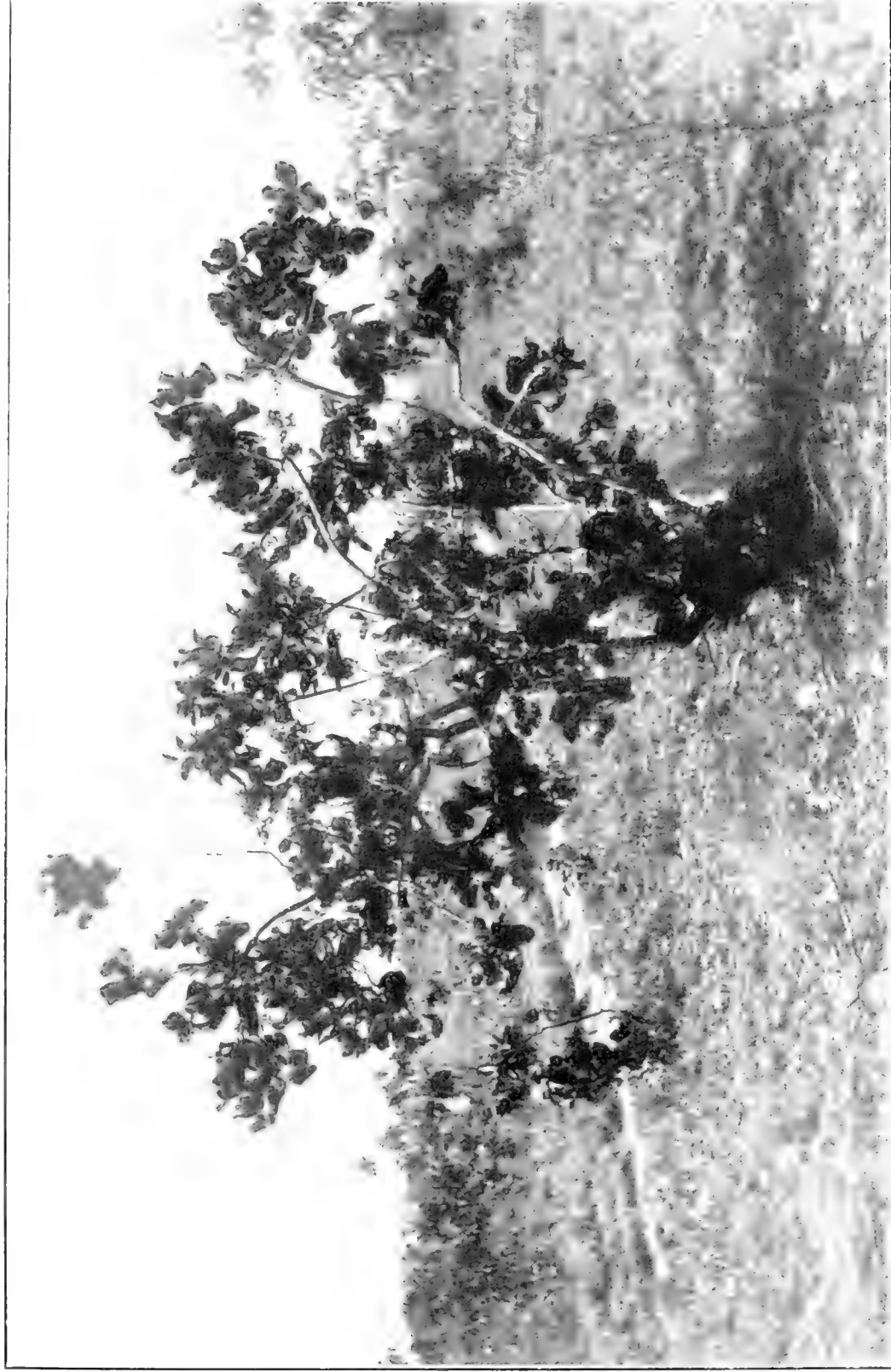
*Ficus nitida*, "Spanish Laurel." A large spreading tree north of Santa Fé.  
Photograph by O. E. Jennings, May 25, 1910.





A Strangling Fig (*Ficus aurea*) growing as a partial parasite on an isolated Ceiba Tree (*Bombax emarginata*). East base of Caballos Mts., May 9, 1910.





Sandpaper Tree (*Curatella americana*) on savanna near Nueva Gerona. Photograph by O. E. Jennings, May 5, 1910.



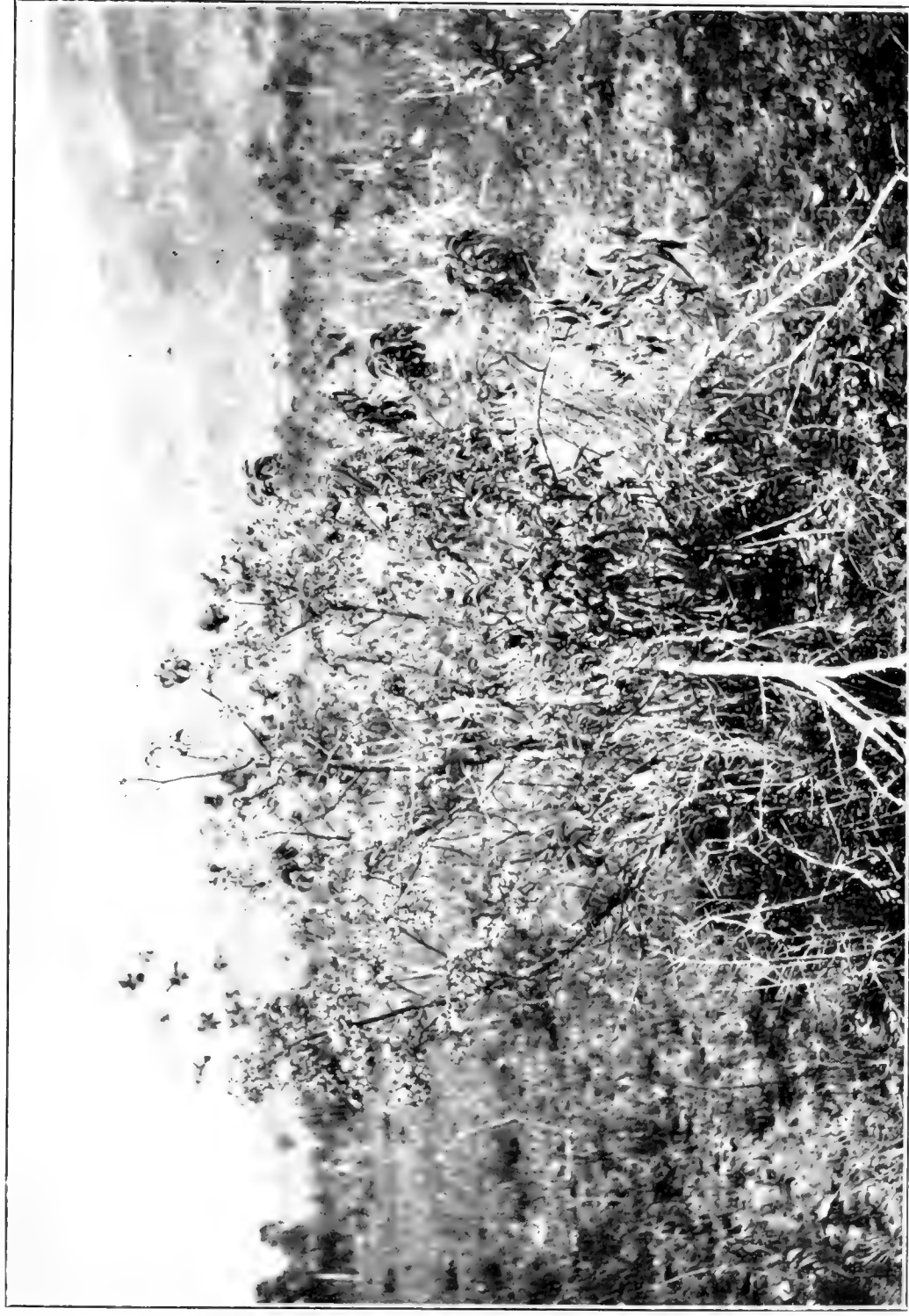


*Ouratea elliptica*, growing on white sand in the pine-barrens near Los Indios, O. E. Jennings, No. 325.

Photographed May 17, 1910.

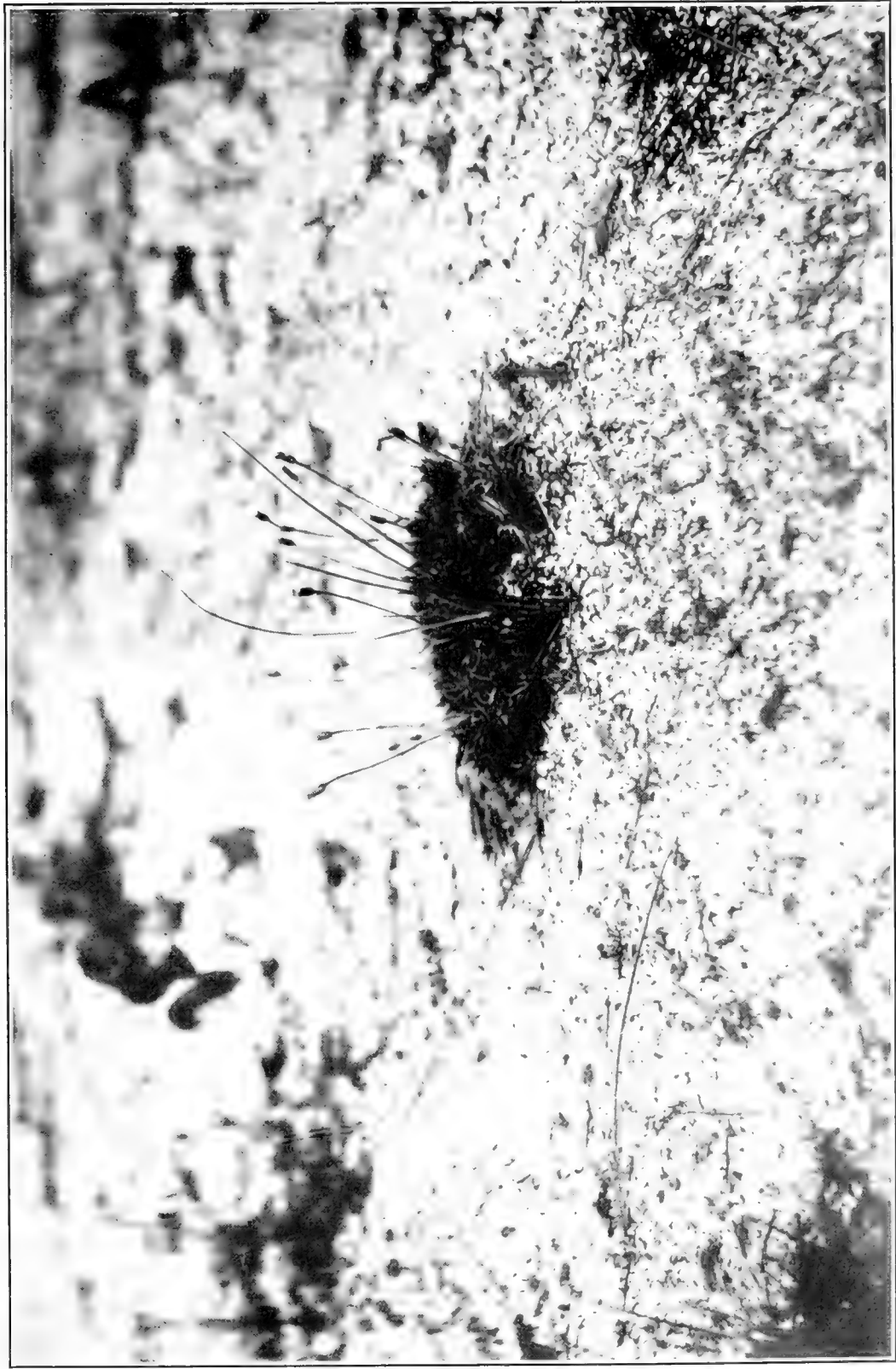






*Tetrazygia bicolor*, on the savanna near Nueva Gerona. Photographed May 5, 1910, by O. E. Jennings.





*Aster Grischachii*, on the white quartz gravel in the pine barrens near Los Indios.

Photographed by O. E. Jennings, May 17, 1910.



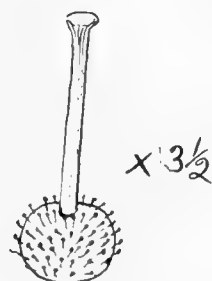


B



x 3 1/2

C



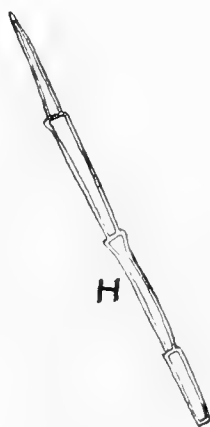
x 3 1/2

D



A

x 1



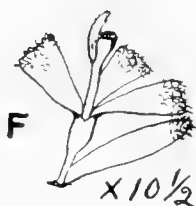
H

x 85



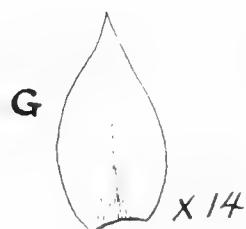
E

x 1



F

x 10 1/2



G

x 14

FIGS. A-D. *Kalmiella aggregata* Small.FIGS. E-H. *Pæpalanthus alsinoides* var. *minimus* Jennings, var. nov.

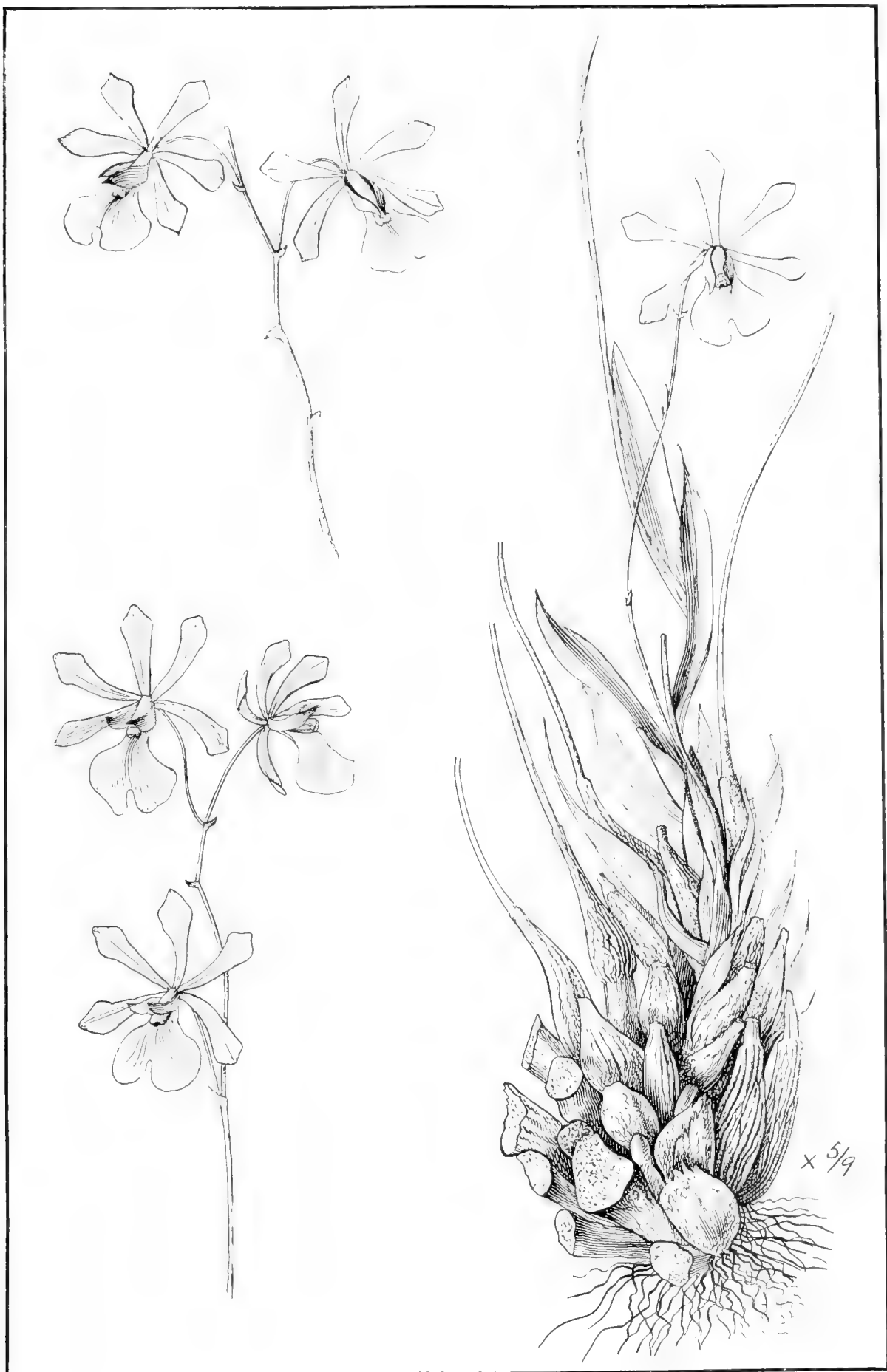




*Epidendrum obcordatum* Jennings, sp. nov.

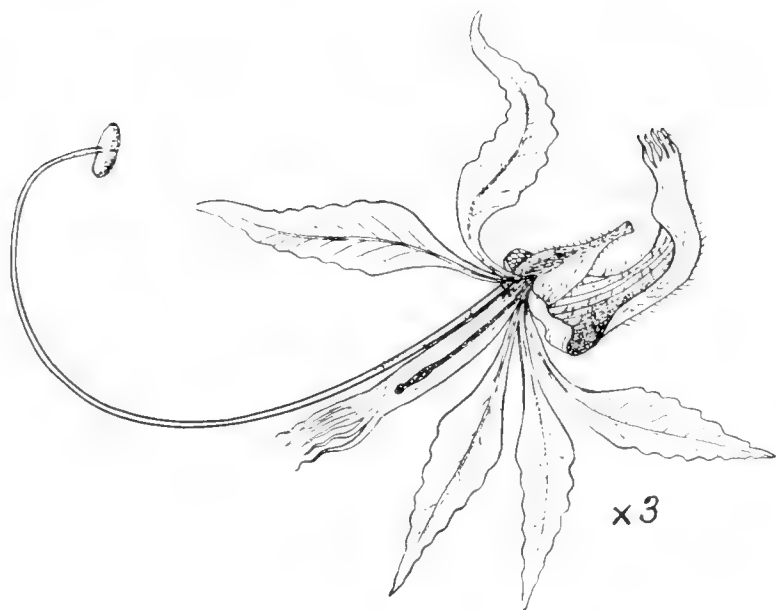






*Epidendrum brevifolium* Jennings, sp. nov.





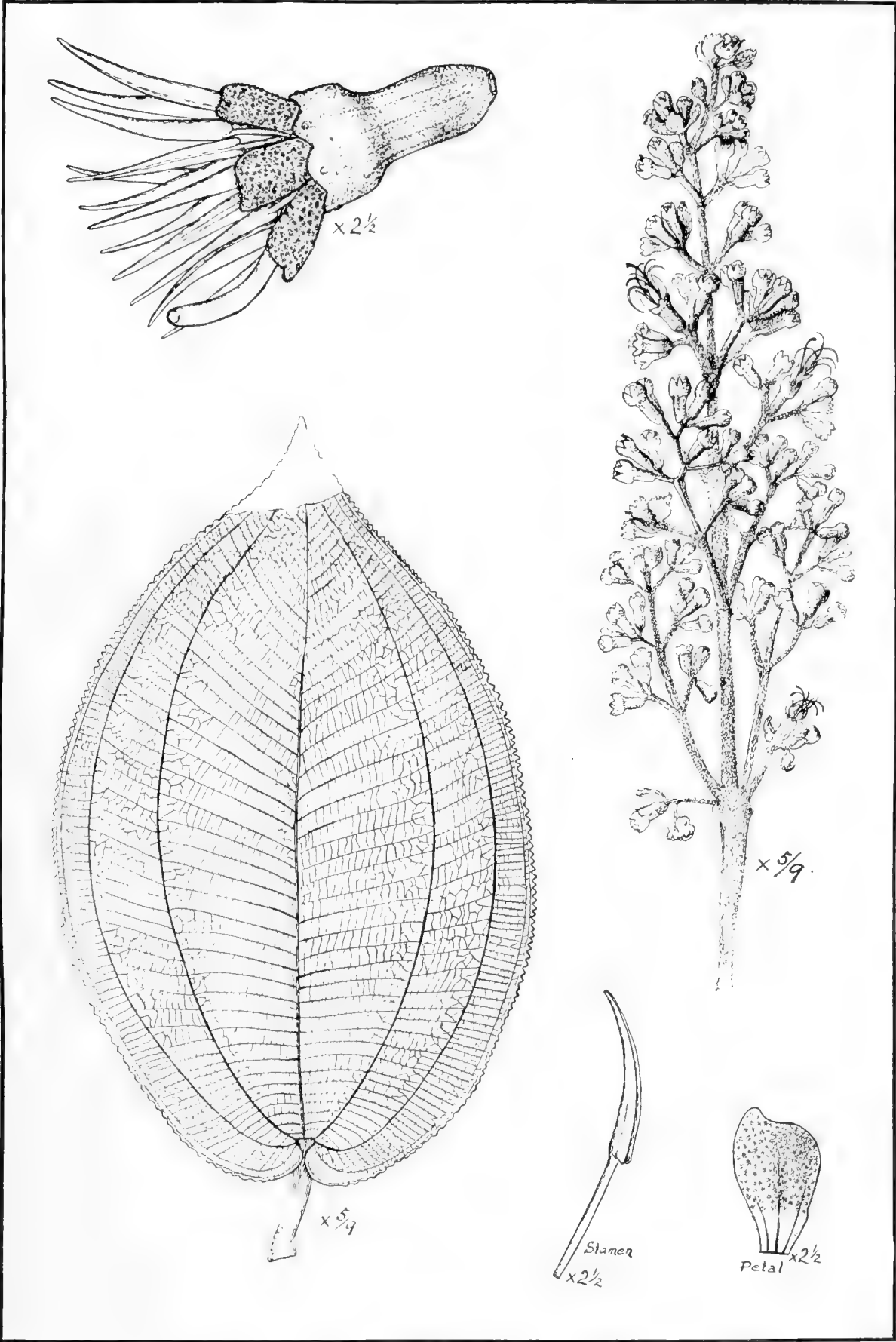
*Bauhinia caribaea* Jennings, sp. nov.





*Acisanthera glandulifera* Jennings, sp. nov.

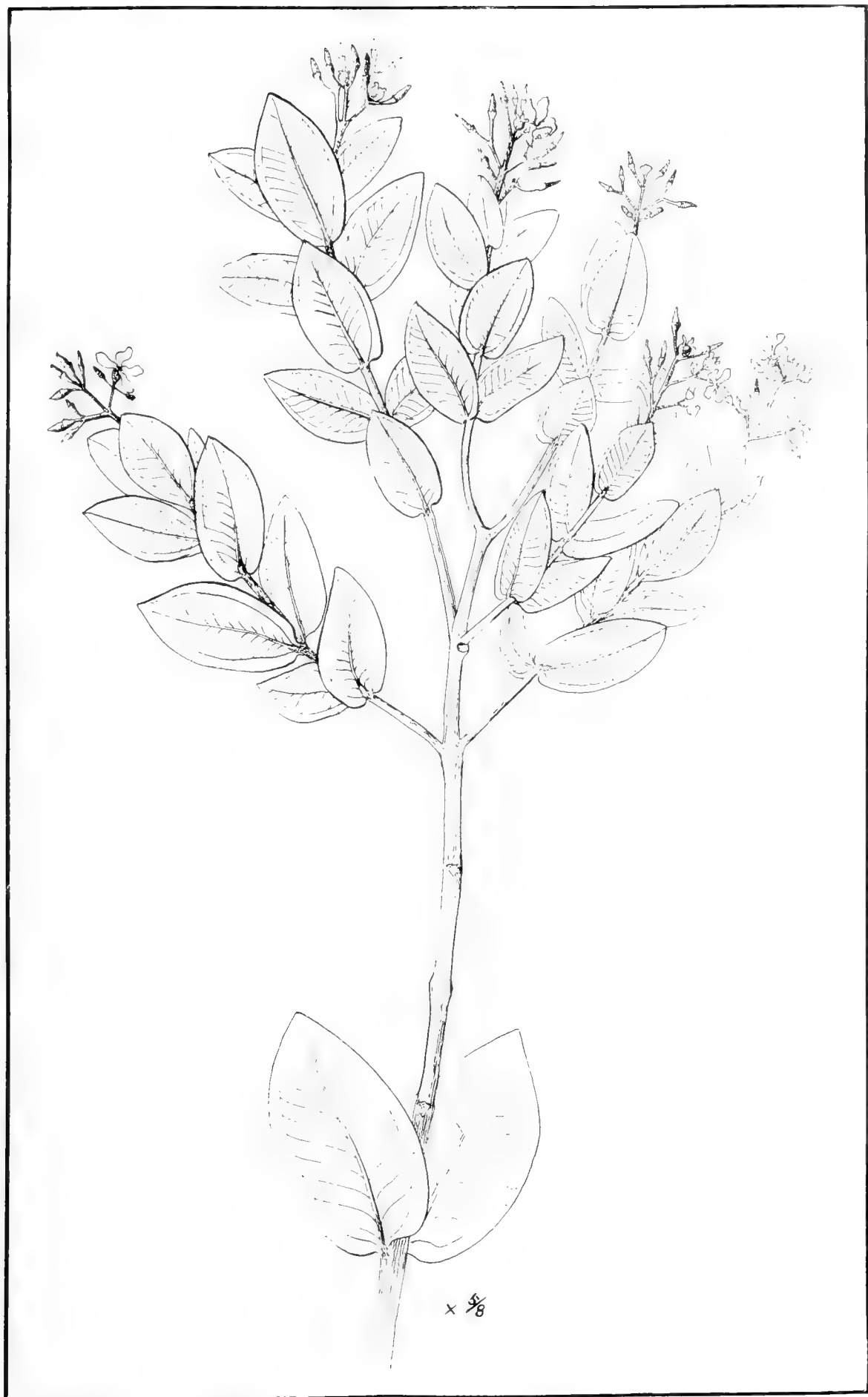




*Tamonea tomentosa* var. *auriculata* Jennings, var. nov.







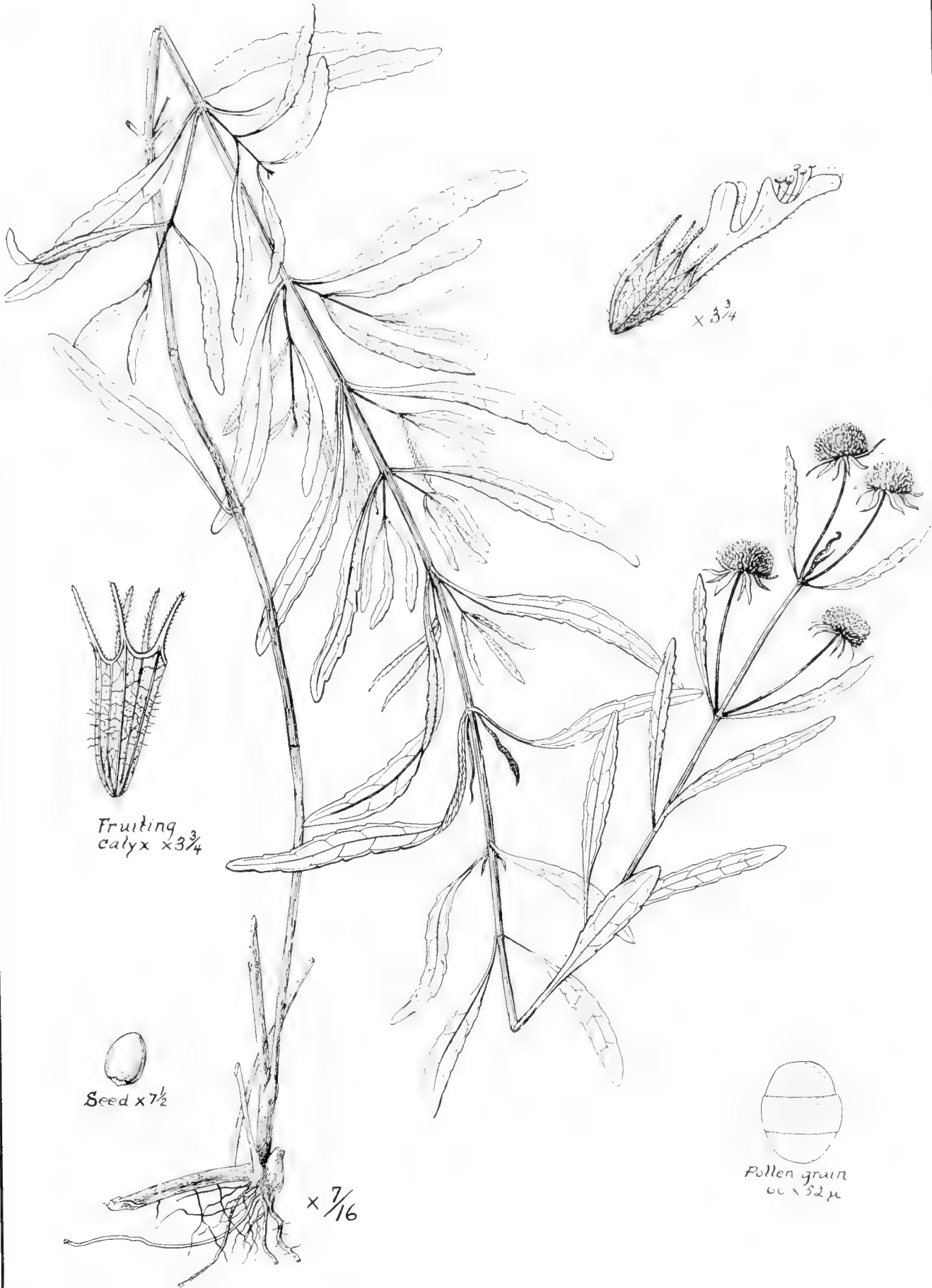
*Tamonea androsæmifolia* (Grisebach) Jennings, comb. nov.





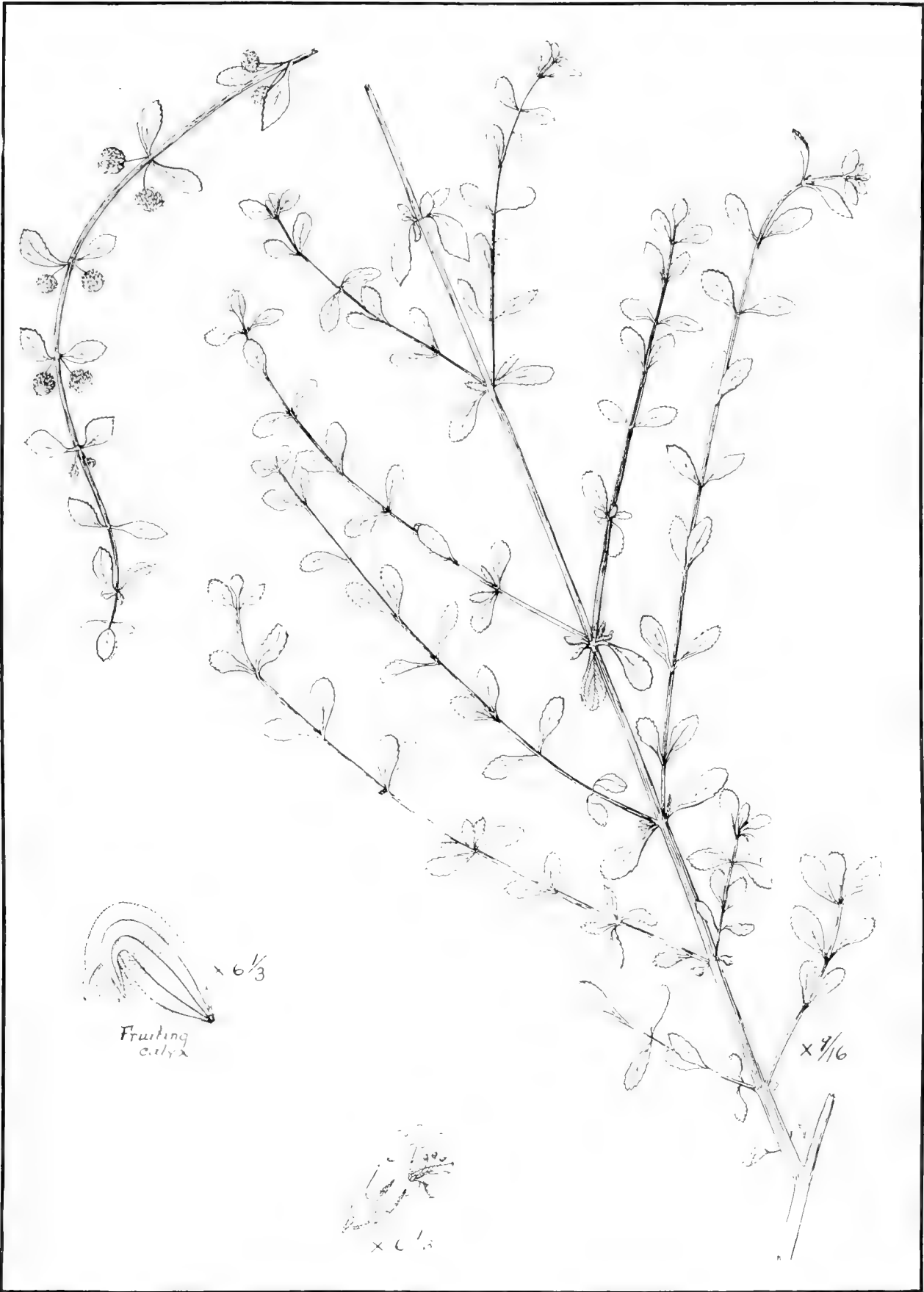
*Pachyanthus longifolius* Jennings, sp. nov.





*Mesosphærum Hollandianum* Jennings, sp. nov.

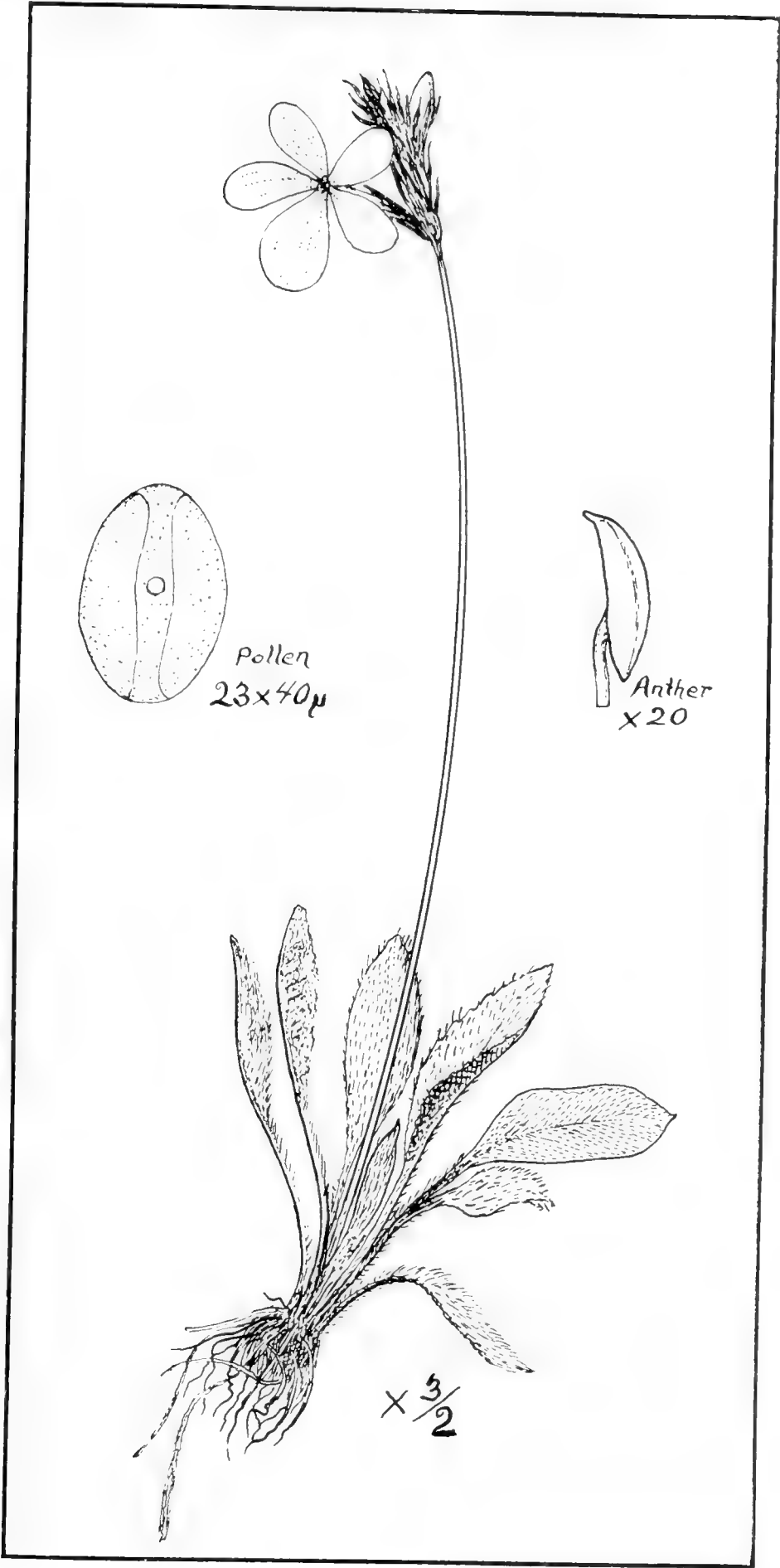




*Mesospharum capitellatum* Jennings, sp. nov.

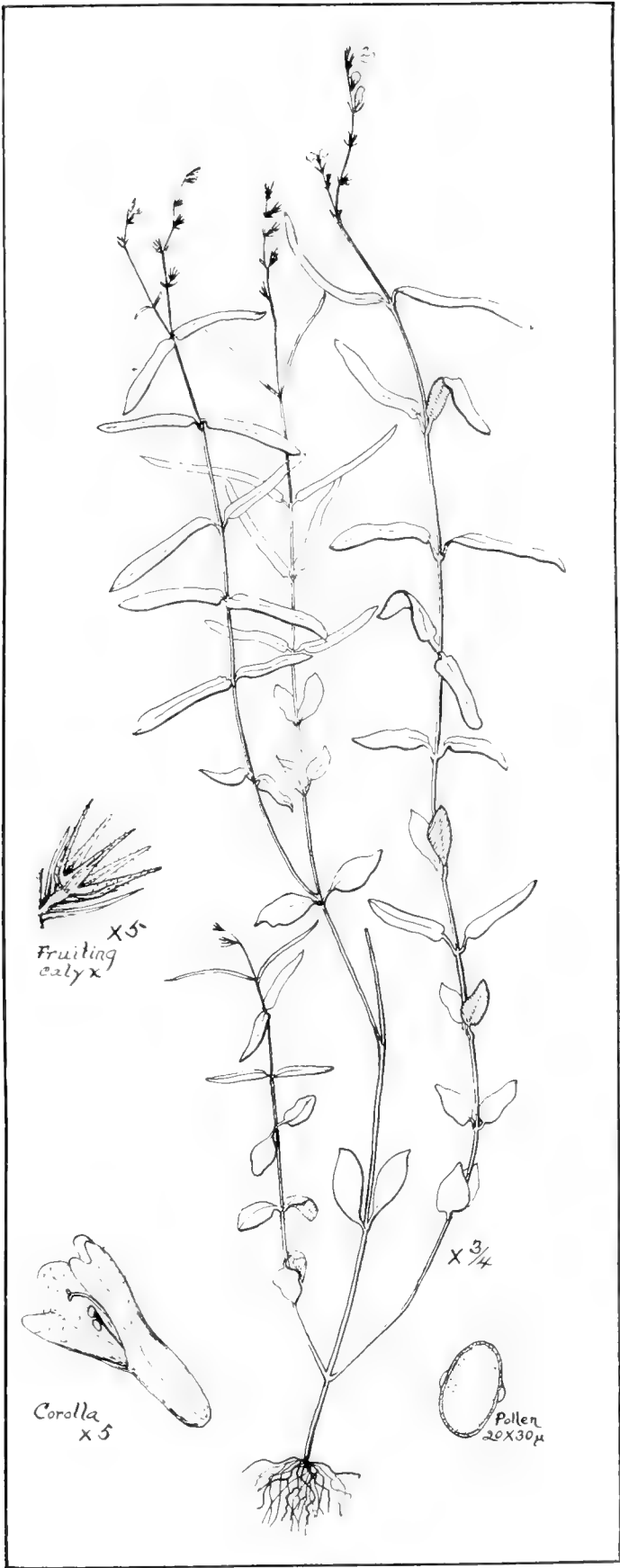






*Gerardia pinetorum* Britton & Wilson.





*Justicia diversifolia* Jennings, sp. nov.



III. LIST OF THE HYMENOPTERA COLLECTED ON THE  
ISLE OF PINES BY G. A. LINK, SR., 1912-1913,  
AND CONTAINED IN THE CARNEGIE MUSEUM.<sup>1</sup>

Family BRACONIDÆ.

Genus MICROBRACON Ashmead.

1. **Microbracon centralis** (Cresson).

Two specimens taken at Nueva Gerona, September, 1912.

2. **Microbracon exiguus** (Cresson).

Two examples caught at Nueva Gerona, September, 1912.

Genus CHELONUS Panzer.

3. **Chelonus insularis** Cresson.

Three examples captured at McKinley, July 24, 1912.

Family ICHNEUMONIDÆ.

Genus THYREODON Brullé.

4. **Thyreodon grandis** Cresson.

One specimen taken at Nueva Gerona, June 1, 1912.

Genus JOPPIDIUM Walsh.

5. **Joppidium** sp.?

One example taken at Los Indios, November, 1912. (May be new, but more material needed. *S. A. Rohwer.*)

Genus ANOMALON Panzer (*non auctorum*).

6. **Anomalon fuscatum** (Cresson).

One specimen taken at Columbia, August; six caught at Nueva Gerona, September 10, 1912.

<sup>1</sup> The hymenoptera brought back by Mr. Link were arranged and listed by the undersigned, who in some instances affixed determinations to them. They were then submitted to Mr. S. A. Rohwer, of the United States National Museum, who is today one of our leading authorities upon this group of insects. The determinations given in this list are to be credited to Mr. Rohwer, who, while refusing to accept the authorship of the list, did so much of the work that it does not seem proper that credit should be assumed by the writer.—*W. J. Holland.*

7. **Anomalon basale** (Cresson).

Three specimens captured at Nueva Gerona, September 12, 1912.  
(Very probably the same as *A. fuscatum*. S. A. Rohwer.)

## Genus ITOPLECTIS.

8. **Itoplectis** sp.?

One example taken at Nueva Gerona, September 10, 1912.

## Genus MESOSTENUS.

9. **Mesostenus** sp.?

A single individual taken at McKinley, July 24, 1912. (May be new. S. A. Rohwer.)

## Family CHALCIDIDÆ.

## Genus SPILOCHALCIS Thomson.

10. **Spilochalcis** sp.?

Three, Nueva Gerona, August 12, 1912.

11. **Spilochalcis** sp.

Two, Nueva Gerona, August 12.

12. **Spilochalcis** sp.

One, Nueva Gerona, July 25.

13. **Spilochalcis** sp.

One, Nueva Gerona, July 25, 1912.

14. **Spilochalcis flavopicta** (Cresson).

One, McKinley, July 24.

15. **Spilochalcis nigropicta** (Cresson).

Four specimens, taken at Nueva Gerona, September; and one caught at McKinley, July 24, 1912.

## Subfamily EUCHARINÆ.

## 16. Genus? sp.?

One taken at Nueva Gerona, September 11.

## Family FORMICIDÆ.

## Genus ATTA Fabricius

17. **Atta insularis** Guérin.

One worker taken at Los Indios, November.

## 18. Genus? sp.?

One specimen, Nueva Gerona, August 12, 1912.

## 19. Genus? sp.?

One example, Nueva Gerona, July 27, 1912.

## Family MUTILLIDÆ.

## Genus MUTILLA Linnæus.

20. **Mutilla nigriceps** Cresson(?).

Two specimens from Los Indios, one taken in October, the other in November. (These specimens were compared by Dr. Holland with the type, and considered by him as the same species. The description given by Cresson calls for fourth and following segments to have black pubescence. In these specimens the fourth and fifth have ochraceous pubescence, like the third, while the sixth has black pubescence. *S. A. Rohwer.*)

## Family TIPHIIDÆ.

## Genus TIPHIA Fabricius.

21. **Tiphia** sp.

One male caught at Nueva Gerona, August 12, 1912. (Probably represents a new species, but it is very unwise to describe new species in this genus from males only. *S. A. Rohwer.*)

## Family SCOLIIDÆ.

## Genus CAMPSOMERIS Guérin.

22. **Campsomeris trifasciata** (Fabricius).

Twenty-two specimens taken at Nueva Gerona from June to September.

23. **Campsomeris atrata**.

Seventeen specimens caught at Nueva Gerona in July.

## Family EUMENIDÆ.

## Genus EUMENES Latreille.

24. **Eumenes ferruginea** Cresson.

Four specimens taken at Nueva Gerona, July and August.

## Genus PACHYODYNERUS Saussure.

25. **Pachyodynerus simplicicornis** Saussure.

One captured at Nueva Gerona in June, and three taken at Los Indios in October and November.

## Family VESPIDÆ.

## Genus POLISTES Latreille.

26. **Polistes lineatus** (Fabricius).

Six examples, Nueva Gerona, June, July, and August.

27. **Polistes minor** (Palisot de Beauvois).

Eight specimens from Nueva Gerona and one from McKinley taken in July and August.

28. **Polistes carnifex** (Fabricius).

Twelve, Nueva Gerona, June, July, and August.

## Family CEROPALIDÆ.

## Genus PEPSIS Fabricius.

29. **Pepsis ruficornis** Fabricius.

Seven individuals, Nueva Gerona, June, July, and August.

30. **Pepsis ornata** Lepeletier de Saint Fargeau.

Sixteen specimens, Nueva Gerona, May to August.

31. **Pepsis marginata** Palisot de Beauvois.

Eight specimens, Nueva Gerona, May to August.

## Genus POMPILOIDES Radoszkowski.

32. **Pompiloides æneopurpurea** Fox.

One example, Nueva Gerona, August 12, 1912.

## Family PEMPHREDONIDÆ.

## Genus MIMESA Shuckard.

33. **Mimesa argentifrons** Cresson.

One male, Nueva Gerona, August 12; one male taken at McKinley, July 24, one male captured at Santa Fé, July 28, 1912.

## Family SPHECIDÆ.

## Genus SCELIPHRON Klug.

34. **Sceliphron cæmentarium** (Drury).

One specimen, Los Indios, November, 1912.

35. **Sceliphron fasciatum** Lepeletier de Saint Fargeau.

Three specimens, two taken at Nueva Gerona in June, and one at Los Indios in November, 1912.

## Genus SPHEX Linnæus.

36. **Sphex guerinii** Dalla Torre.

One, taken at Nueva Gerona, August 12, 1912.

## Genus PRIONONYX Dahlbom.

37. **Priononyx thomæ** (Fabricius).

One, Nueva Gerona, July 1, 1912.



Genus AMMOBIA Billberg.

38. **Ammobia auriflua** Perty.

Three, Nueva Gerona, June and July, 1912.

Family PHILANTHIDÆ.

Genus CERCERIS Latreille.

39. **Cerceris zonata** Cresson.

Four examples, the dates of capture ranging from July 25 to August 12, 1912.

Family BEMBECIDÆ.

Genus STICTIA Rossi.

40. **Stictia signata** (Linnæus).

Twenty-six specimens, all taken at Nueva Gerona, two on May 22, all the rest on July 1, 1912.

Family LARRIDÆ.

Genus TACHYTES Panzer.

41. **Tachytes argenteipes** Smith.

A specimen taken July 24 and another captured August 12 at Nueva Gerona.

Genus NOTOGONIDEA Rohwer.

42. **Notogonidea vinulenta** (Cresson).

Two examples, one female caught on September 10 at Nueva Gerona, the other, a male, taken at Los Indios in November.

Family TRYPOXYLIDÆ.

Genus TRYPOXYLON Latreille.

43. **Trypoxylon excavatum** Cresson.

One female taken at Los Indios in November.

Family HALICTIDÆ.

Genus AGAPOSTEMON Guérin.

44. **Agapostemon festivus** Cresson.

A specimen taken at McKinley July 24, and seven specimens taken at Nueva Gerona, August 12, 1912.

Genus AUGOCHLORA Smith.

45. **Augochlora elegans** Cresson.

A single individual captured at Nueva Gerona September 9.

## Family NOMADIDÆ.

## Genus NOMADA Fabricius.

46. *Nomada tibialis* Cresson.

Appears to be very near *N. tibialis* Cresson. *W. J. Holland.*

One specimen, Nueva Gerona, July 31, 1912. (The ground-color is slightly more intense than Cresson's description would indicate, but otherwise no differences are noted. *S. A. Rohwer.*)

## Family ANTHOPHORIDÆ.

## Genus EXOMALOPSIS Spinola.

47. *Exomalopsis globosa* (Fabricius).

Five specimens taken at Nueva Gerona in August and September.

48. *Exomalopsis pubescens* Cresson.

Two, one captured in August, the other in September, at Nueva Gerona.

49. *Exomalopsis pulchella* Cresson.

Four specimens taken at Nueva Gerona from July to September.

## Family MEGACHILIDÆ.

## Genus MEGACHILE Latreille.

50. *Megachile maura* Cresson.

Four, Nueva Gerona, July and August.

51. *Megachile poeyi* Guérin.

One specimen taken in July and one in September at Nueva Gerona.

52. *Megachile singularis* Cresson.

One male specimen, Nueva Gerona, July.

## Genus CÆLIOXYS Latreille.

53. *Cœlioxys rufipes* Guérin.

A single specimen, Nueva Gerona, May 31, 1912.

## Family XYLOCOPIDÆ.

## Genus XYLOCOPA Latreille.

54. *Xylocopa morio* (Fabricius).

Eleven specimens taken at Nueva Gerona, one in March, the others in July and August, and one specimen captured at Los Indios in September.

## Family APIDÆ.

## Genus APIS Linnæus.

55. *Apis mellifica* Linnæus.

Five taken at Nueva Gerona in July.

#### IV. SOME SPECIES OF FARLOWELLA.<sup>1</sup>

By C. H. EIGENMANN AND LOLA VANCE.

(PLATES XXIX-XXXI.)

FARLOWELLA Eigenmann & Eigenmann.

*Acestra* (non Dallas, 1852) KNER, Denksch. Akad. Wiss. Wien, 1853, p. 93.

*Farlowella* EIGENMANN & EIGENMANN, Proc. Cal. Acad. Sci. (2), 1889, p. 32 (*acus*).

Type, *Acestra acus* Kner. Body slender, snout produced into a long rostrum; no orbital notch; teeth numerous, setiform. Dorsal I, 6, opposite to anal. Anal I, 5; pectorals I, 5-6; ventrals I, 4-5. Vertebrae 5+7+23 (in *F. kneri*); ribs absent.

Range.—Paraguay, Amazon, Essequibo, Orinoco, and Magdalena river-systems.

The genus *Farlowella* was reviewed in Eigenmann & Eigenmann, "Occasional Papers of the California Academy of Sciences," Vol. I, 1890, pp. 355-358, and by Regan, "Transactions of the Zoölogical Society," London, Vol. XVII, part III, 1904, pp. 302-305. The most notable contribution since the last mentioned monograph is in Steindachner's paper describing the new species *nattereri*, *boliviana*, and *pseudogladolus* in the Annalen des K. K. Naturhistorischen Hofmuseums, Wien, 1910, pp. 403-406.

The known species of the genus *Farlowella* may be distinguished by the following key:

- a. Abdomen with a median series of plates between the lateral series.
- b. Length of produced part of snout (measured on the ventral surface from the edge of the naked area containing the mouth) two and one-quarter to three and one-quarter times in the distance from its tip to the anus.
- c. Distance from the supra-occipital to base of first dorsal ray six to six and four-tenths times in the total length.
- d. Diameter of eye eighteen times in the length of the head; length of postorbital part of head two and three-quarter times in that of the produced part of snout. . . . . 1. *gladius* (Boulenger).
- dd. Diameter of eye twelve and one-half times in the length of head; length of postorbital part of head three and three-quarter times in that of the produced part of snout. . . . . 2. *gracilis* Regan.

<sup>1</sup> Contributions from the Zoölogical Laboratory of Indiana University, No. 136.

- ddd.* Diameter of eye twelve times in the head to end of temporal plate; postorbital part of head three and one-half times in the snout.  
3. *hargreavesi* Eigenmann.
- dddd.* Diameter of eye thirteen and one-half times in the head; postorbital part of head two times in snout. . . . . 4. *nattereri* Steindachner.
- cc.* Distance from supra-occipital to base of first dorsal ray five and a quarter to five and a half times in the total length. Diameter of eye sixteen times in the length of the head.
- e.* Sides of snout concave; width of head three and a half to three and three-quarters in its length. . . . . 5. *oxyrhyncha* (Kner.)
- ee.* Head tapering regularly forward; width of head four and two-thirds times in its length. . . . . 6. *boliviana* Steindachner.
- ccc.* Distance from supra-occipital to base of first dorsal ray seven times in the total length; eye thirteen times in head; length of postorbital part of head two and seven-tenths times in the length of the produced part of snout. . . . . 7. *azygia* Eigenmann & Vance, *sp. nov.*
- cccc.* Distance from supra-occipital to base of first dorsal ray six and eight-tenths times in total length; eye twelve times in the head; length of post-orbital part of head two and a quarter times in the length of produced part of snout. . . . . 8. *smithi* Fowler.
- bb.* Length of produced part of snout three and seven-tenths to three and eight-tenths times in the distance from its tip to the anus; distance from supra-occipital to first dorsal ray five and a quarter times in the total length. . . . . 9. *kneri* (Steindachner).
- bbb.* Length of produced part of snout four and one-fifth times in the distance from its tip to the anus; distance from supra-occipital to first dorsal ray five and one-half times in the total length.  
10. *jauruënsis* Eigenmann & Vance, *sp. nov.*
- bbbb.* Length of produced part of snout about three and one-third times in the distance from its tip to the anus. Distance from supra-occipital to base of first dorsal ray six and one-fifth times in the total length.  
11. *hasemani* Eigenmann & Vance, *sp. nov.*
- aa.* Abdomen without median series of plates, except one or two anteriorly.
- f.* Length of produced part of snout four to four and one-half times in the distance from its tip to the anus. . . . . 12. *acus* (Kner).
- ff.* Length of produced part of snout three times in the distance from its tip to the anus. . . . . 13. *amazona* (Günther).
- fff.* Length of produced part of snout two and one-third to two and one-half times in the distance from its tip to the anus; eye sixteen to eighteen times in the head. . . . . 14. *gladiolus* (Günther).
- ffff.* Length of produced part of snout about two and one-half times in the distance from its tip to the anus; a median plate in front of the ventrals; eye thirty-two times in the head; interorbital eight times in the head.  
15. *pseudogladiolus* Steindachner.

1. *Farlowella oxyrhyncha* (Kner).

C. M. No. 3788, seven, 150–175 mm., San Joaquín, Sept. 5, 1909. Haseman.

C. M. No. 3789, one, 104 mm., Villa Hays, Paraguay, April 11, 1909. Haseman.

C. M. No. 3790, one, 98 mm., São Antonio, Rio Madeira, Nov. 3, 1909, Haseman.

C. M. No. 3791, one, 88 mm., Santarem, Dec. 15, 1909. Haseman.

C. M. No. 3792, one, 153 mm., Maciél, Rio Guaporé, July 30, 1909. Haseman.

Length of head to end of opercle three and four-fifths to four times in the length; distance between occipital and dorsal five and one-quarter to five and one-half in the length; width of head three and one-half to three and three-quarters in its length to end of opercle; interorbital four and three-quarters to five and one-fifth times in head; eye about fifteen times in the head; length of produced part of snout three to three and three-tenths in the distance from its tip to the anus; usually seven plates between the occipital and dorsal, rarely six (in one specimen); Regan gives the number of plates as eight.

2. *Farlowella azygia* Eigenmann & Vance, *sp. nov.* (Plate XXIX, figs. 1–2.)

C. M. No. 3782, type, 79 mm., Santarem. Haseman.

Head three and three-fifths in the length; width of head three and one-half in its length; eye thirteen times in head; interorbital six and one-half times in head; snout beyond naked area about mouth two and three-fifths in the distance from its tip to the anus, two and one-half times as long as the postorbital portion of the head; distance between supra-occipital and dorsal seven times in the length.

Sides of head without bristles; scutes 15+18, six between occipital and dorsal; abdomen with a median series of plates; outer caudal lobes produced, each lobe with a dark stripe; a dark streak from snout along sides to posterior part of body.

3. *Farlowella smithi* Fowler (Plate XXIX, figs. 3, 4).

*Farlowella smithi* Fowler, Proc. Acad. Nat. Sci. Phila., LXV, 1913 (1914), 574, fig. 24.

C. M. No. 3783, type, one, 64 mm. long, from Villa Bella, Brazil. Haseman.

One small specimen probably belonging here. D. I, 5; A. I, 5; P. I, 5; V. I, 4.

Head three and one-fifth in length; width of head three and one-half in its length; eye twelve times in head; interorbital six in head; snout beyond naked area about mouth two and seven-tenths in the distance from its tip to the anus, two and one-quarter times as long as the postorbital part of the head; distance between supra-occipital and dorsal six and four-fifth times in the length.

Sides of head without bristles; snout swollen and rounded at end. Scutes 15+18, seven between supra-occipital and dorsal; abdomen with a median series of plates.

#### 4. *Farlowella kneri* (Steindachner).

C. M. No. 3786, one, 130 mm., Caceres, May 23, 1909. Haseman.

C. M. No. 3787, two, 106-120 mm., Rio Jaura, June 3, 1909. Haseman.

Length of head to end of opercle from four to four and two-fifth times in the head; distance from occipital to dorsal five and one-fifth to five and one-third times in the length; width of head three and one-third times in its length, interorbital four and a half times; diameter of eye ten to thirteen times in head; length of produced part of snout three and three-quarters in the distance from its tip to the anus; seven or eight plates between the occipital and the dorsal; upper caudal lobe black, a narrow oblique black bar across the lower lobe beyond the tip of the middle rays.

#### 5. *Farlowella jauruënsis* Eigenmann & Vance, *sp. nov.* (Plate XXX, fig. 3.)

C. M. No. 3780, Type, 133 mm., Jaura, June 2, 1909. Haseman.

Head four times in the length; width of head two and three-fifths in its length; eye eleven times in the head; interorbital five times in head; snout beyond naked area about mouth four and one-fifth in the distance from its tip to the anus, one and one-half times as long as the postorbital portion of the head; distance between supraoccipital and dorsal five and one-half in the length; anterior margin of orbit raised, snout slightly enlarged and rounded at end; anterior part of head depressed laterally; sides of head with a few minute bristles; scutes 15+19, six between the occipital and dorsal; abdomen with a median series of plates; outer caudal rays greatly produced, each lobe with a

dark stripe; fin-rays with dark spots; a wide stripe of black from snout along sides to below the dorsal.

6. **Farlowella hasemani** Eigenmann & Vance, *sp. nov.* (Plate XXX, figs. 1, 2.)

C. M. No. 3781a, type, 165 mm.; 3781b paratype, 170 mm., Para. Haseman.

Head three and four-fifths in the length; width three and one-fifth in its length; eye fifteen times in head; interorbital five and one-quarter times in head; snout beyond naked area about mouth three and two-fifths in the distance between its tip and the anus, two and a third times as long as the postorbital portion of the head; distance between occipital and dorsal about six and one-fifth in the length.

Sides of head without bristles; scutes 15+19, six between occipital and dorsal; abdomen with a median series of plates; outer caudal rays much produced, each lobe with a longitudinal black stripe; fin-rays with dark spots; snout swollen and rounded at end, compressed near the end.

In the paratype the head is three and nine-tenths in the length; width of head three and one-quarter in its length; eye sixteen and one-half times in head; interorbital five and three-quarters times in head; snout beyond naked area about mouth three and one-quarter in the distance between its tip and the anus; distance between occipital and dorsal about six in the length; scutes 16+18.

7. **Farlowella acus** (Kner). (Plate XXXI, figs. 1-4.)

I. U. M., No. 13199, six, largest 158 mm., Barrigona, Rio Meta, eastern Colombia. Manuel Gonzales.

I. U. M., No. 13200, two, 77 and 84 mm. to base of caudal. Quebrada, Cramalote, Villa Vicencio, eastern Colombia. Gonzales.

I. U. M., No. 13252, one, 44 mm., Rio Fozco, alt. 4,500 feet, eastern Colombia. Gonzales.

Description of the specimen from Barrigona:

Length of head to end of opercle four and one-third to four and three-quarter times length; distance between occipital and dorsal five times in the length; width of head about three times in its length to end of opercle; interorbital four times in the head; eye thirteen to sixteen times in the length of the head to end of opercle; produced part of snout three and two-third times the distance between its tip and the

anus; eight plates between occiput and dorsal; central membranes of caudal hyaline, the rays spotted, outer rays prolonged, spotted, the first or first and second membrane within the lower ray and the two to five rays and membranes within the uppermost rays black, the black interrupted near the middle by a narrow extension of the median hyaline and with a few hyaline spots in the black distad to the median interruption; rays of all other fins spotted.

8. **Farlowella amazona** Günther.

C. M. No. 3784, one, 188 mm., Santarem, Dec. 6, 1909. J. D. Haseman.

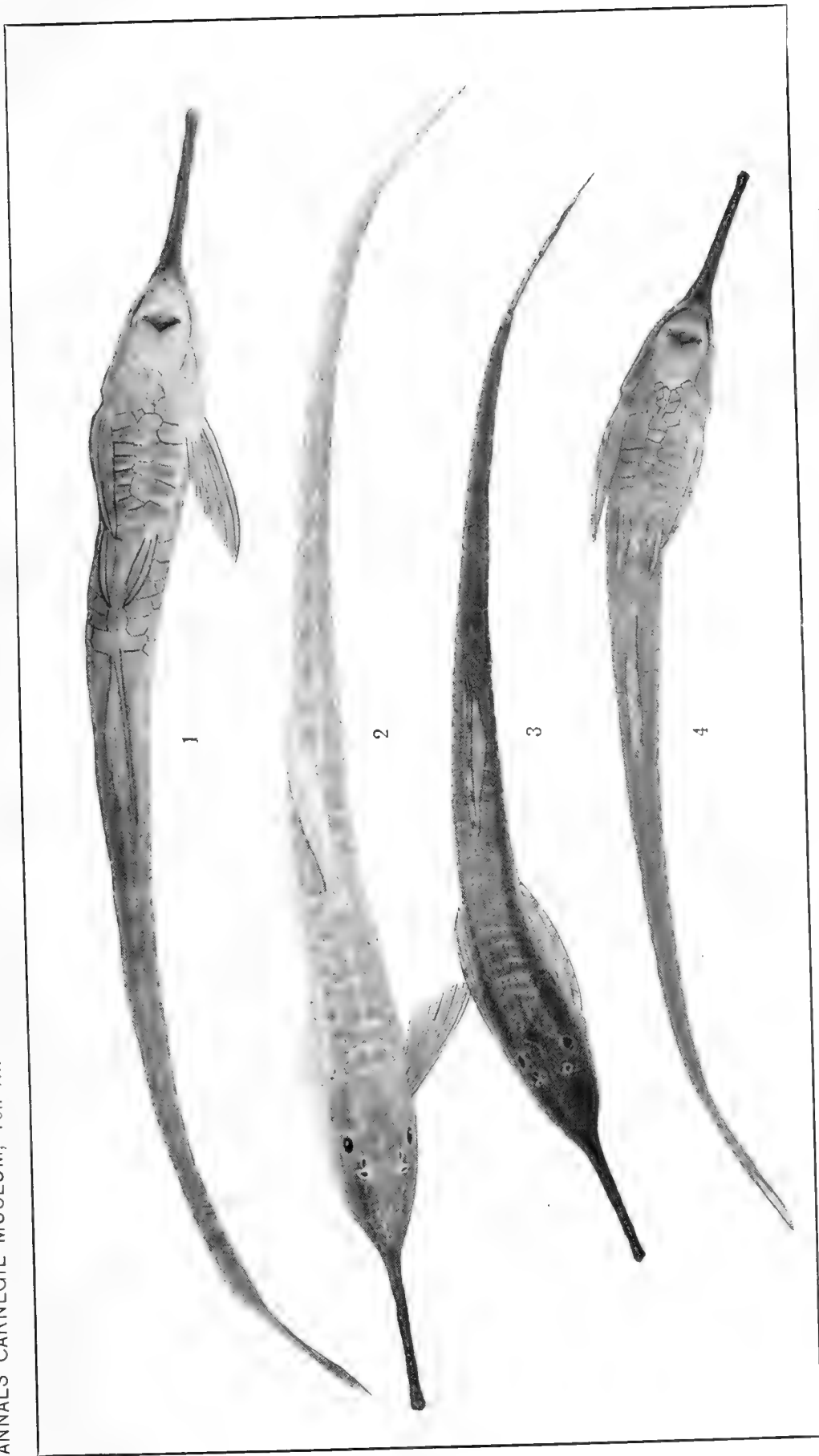
Head to end of opercle three and nine-tenths in the length; distance of occipital from dorsal six and one-fifth in the length; width of head four times in its length; diameter of eye sixteen times in head; interorbital a very little less than five times in the head; produced part of snout two and three-quarter times in the distance from tip of snout to anus; seven scutes between occipital and dorsal. Each caudal lobe with an interrupted dark stripe.

9. **Farlowella gladiolus** Günther.

C. M. No. 3755, two, 3755*a*, 141 mm., 3755*b*, 181 mm., Rio Tapajos, Dec. 6, 1909. Haseman.

Length of produced part of snout (from naked area about mouth to tip of snout) two and one-half times in the distance from the tip of snout to anus in 3755*a*, two and three-eighth times in 3755*b*; head to end of occipital three and one-third in the length in 3755*a*, two and two-fifth times in 3755*b*; head to end of opercle three and three-fifth times in the length in 3755*a*, three and two-fifth times in 3755*b*. Distance between occipital and dorsal six and one-fifth in both specimens; interorbital about one-sixth of length of head; seven plates between occipital and dorsal in 3755*a*, six in 3755*b*; a median plate in front of ventrals; eye eighteen times in length of head to end of opercle in 3755*b*, sixteen times in 3755*a*. Four series of plates between naked area of snout and the median plate between the pectorals; three plates in each series, not counting the marginal ones.





FIGS. 1-2. *Farlowella azygia* Eigenmann & Vance. Type, C. M. No. 3782, 79 mm., Santarem, Brazil.  
FIGS. 3-4. *F. smithi* Fowler. C. M. No. 3783, 64 mm., Villa Bella, Brazil.



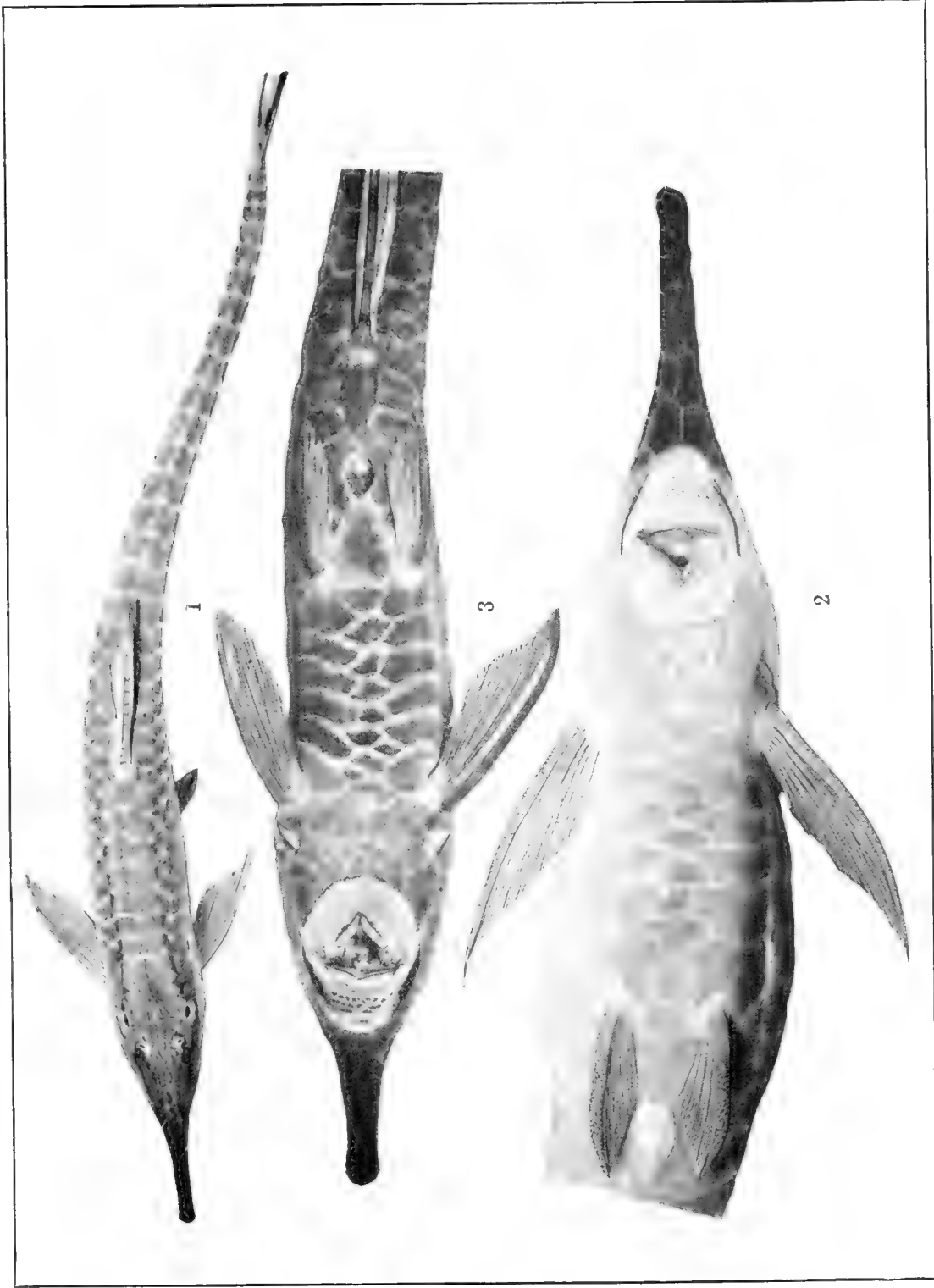
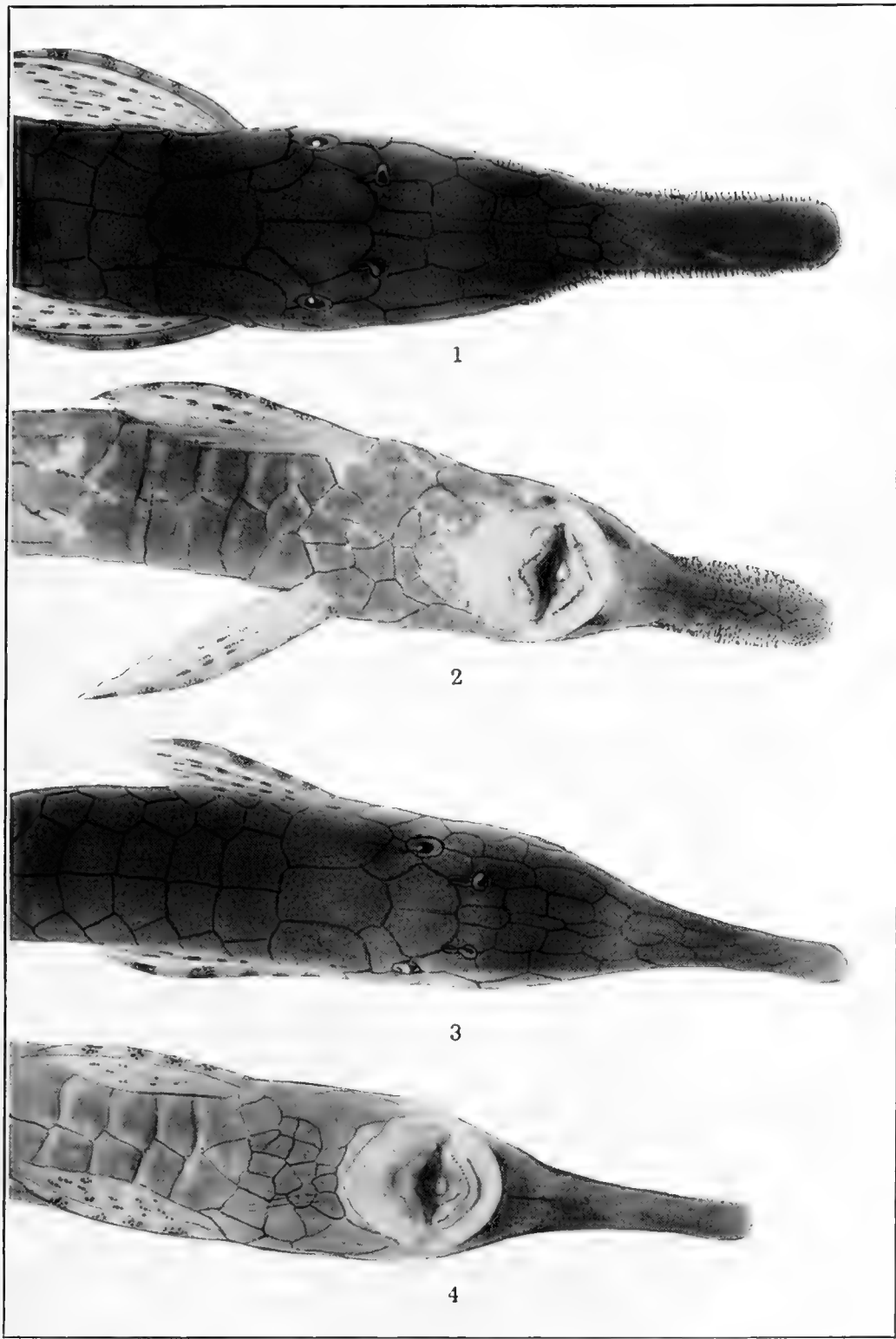


FIG. 1. *Farlowella hasemani* Eigenmann & Vance. Type, C. M. No. 3781a, 165 mm. FIG. 2. *Do.*, Paratype, C. M. No. 3781b, 170 mm. FIG. 3. *F. jauruensis* Eig. & Vance. Type, C. M. No. 3780, 133 mm.





FIGS. 1-2. *F. acus* (Kner), male. FIGS. 3-4. *Do.*, female.



EXPLANATION OF PLATES XXIX-XXXI.

PLATE XXIX.

FIGS. 1-2. *Farlowella azygia* Eigenmann & Vance. Type, C. M. No. 3782, 79 mm., Santarem, Brazil.

FIGS. 3-4. *F. smithi* Fowler. C. M. No. 3783, 64 mm., Villa Bella, Brazil.

PLATE XXX.

FIG. 1. *Farlowella hasemani* Eigenmann & Vance. Type, C. M. No. 3781a, 165 mm. FIG. 2, *Do.*, Paratype, C. M. No. 3781b, 170 mm. FIG. 3, *F. jauruënsis* Eigenmann & Vance. Type, C. M. No. 3780, 133 mm.

PLATE XXXI.

FIGS. 1-2. *F. acus* (Kner). Male. Figs. 3-4, *Do.*, female.

V. A LIST OF THE SOUTH AMERICAN LIZARDS OF THE  
CARNEGIE MUSEUM, WITH DESCRIPTIONS OF  
FOUR NEW SPECIES.

BY LAWRENCE EDMONDS GRIFFIN.

(PLATES XXXII-XXXV.)

The South American lizards in the Carnegie Museum, with few exceptions, have been derived from the collections of J. D. Haseman, H. H. Smith, and José Steinbach. Information of a general character in regard to these collections has been published in the *Memoirs of the Carnegie Museum*, Volume VII, 1916, page 163, *et seq.* It is quite characteristic of herpetological collections made in South America that a small one, such as that described in the following pages, should contain a number of rare and new species.

CLASS **REPTILIA.**

Subclass **DIAPSIDA.**

ORDER *SQUAMATA.*

Suborder *SAURIA.*

Family GECKONIDÆ Cope.

Genus GONATODES Fitzinger.

I. **Gonatodes hasemani** sp. nov. (Plate XXXII.)

Digits slender, basal phalanges cylindrical, with a few moderately enlarged plates beneath. Snout obtusely pointed, a little longer than the distance between the eye and the ear-opening, one and a half times the diameter of the orbit, equal to the width of the crown at the hinder edge of the orbit. Rostral nearly twice as broad as high, showing a trace of a median division, deeply incised behind; a small internasal on each side, separated by a smaller scale which enters the notch of the rostral. Nostril between the rostral, internasal, first labial, and two small scales. Six upper labials, the fifth below the center of the eye. Six lower labials, the last almost reaching a vertical



from the posterior margin of the eye. A well-developed spine projects from the middle of the supraciliary edge of the male specimens; it is not developed in the female. Mental very large, obtusely angulate behind, in contact with two rather small chin-shields. Two chin-shields only are present, in contact not only with the mental but also with the first lower labials. The scales back of the chin-shields diminish in size slightly toward the throat. The upper surface and sides of the body and the upper and lower surfaces of the fore limbs are covered by rather large, high, conical, pointed, granular scales, which are slightly smaller on the head than on the body. They are not larger on the snout than on the body, but are there more closely set, and somewhat imbricate. The scales of the abdomen and of the lower surfaces of the hind limbs are large, flat, hexagonal, and imbricate. The tail is cylindrical, tapering, covered on the dorsal and lateral surfaces by closely set, pointed, imbricate scales. The scales of the center of the lower surface of the tail are like those of the abdomen; there is a gradual transition from these to those of the sides of the tail. Only on the tail of the female specimen is there a central row of much enlarged scales. On this, the scales of the base and tip of the tail are as described, while those of the middle are broader, but only a few are broader than long, and some are twice as broad as long.

*Coloring of the Male (in Alcohol)* C. M. No. 1040: head and body dark brown above, light beneath, the color of the lower part of the side gradually fading to that of the ventral surface. A narrow light stripe on each side of the back, passing through the eye, to the base of the tail. Small light spots, covering five to eight scales, are arranged in about fourteen pairs in the dark dorsal band between the head and the base of the tail. A single row of conspicuous light spots lies near the top of the dark lateral band; others less conspicuous and regular are below these. The upper surface and sides of the head are irregularly mottled with brown and white. The tail is marked with alternate light and dark rings. The dark rings are much wider, darker, and more conspicuous on the lower than on the upper surface of the tail, except near the tip, where they are longer and alike on both surfaces. The upper sides of the limbs are spotted with brown on a light ground.

C. M. No. 1041: the dark bands of the body are much less distinct in this specimen, in its faded condition only a number of dark dorsal and lateral spots being conspicuous. Sufficient traces of the rest of

the coloration can be seen under the lens to show that it was identical with that of the specimen already described, except in depth of color.

*Coloring of the Female (in Alcohol)* C. M. No. 1042: no distinct color-pattern appears on the female specimen. The upper surface of the head, body, and tail is faintly lined and mottled with brown. Faint brown bands cross the upper surface of the tail. The lower surfaces are uniformly light in color.

There is a very narrow, indistinct, whitish, vertical streak in front of the fore limb of the female; no trace of this is visible in the males.

The centers of the upper and lower labials, in both sexes, are brown; the margins and sutures light.

Type, C. M. No. 1040; paratypes, C. M. Nos. 1041, 1042.

The specimens were collected by John D. Haseman on a rocky forested hill near the river Beni, in the neighborhood of Villa Bella, Bolivia, October 12, 1909. The species is named in honor of the collector.

#### MEASUREMENTS.

	C. M. 1040, mm.	C. M. 1041, mm.	C. M. 1042, mm.
Total length.....	64	54	55
Snout to vent.....	30	29	25
Vent to tip of tail.....	34	25	30
Length of head.....	9	7.7	8
Width of head.....	5.6	5.3	4.3
Snout to ear-opening.....	7.8	7	7
Length of fore limb.....	12	11	11
Length of hind limb.....	15	14	14

## 2. *Gonatodes humeralis* (Guichenot).

*Gymnodactylus humeralis* GUICHENOT, in Castelnau, Voy. Amér. Mér., Reptilia, 1855, p. 6, Pl. III, fig. 1.

*Gonatodes humeralis* BOULENGER, Cat. Lizards, I, 1885, p. 62.

This species is represented by a single male specimen, C. M. No. 1039, collected by Haseman on a rocky, forested hill near the river Beni, at Villa Bella, Bolivia.

The specimen is an almost uniform dark brown, with a light vertical band just in front of the fore limb, and a small dark spot immediately anterior to this band. The dark upper surface is finely vermiculated with darker brown, as Boulenger describes it. Haseman's note on the field-label says, "yellow band on head and yellow throat." The band across the head now appears as a narrow whitish band passing from

the back of one eye to the back of the other, curving behind the parietal region. The alternate dark and light bars of the tail are very indistinct; a light stripe runs along each side of the tail from base to tip.

Genus *GYMNODACTYLUS* Spix.

3. *Gymnodactylus geckoides* Spix.

*Gymnodactylus geckoides* SPIX, Spec. Nov. Lacert. Bras., 1825, p. 17, Pl. XVIII, fig. 1.

*Gymnodactylus geckoides* BOULENGER, Cat. Lizards, I, 1885, p. 39.

The collection contains two male specimens, C. M. Nos. 947 and 948, secured by Haseman at Queimadas, and Bom Jesus de Lapa, Bahia, Brazil, respectively.

Genus *HEMIDACTYLUS* Cuvier.

4. *Hemidactylus mabouia* Moreau de Jonnés.

*Gecko mabouia* MOREAU DE JONNÉS, Bull. Soc. Philom., 1818, p. 138.

*Hemidactylus mabouia* BOULENGER, Cat. Lizards, I, 1885, p. 122.

A young female specimen, C. M. No. 935, was collected by Haseman at Barra de Penedo, Alagôas, Brazil. An adult female, C. M. No. 964, was secured by the same collector at Santerem, Brazil.

Genus *PHYLLOPEZUS* Peters.

5. *Phyllopezus goyazensis* Peters.

*Phyllopezus goyazensis* PETERS, Mon. Berl. Ac., 1877, p. 415.

*Phyllopezus goyazensis* BOULENGER, Cat. Lizards, I, 1885, p. 145.

Specimen, C. M. No. 946, was collected by Haseman at São João del Rey, Minas Geraes, Brazil. C. M. No. 956 was collected at Puerto Suarez, Bolivia, by José Steinbach.

Some characters of C. M. No. 946 are worth noting. A narrow dark brown stripe passes through each eye from the snout to the shoulder. On each side of the back are narrow brown cross-bars, bordered posteriorly with white. On the tail the bars cross the back and are broader. The scales of the dorsal surface of the tail are smaller than those of the abdomen. Neither of the anterior chinshields is as large as the mental. The posterior chin-shields are all smaller than the anterior, the central one being divided into two, one in front of the other.

The dark lateral stripe of No. 956 passes along the side of the back to the sacrum. On the back between the lateral stripes are two rows of elongated dark spots, resembling interrupted stripes. On the top of the head and back of the tail are a few dark spots.

Genus *THECADACTYLUS* Cuvier.6. *Thecadactylus rapicaudus* (Houttuyn).

*Gecko rapicauda* HOUTTUYN, Verh. Genotsch. Vlissing, IX, p. 322, Pl. III, fig. 1.

*Thecadactylus rapicaudus* BOULENGER, Cat. Lizards, I, 1885, p. 111.

The collection contains but three specimens of this lizard.

C. M. No. 940, ♂, Bonda, Colombia, H. H. Smith.

C. M. No. 941, ♀, Bonda, Colombia, H. H. Smith.

C. M. No. 953, ♂, South America, Le Boutelier.

## Family IGUANIDÆ Gray.

Genus *ANOLIS* Daudin.7. *Anolis nitens* (Wagler).

*Draconura nitens* WAGLER, Syst. Amph., 1830, p. 149.

*Anolis nitens* BOULENGER, Cat. Lizards, II, 1885, p. 91.

The specimen referred to this species, C. M. No. 949, was collected by Haseman at Riberao Azul, Matto of Tieté, São Paulo, Brazil. The identification is somewhat doubtful, as the specimen is not in the best of condition, but it agrees well with the description of *Anolis nitens* in all major characters.

8. *Anolis punctatus* Daudin.

*Anolis punctatus* DAUDIN, Rept., IV, 1804, p. 84, Pl. XLVIII, fig. 2.

*Anolis punctatus* BOULENGER, Cat. Lizards, II, 1885, p. 57.

This species is represented by a single male specimen, C. M. No. 967, collected by Steinbach, in the Department of Santa Cruz de la Sierra, Bolivia.

9. *Anolis rosenbergi* Boulenger.

*Anolis rosenbergii* BOULENGER, Ann. Mag. Nat. Hist. (6), XVII, 1896, p. 16.

A single male specimen which agrees with Boulenger's description, C. M. No. 939, was collected by Smith in Colombia.

10. *Anolis steinbachi* sp. nov. (Plate XXXIII.)

Tail cylindrical, no dorsal crest; length of the tibia less than the distance from the tip of the snout to the ear-opening; head about once and a quarter as long as the tibia, once and three-fourths as long as wide; forehead slightly concave; frontal ridges low and broad; all the head-scales strongly keeled, those of the snout bi- or tri-carinate; scales of the supra-orbital semicircles large, separated by one or two series of scales; two or three rows of enlarged supra-oculars (six to

eight in all), those of the median row much larger than the others, separated from the supra-orbital row by a series of smaller scales; occipital larger than the ear-opening, separated from the supra-orbital row by two series of scales; canthus rostralis sharp, three canthal scales; six series of keeled loreal scales; seven longitudinally keeled upper labials to below the center of the eye; ear-opening small, oval, very oblique.

Gular appendage of male well-developed, of female, scarcely noticeable; gular scales keeled. Body slightly compressed, short; no dorso-nuchal fold. Dorsal scales much smaller than the ventrals, strongly keeled, subimbricate, hexagonal, passing gradually into the small scales of the sides of the body; lateral scales very small, keeled, subimbricate, not granular; ventral scales large, imbricate, strongly keeled, terminating in a sharp spine, the keels forming continuous lines. The appressed hind limb reaches the posterior margin of the orbit; digits very little dilated, twelve lamellæ under the second and third phalanges of the fourth toe. Tail nearly twice as long as the head and body. No enlarged postanal scales.

Gray above, a faintly indicated light vertebral line, and a more distinct light line along each side of the back from the eye to the tail; a series of angular brown marks on each side of the back, opposite or alternate, the points directed toward the vertebral line. On specimen 985 these are visible only on the posterior part of the trunk and the base of the tail. Limbs barred with brown. The lips and upper surface of the head are more or less spotted with brown. The lower surface is yellowish.

Type, C. M. No. 988, ♀, collected in the Provincia del Sara, Bolivia, by José Steinbach, January, 1912. Elevation, 350 meters.

Paratype, C. M. No. 985, ♂, collected by Steinbach at the same place, in March, 1912.

The species is named in honor of the collector.

#### MEASUREMENTS.

	C. M. No. 985, mm.	C. M. No. 988, mm.
Total length.....	138 <sup>2</sup>	126 <sup>2</sup>
Snout to vent.....	43	44
Vent to tip of tail.....	95	82
Length of head.....	12.5	12.5
Width of head.....	7	7
Snout to ear-opening.....	11.25	11
Length of fore limb.....	19	18
Length of hind limb.....	32.5	33

<sup>2</sup>The tip of the tail of both specimens is missing.

Genus *BASILISCUS* Laurenti.11. *Basiliscus americanus* (Linnæus).

*Lacerta basiliscus* LINNÆUS, Syst. Nat., 12 ed., I, 1766, p. 366.

*Basiliscus americanus* BOULENGER, Cat. Lizards, II, 1885, p. 108.

The museum has two young specimens collected at Bonda, Colombia, by H. H. Smith; C. M. No. 937, female, and C. M. No. 938, male.

Genus *IGUANA* Laurenti.12. *Iguana tuberculata* Laurenti.

*Iguana tuberculata* LAURENTI, Syn. Rept., 1768, p. 49.

*Iguana tuberculata* BOULENGER, Cat. Lizards, II, 1885, p. 189.

The five specimens of the collection were received from the following sources:

C. M. No. 944, ♂, young, Bom Jesus de Lapa, Bahia, Brazil. Haseman coll.

C. M. No. 945, ♀, young, Januaria, Minas Geraes, Brazil. Haseman coll.

C. M. No. 963, ♂, young, Cachoele de Ribeirao, Brazilian side of the Rio Madeira. Haseman coll.

C. M. No. 1051, ♂, adult, Santerem, Brazil. Haseman coll.

C. M. No. 936, ♀, adult, Bonda, Colombia. Smith coll.

Genus *LIOCEPHALUS* Gray.13. *Liocephalus tricristatus* (Duméril).

*Ophryoessoides tricristatus* A. DUMÉRIL, Cat. Meth. Rept., 1851, p. 66.

*Liocephalus tricristatus* BOULENGER, Cat. Lizards, II, 1885, p. 170.

The five specimens of the museum were all collected by Steinbach in Bolivia. They are listed under the following numbers:

C. M. No. 966, ♂, Santa Cruz de la Sierra, Bolivia.

C. M. No. 969, ♀, Santa Cruz de la Sierra, Bolivia.

C. M. No. 970, ♀, Las Juntas, Bolivia.

C. M. No. 976, ♂, Provincia del Sara, Bolivia.

C. M. No. 980, ♀, Provincia del Sara, Bolivia.

The back is uniformly colored, or crossed by several angular, dark brown bars, the posteriorly directed points of the bars lying on the vertebral line, or with only a few dark brown to black spots on the shoulders. The end of the snout is covered by a semicircular dark patch, with a light posterior border. Above and in front of the fore-

limb is a narrow, white, vertical bar, narrowly and irregularly margined with brown, which turns at the shoulder to run about half way down the front of the upper arm. The tail is quite regularly barred by more or less distinct alternate rings of light and dark brown. The upper surface of the hind limb is crossed by broad dark bars, which extend to the foot, and are especially distinct on the tibia.

Genus POLYCHRUS Cuvier.

14. **Polychrus acutirostris** Spix.

*Polychrus acutirostris* SPIX, Spec. Nov. Lacert., 1825, p. 15, Pl. XIV, A.

*Polychrus acutirostris* BOULENGER, Cat. Lizards, II, 1885, p. 99.

The collection includes fifteen specimens of this species. Numbers 965, 968, 971, 972, 975, 977, 978, 979, 982, 983, 984, and 987 were collected by Steinbach in the Provincia del Sara, Bolivia. The others are recorded as follows:

C. M. No. 954, Puerto Suarez, Bolivia. Steinbach coll.

C. M. No. 959, Corumbá, Matto Grosso, Brazil. Haseman coll.

C. M. No. 960, Asumpcion, Bolivia. Haseman coll.

All except No. 954 are females.

Genus STENOCERCUS Duméril & Bibron.

15. **Stenocercus roseiventris** Duméril & Bibron.

*Stenocercus roseiventris* DUMÉRIL & BIBRON, Érp. Gen., IV, p. 350.

*Stenocercus roseiventris* BOULENGER, Cat. Lizards, II, 1885, p. 133.

There are two specimens in the collection, C. M. Nos. 973 and 974, captured by Steinbach in the Provincia del Sara, Bolivia, at an altitude of 350 meters. The scales of the sides of the body are keeled, the keels diminishing toward the ventral surface, so that there is on the sides a gradual transition from the keeled to the smooth condition. The antehumeral fold is dark, the tail barred with alternate light and dark rings. Pterygoid teeth are lacking. These variations from the typical characters of the species do not seem to me sufficient to justify separating these specimens from *S. roseiventris*.

Genus TROPIDURUS Wied.

16. **Tropidurus spinulosus** (Cope).

*Microlophus spinulosus* COPE, Proc. Philad. Acad. Sci., 1862, p. 351.

*Tropidurus spinulosus* BOULENGER, Cat. Lizards, II, 1885, p. 175.

We have a single male specimen, C. M. No. 955, collected by Steinbach at Puerto Suarez, Bolivia.

17. **Tropidurus torquatus** (Wied).

*Stellio torquatus* WIED, Reise n. Bras., I, 1820, p. 139.

*Tropidurus torquatus* BOULENGER, Cat. Lizards, II, 1885, p. 176.

The two specimens of this species in the museum are:

C. M. No. 943, ♂, Januaria, Minas Geraes, Brazil. Haseman coll.

C. M. No. 951 ♂, Rio Doce, Espirito Santo, Brazil. Haseman coll.

Family ANGUIDÆ Cope.

Genus OPHIODES Wagler.

18. **Ophiodes striatus** (Spix).

*Pygopus striatus* SPIX, Spec. Nov. Lac. Bras., 1825, p. 25, Pl. XXVIII, fig. 1.

*Ophiodes striatus* BOULENGER, Cat. Lizards, II, 1885, p. 296.

The collections contain only a single male specimen of this lizard, C. M. No. 950, secured by Haseman at Entre Rios, Minas Geraes, Brazil.

Genus BACHIA Gray.

19. **Bachia dorbignyi** (Duméril & Bibron).

*Chalcides dorbignyi* DUMÉRIL & BIBRON, Erp. Gen., p. 462.

*Cophias dorbignyi* BOULENGER, Cat. Lizards, II, 1885, p. 419.

The museum has a single male specimen, C. M. No. 1044, collected by Steinbach at Las Juntas, Bolivia. The fore limb has three tubercles; the four lower labials are of about equal size; the second pair of chin-shields are in contact anteriorly; there is one pre-anal pore on each side; the ventral surface is of a lighter color than the sides.

Family TEIIDÆ Gray.

Genus AMEIVA Cuvier.

20. **Ameiva ameiva** (Linnæus).

*Lacerta ameiva* LINNÆUS, Syst. Nat., 12 ed., I, 1766, p. 362.

*Ameiva surinamensis* BOULENGER, Cat. Lizards, II, 1885, p. 352.

The sources of the four specimens of the collection are as follows:

C. M. No. 922, ♂, Provincia del Sara, Bolivia. Steinbach coll.

C. M. No. 926, ♂, Provincia del Sara, Bolivia. Steinbach coll.

C. M. No. 927, ♀, Fazenda de Amaratu, Brazil. Haseman coll.

C. M. No. 933, ♂, Bonda, Colombia. Smith coll.

Genus CNEMIDOPHORUS Wagler.

21. **Cnemidophorus lemniscatus** (Daudin).

*Lacerta lemniscata* DAUDIN, Rept. III, p. 175, Pl. XXXVI, fig. 1.

*Cnemidophorus lemniscatus* BOULENGER, Cat. Lizards, II, 1885, p. 363.



The museum has four male specimens of this species, one (C. M. No. 924) collected by Haseman at Santerem; three (C. M. Nos. 923, 925, 1053) collected by Smith at Bonda, Colombia.

22. **Cnemidophorus ocellifer** (Spix).

*Teius ocellifer* SPIX, Spec. Nov. Lacert. Bras., 1825, p. 23, Pl. XXV.

*Cnemidophorus ocellifer* BOULENGER, Cat. Lizards, II, 1885, p. 372.

Specimens C. M. No. 929, 930, and 931, all males, collected by Haseman at Joazeiro, on the Rio San Francisco, Brazil, represent this species in the museum.

Genus **CERCOSAURA** Wagler.

23. **Cercosaura ocellata** Wagler.

*Cercosaura ocellata* WAGLER, Syst. Amph., 1830, p. 158.

*Cercosaura ocellata* BOULENGER, Cat. Lizards, II, 1885, p. 395.

The single male specimen of this lizard in our collections, C. M. No. 986, was captured by Steinbach in the Provincia del Sara, Bolivia.

In all the scale characters it agrees perfectly with Boulenger's description, but it is very different in its markings. The specimen is very hard, making the determination of the sex a little uncertain. It has two femoral pores, which would indicate it to be a female. But the examination of anatomical characters makes me fairly certain that it is a male. If the specimen is a female it contradicts Boulenger's conclusion that the males and females of this species are distinguished by the lateral ocelli.

There are three black lines on the back from the occiput to the base of the tail. The vertebral dark streak is separated from the lateral ones by light olive lines of equal width. Outside the lateral dark streak of each side is a white line running along the outer row of dorsal scales which commences at the top of the ear and extends to the base of the tail. The sides of the body are brown, darkest above, shading below into the light color of the ventral surface. The color of the sides extends upon the base of the tail in a narrow light brown lateral stripe. The rest of the upper surface of the tail is a lighter brown. On each side of the belly in the brown stripe is a row of small black ocelli with white centers. There is a small ocellus on the side of the neck in front of the shoulder; a small white spot on the upper surface of the arm close to the body; a small white spot on the back of the thigh close to the body; a narrow black line from the eye to the top

of the ear, continuing along the lower side of the white latero-dorsal stripe.

Genus PRIONODACTYLUS Peters.

24. **Prionodactylus albostrigatus** sp. nov. (Plate XXXIV.)

Snout as long as the distance between the posterior angle of the eyelids and the anterior margin of the ear-opening. Nostril in a single nasal, a little in front of the center; frontonasal undivided, pentagonal, sides strongly divergent, much wider than long, anterior margin equal in length to the posterior margins; prefrontals of moderate size, meeting in a suture which is half as long as the shields; frontal once and a half as long as broad, longer than its distance from the rostral, as long as the interparietal, obtusely pointed in front, rounded behind, half as broad at the back as in front; two frontoparietals, a little larger than the prefrontals; parietals not quite so large as the interparietal; three occipitals, the central one smallest; postoccipitals small, irregular, three or four; three supra-oculars, the anterior largest, the first and second in contact with the frontal; a large anterior supraciliary; a large loreal; a small triangular pre-ocular; temples covered by irregular, moderate sized shields; eight upper labials, the third and fourth largest, the last very small, the center of the fourth below the middle of the eye; seven or eight lower labials; mental moderate; chin-shields large, one anterior and four pairs, the second pair larger than any of the others, the third and fourth pairs separated by a pair of large shields in contact medially, behind which is a pair of smaller shields; two longitudinal rows of large transverse gulars, six in each row; six collar-shields, the two central ones wider than the gulars, as wide as the combined width of the two small, outer, collar-shields. Tympanum as large as the transparent disc of the eye, its long axis slightly inclined from the perpendicular.

Dorsal scales strongly keeled, pointed, with straight sides, twice as long as broad, twenty-eight transverse rows between the postoccipitals and the sacrum; lateral scales smaller than the dorsals, but not extremely small, except around the bases of the limbs, where the scales are almost granular; twenty-seven scales around the middle of the body. Ventral shields in six rows, those of the four inner rows large and of equal size, those of the outer rows about half as large; in seventeen transverse rows. A single pair of large posterior pre-anal shields, in front of which is a pair of anterior pre-anals about half as large. The front of the hind limb is covered with large shields, the back with

granules; all except a small part of the lower surface of the fore limb is covered with large shields. There are no femoral pores on the type, which is a female. The scales of the back and sides of the tail are similar to the dorsals; there is a double row of large smooth scales in the lower surface.

The color is brown above, darker on the sides; the individual scales are yellowish, speckled with fine brown dots; those of the middle and sides of the back are tipped with black, a vertebral and two laterodorsal stripes being faintly indicated. A narrow, rather faint, light line commencing on the supraciliaries runs along the side of the back and tail. A narrow white stripe commences at the inferior margin of the orbit, passes through the ear, along the side of the body just above the bases of the limbs, and along the side of the tail. This stripe is interrupted by a narrow black bar above the fore limb, above which is a small black ocellus with a white center, and by a longer break above the hind limb. The lower surface of the fore limb is yellowish; on the remainder of its surface the scales are dotted and margined with dark brown; there is a small white spot on the upper side close to the body, and another on the tip of the elbow. The general color of the hind limb is similar; there is a small white, black-margined spot on the upper surface close to the body; the lateral white streak of the tail commences on the back of the thigh, and may join, or be narrowly separated from, a small, white, black margined spot; on the middle of the back of the thigh is an elongated white spot, broadly margined with black. Fainter light spots are visible on the top and back of the shank. The color of the lower surface is uniformly light, white on the head and body, yellowish on the tail. The shields of the top and sides of the head, except in the light stripes and along the lower edges of the supralabials, are uniformly and finely dotted with brown.

Type, C. M. No. 952, ♀, Sete Lagoas, Minas Geraes, Brazil, Haseman coll., May 5, 1908.

## MEASUREMENTS.

	mm.
Total length.....	72
Snout to vent.....	30
Vent to tip of tail.....	42
Length of head.....	8.5
Width of head.....	4.5
Snout to ear-opening.....	7.5
Length of fore limb.....	11
Length of hind limb.....	13

25. *Prionodactylus eigenmanni* sp. nov. (Plate XXXV.)

Snout as long as the distance from the posterior angle of the lids to the anterior margin of the ear-opening. Rostral thrice as broad as deep, concave behind; frontonasal single, broader than long, the anterior margin as long as the shield, posterior angle very obtuse, pentagonal; nostril pierced in a single nasal, slightly in front of and above the center; a large loreal, its posterior extremity pointed; a triangular pre-ocular; two large prefrontals, meeting in a suture which is more than half as long as the shields, narrowly in contact with the anterior supra-ocular, as broad as long; frontal shorter than its distance from the rostral, shorter than the interparietal, once and two thirds as broad in front as behind, sides concave, anterior margin obtusely pointed; frontoparietals longer than the prefrontals; interparietal large, heptagonal, once and a half as long as broad, projecting between the lateral occipitals, much longer than the parietals; three occipitals, the median about a fourth as large as the laterals and projecting slightly back of them; two large postoccipitals; three supra-oculars, the first much the largest and in contact with nearly the entire lateral margin of the frontal, the second narrowly in contact with the posterior part of the frontal; a large anterior supraciliary in contact with the loreal and prefrontal; temples covered with large shields, below which are three rows of small cheek-scales; six upper labials, the fourth and sixth the largest, the fifth smallest, the posterior end of the fourth below the hinder margin of the eye; seven lower labials, the third largest; a single anterior chin-shield, followed by four pairs, the third pair separated by a pair of small scales, the fourth by a pair of large scales, which latter are prevented from touching mesially by a row of small scales; two longitudinal rows of large, transverse, gular shields, seven in each row, the anterior pair separated by smaller scales; collar fold poorly developed, eight collar-shields, the two central ones large, the lateral shields smaller than the gulars, the few scales under the sides of the fold imbricate and good sized, not small and granular.

Dorsal scales large, rounded or bluntly pointed behind, strongly keeled, once and a half as long as broad, or a little longer; thirty-one scales between the postoccipitals and the sacrum; scales of the sides of the body smaller than those of the back, but not granular, except over the bases of the limbs; six rows of large ventral shields, those of the outer row being about half as large as the shields of the four inner rows, in eighteen transverse series. A double row of large smooth

shields under the tail. Twenty-nine scales around the middle of the body. Four posterior pre-anal scales, much longer than wide, preceded by two large anterior pre-anals. Limbs covered by large scales, except on the posterior surfaces of the thighs and shanks, which are covered with granular scales. No femoral pores are visible on the type, which is a female.

The color of the dorsal surface and sides of the head, body, and tail is dark brown; the scales are finely spotted and often tipped with brown. A row of small black spots on each side of the back, from the occiput to the tail. Just back of the ear is an oblique white bar, margined with black; back of this a row of white, black-edged ocelli extends to the base of the hind limb; there is an ocellus on the front of the shoulder, one above and in front of, and another close behind the hip-joint; a row of small, white, black-margined spots on the upper surface, and a row of similar but larger spots on the posterior surface of the thigh. The scales of the anterior and upper surfaces of the limbs are finely dotted and margined with brown. The middle of the dorsal surface of the tail and a narrow line along the center of each side are slightly darker than the remainder of these surfaces; it is quite probable that these lines may be more strongly marked in other individuals of the species. The upper and lower labials are white, except where crossed by four vertical, black bars, one on the rostral and mental, one half-way between the tip of the snout and the eye, one under the eye, the last just back of the eye. The cheeks are black, with a white spot between the eye and the ear; the anterior margin of the ear-opening is white.

Type, C. M. No. 981, ♀, secured in the Provincia del Sara, Bolivia, at an elevation of 400 meters, in September, 1911, by José Steinbach.

The species is named in honor of Professor Carl H. Eigenmann.

#### MEASUREMENTS.

	mm.
Total length. . . . .	69 <sup>3</sup>
Snout to vent. . . . .	40
Vent to tip of tail. . . . .	29
Length of head. . . . .	11
Width of head. . . . .	5.7
Snout to ear-opening. . . . .	9.3
Length of fore limb. . . . .	14.5
Length of hind limb. . . . .	18.5

\* The tip of the tail has been lost.

## Genus PROCTOPORUS Tschudi.

26. *Proctoporus pachyurus* Tschudi.

*Proctoporus pachyurus* TSCHUDI, Arch. f. Naturg., 1847, p. 53.

*Proctoporus pachyurus* BOULENGER, Cat. Lizards, II, 1885, p. 412.

The museum possesses a single male specimen of this rare lizard, C. M. No. 1043, collected by Lola Vance at Tarma, Peru. This region is six thousand feet above the sea. The differences between our specimen and those previously described do not seem to me to justify distinguishing it as a new species. The description of the specimen which follows is made to supplement those of this species already published.

Frontonasal barely longer than broad, in contact with the large first supraciliary; broader than the frontal but of the same length; frontoparietals forming a long suture; interparietal pentagonal, slightly narrower behind than in front, half as wide as, and a little shorter than, the parietals; posterior margins of the parietals and interparietal nearly a semicircle; five occipitals in a curved row, the middle and lateral ones smaller than the two on either side of the central shield; a row of ten small postoccipitals; three supra-oculars; a large loreal; a pre-orbital; four small infra-orbitals in a single row; temples covered with irregular shields, the upper ones large; seven upper and seven lower labials; a large anterior and four pairs of chin-shields, the third pair narrowly in contact by their anterior portions, the fourth pair widely separated by several scales; the gular scales nearest the chin-shields large, eleven rows to the edge of the anterior collar fold, the fifth row very small; one row of scales between the anterior and posterior collar-folds; twelve collar-shields.

Dorsal scales elongate, quadrangular, keeled, juxtaposed, in continuous transverse series, except in the lumbar region, where the rows are broken along the mid-dorsal line; fifty-four series between the postoccipitals and the base of the tail. Ventral shields nearly square, in twelve longitudinal and twenty-five transverse series. Two large anterior and four posterior pre-anal scales. Shields of limbs smooth, large on the anterior and upper surfaces. Tail tapering, scales of upper surface keeled, squamation like that of the body. Eight femoral pores.

Olive-gray above, the sides darker, the tail lighter; scales spotted with brown. A light line along each side of the back, bordered on the outer side by brown, commencing on the snout, passing above the eye,

and extending to the tip of the tail; a less distinct light line passing from the back of the eye, above the ear, and along the side of the body. Ventral surface yellowish, a brown spot in the center of each ventral scale from the anterior collar-fold to the tip of the tail; on the tail these spots are as long as the scales and form narrow, parallel, brown lines. A brown spot in the center of each supra- and infralabial shield.

## MEASUREMENTS.

	mm.
Total length. . . . .	76
Snout to vent. . . . .	31
Vent to tip of tail. . . . .	45
Length of head. . . . .	8
Width of head. . . . .	4.7
Snout to ear-opening. . . . .	7
Length of fore limb. . . . .	9
Length of hind limb. . . . .	12

Genus *TEIUS* Merrem.27. *Teius teyou* (Daudin).

*Lacerta teyou* DAUDIN, Rept., III, p. 105.

*Teius teyou* BOULENGER, Cat. Lizards, II, 1885, p. 379.

The museum has two specimens, a large adult male, C. M. No. 932, collected by Steinbach in Santa Cruz de la Sierra, Bolivia, and a young male, C. M. No. 928, secured by Haseman at Cacequy, Rio Grande do Sul, Brazil.

Genus *TUPINAMBIS* Daudin.28. *Tupinambis teguixin* (Linnæus).

*Lacerta teguixin* LINNÆUS, Syst. Nat., 12 ed., I, 1766, p. 368.

*Tupinambis teguixin* BOULENGER, Cat. Lizards, II, 1885, p. 335.

The Museum possesses three stuffed specimens of this lizard, collected by Steinbach; C. M. Nos. 1048 and 1049 in Bolivia, No. 1038 at Miraflores, Dep. Oran, N. Argentina.

## Family AMPHISBÆNIDÆ Gray.

Genus *AMPHISBÆNA* Linnæus.29. *Amphisbæna alba* Linnæus.

*Amphisbæna alba* LINNÆUS, Syst. Nat., 12 ed., I, 1766, p. 393.

*Amphisbæna alba* BOULENGER, Cat. Lizards, II, 1885, p. 438.

A single adult specimen, C. M. No. 1052, was collected by Steinbach in the Provincia del Sara, Bolivia.

30. **Amphisbæna** sp.

The collection includes a specimen of this genus collected by Haseman at Barra de Penedo, Alagôas, Brazil (C. M. No. 1046). It was found dead under the bark of a coconut tree, and is naturally not in the best state of preservation, some characters being difficult to distinguish. It closely resembles *A. steindachneri* Strauch, differing principally in the greater number of segments around the body, which is forty-six. There are two hundred and forty-nine annuli on the body and twenty-seven on the tail. The color is yellowish brown.

Genus LEPIDOSTERNON Wagler.

31. **Lepidosternon phocæna** Duméril & Bibron.

*Lepidosternon phocæna* DUMÉRIL & BIBRON, Érp. Gen., V, p. 507.

*Lepidosternon phocæna* BOULENGER, Cat. Lizards, II, 1885, p. 463.

A single specimen of this rare species, C. M. No. 1047, was collected by Steinbach in the Provincia del Sara, Bolivia, at an elevation of three hundred and fifty meters.

• Family SCINCIDÆ Gray.

Genus MABUIA Fitzinger.

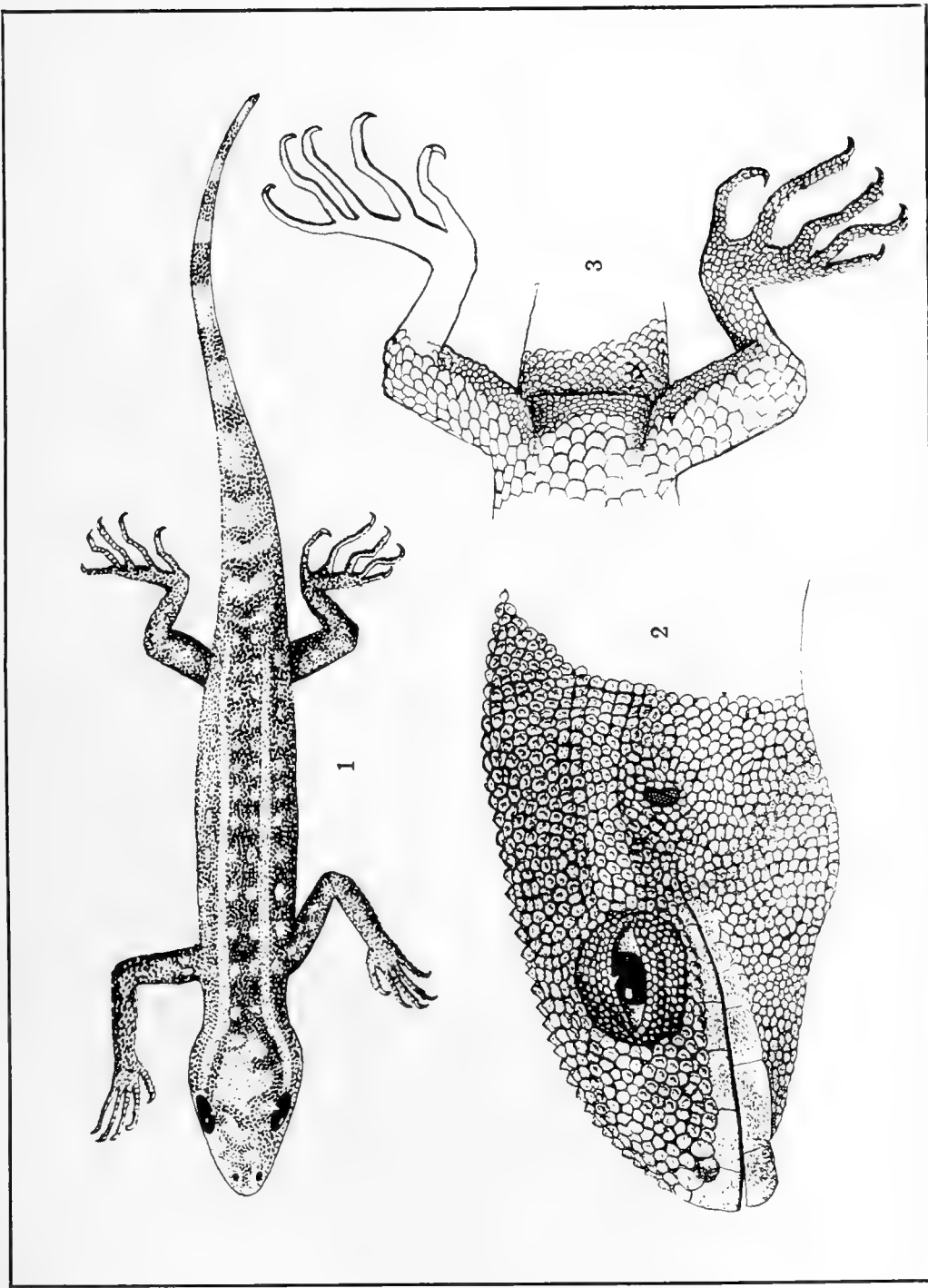
32. **Mabuia agilis** (Raddi).

*Scincus agilis* RADDI, Mem. Soc. Ital. Modena, XIX, 1823, p. 62.

*Mabuia agilis* BOULENGER, Cat. Lizards, III, 1887, p. 190.

Haseman collected two specimens of this lizard, one, C. M. No. 961, at São Antonio de Guaporé, Matto Grosso, Brazil; the other, C. M. No. 962, near São Luiz de Cáceres, Matto Grosso, Brazil. Both are males.





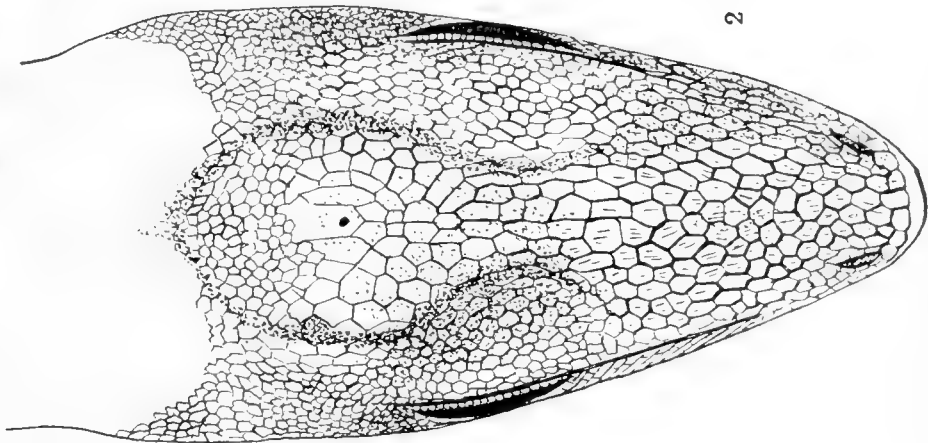
*Gonatodes hasemani* Griffin. Type, C. M. No. 1040.

(Fig. 1,  $\times 2$ ; Fig. 2,  $\times 6$ ; Fig. 3,  $\times 4$ .)

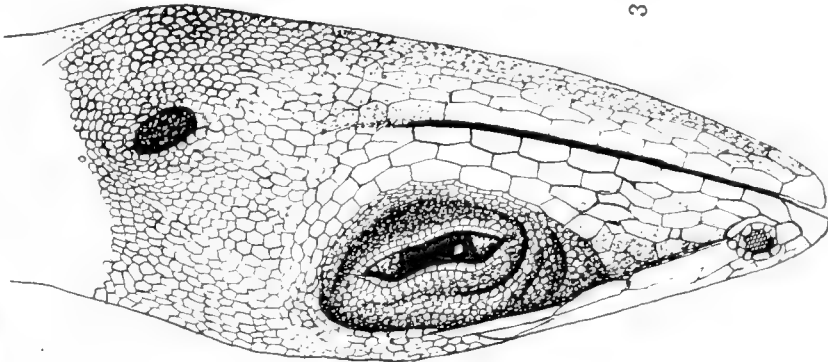




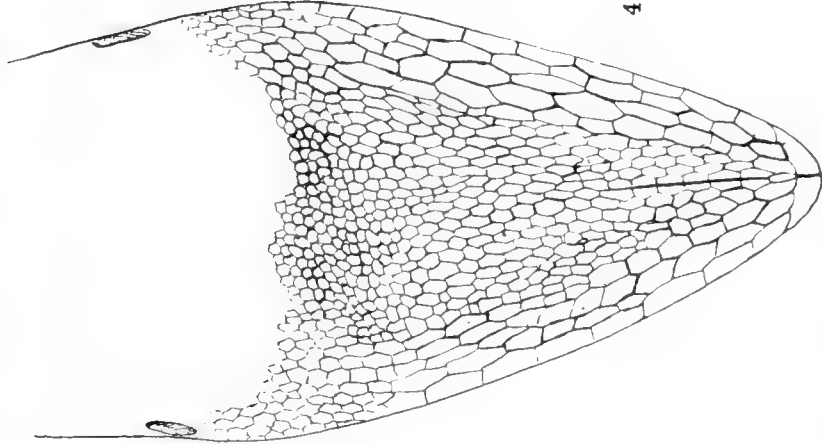
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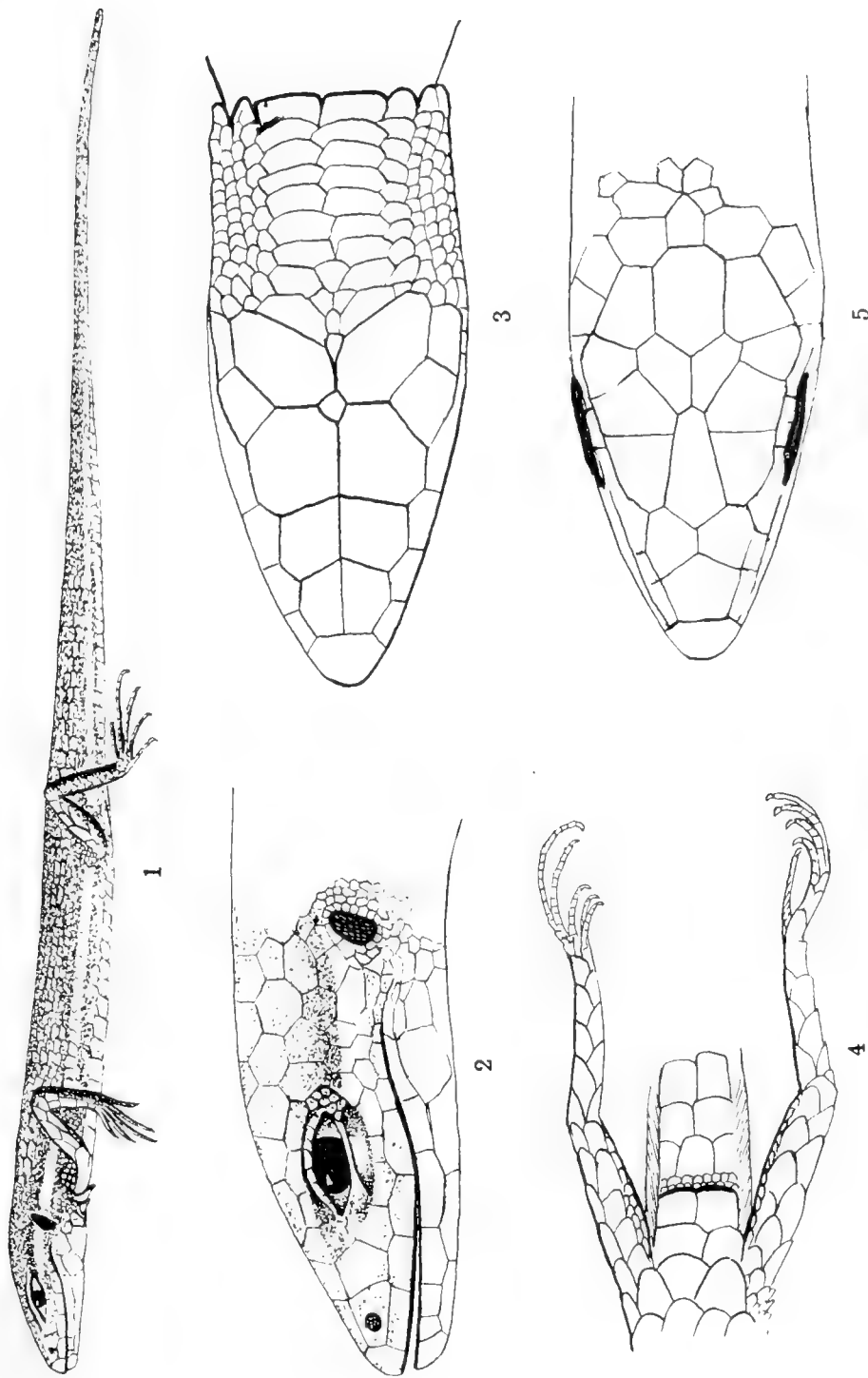


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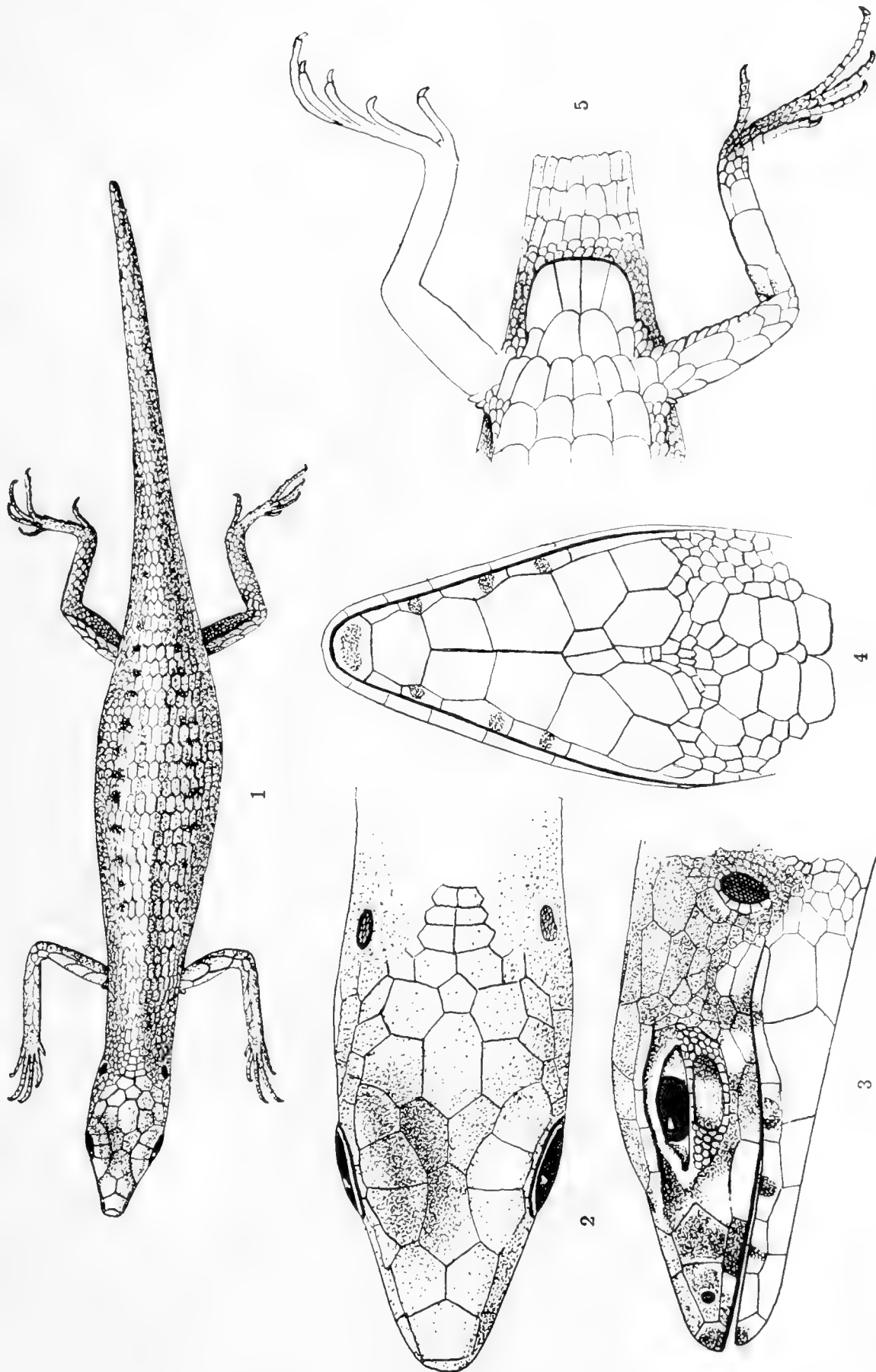
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*Prionodactylus albostrigatus* Griffin. Type, C. M. No. 952, ♀.  
(Fig. 1,  $\times 2$ ; Figs. 2-3,  $\times 6$ ; Fig. 4,  $\times 4$ ; Fig. 5,  $\times 6$ .)





*Prionodactylus Eigenmanni* Griffin. Type, C. M. No. 981.

(Fig. 1,  $\times 2$ ; Figs. 2-4,  $\times 6$ ; Fig. 5,  $\times 4$ .)





## VI. LEPTODEIRA ALBOFUSCA (LACÉPÈDE) A SYNONYM OF LEPTODEIRA ANNULATA (LINNÆUS).

BY LAWRENCE EDMONDS GRIFFIN.

*Coluber annulatus* LINNÆUS, Mus. Ad. Frid., 1754, p. 34, plate VII, fig. 2; Syst. Nat., Ed. XII, I, 1766, p. 386.

*Coluber albofuscus* LACÉPÈDE, Serp., II, 1789, pp. 94 and 312.

*Leptodeira annulata* BOULENGER, Cat. Snakes, III, 1896, p. 97.

*Leptodeira albofusca* BOULENGER, Cat. Snakes, III, 1896, p. 95.

*Leptodeira annulata* is one of the earliest known and commonest serpents of South America. Since originally described it and its varietal forms have been referred to at least six other species, all of which Boulenger (*loc. cit.*) reduced to synonyms of *L. annulata* and *L. albofusca*. In the course of an examination of the collection of snakes from South America in the Carnegie Museum I was impressed by the difficulty of satisfactorily separating these two species, finally reaching the conclusion that there was only one species represented in the collection, namely, *L. annulata*.<sup>1</sup> A careful study of the species in question has been facilitated by the Museum of Comparative Zoölogy, which has very kindly loaned me its entire representation of these two species, making a total of sixty-nine specimens available for comparison. The specimens of the Museum of Comparative Zoölogy have been identified by several naturalists, mostly as *L. annulata*. I have submitted them and the specimens of the Carnegie Museum to a critical re-examination, with the result that I find myself unable to make a satisfactory distinction between *L. annulata* and *L. albofusca*. In order to be as brief as possible I shall omit the tabulated measurements and counts which were made, and shall submit only the condensed results. All counts and measurements were made under a binocular microscope.

The best definitions of the two species which are generally available are those of Boulenger (*Catalogue of Snakes in the British Museum*,

<sup>1</sup> Griffin, Lawrence Edmonds: "A Catalog of the Ophidia from South America at Present (June, 1916) Contained in the Carnegie Museum with Descriptions of Some New Species," *Memoirs of the Carnegie Museum*, VII, 1916, pp. 163-228; Plate XXVIII.

Vol. III, pp. 95-98). For the purpose of showing clearly the characters which have been used to distinguish the species (not to criticise so excellent a naturalist) the principal features of his diagnoses are presented in parallel columns.

*Leptodeira albofusca*

Rostral twice as broad as deep.  
Frontal once and a quarter to once and two-thirds as long as broad.  
Loreal as long as deep, or a little longer than deep.  
One or two pre-oculars.  
A small subocular.  
Temporals 1+2, or 1+3.  
Eight upper labials, fourth and fifth, (rarely third, fourth, and fifth) entering the eye.  
Four to six lower labials in contact with the anterior chin-shields.  
Anterior chin-shields as long as, or a little shorter than, the posterior.  
Scales in 21 or 23 rows.  
Gastrosteges 170-211.  
Urosteges 71-95.  
A lateral series of spots.  
Lower parts whitish, frequently with fine brown specks.  
Tropical America.

*Leptodeira annulata*

Rostral once and a half to once and two-thirds as broad as deep.  
Frontal once and a half to once and two-thirds as long as broad.  
Loreal as long as deep, or a little longer than deep.  
One pre-ocular.  
Rarely a very small subocular.  
Temporals 1+2.  
Eight (rarely seven) upper labials, third, fourth, and fifth (rarely third and fourth, or fourth and fifth only) entering the eye.  
Five or six lower labials in contact with the anterior chin-shields.  
Anterior chin-shields as long as, or a little longer than, the posterior.  
Scales in 19 (exceptionally 17 or 21) rows.  
Gastrosteges 175-196.  
Urosteges 78-107.  
Lateral spots usually small or absent.  
Lower parts white.  
Tropical South America.

As all of the characters given vary enough to cross the narrow boundary between the species, only a constant combination of several characters can be made the basis of distinction between the two supposed species. The number of scale-rows, the proportions of the rostral shield, the presence or absence of a subocular, the number of upper labials bordering the orbit, and the number of gastrosteges and urosteges, are the most important characters used in the definition of the species, and if these occur in constant combinations the two species can be distinguished, otherwise not.

Several authors have used the number of scale-rows and the proportions of the rostral as the chief characters by which to identify the two supposed species. The number of scale-rows certainly appears

to be the best character to use as basic; by placing the other principal characters in conjunction with it the constancy or variability of the alleged specific differences will be made clear. Twenty-six of the specimens at my disposal have nineteen scale-rows; forty-three have twenty-one, twenty-three, or twenty-five rows. I have not always included every specimen in the following tabular statements, the omissions being due to defects in some of the specimens.

PROPORTIONS OF THE ROSTRAL.

	Rostral Twice as Broad as as Deep.	Rostral Less Than Twice as Broad as Deep.	Limits of Variation.
Specimens with twenty-one to twenty-five scale-rows (43) . . . . .	10 (23 %)	33 (77 %)	1-1 1/3:1-2:1
Specimens with nineteen scale-rows (25)	4 (16 %)	21 (84 %)	1-1 1/4:1-2:1

The rostral is twice as broad as deep in only a small proportion of either those having twenty-one to twenty-five or those having nineteen scale-rows. Its usual proportion of width to depth in both categories is about one and two-thirds to one. No distinction can be based on this character.

OCCURRENCE OF A SUBOCULAR.

	A subocular on one or both sides.	No subocular
Specimens with twenty-one to twenty-five scale rows (42) . . . . .	32 (76 %)	10 (24 %)
	On only one side, 2.	
Specimens with nineteen scale-rows (24) . . . . .	10 (42 %)	14 (58 %)
	On only one side, 5.	

This is the most definite of the possibly distinguishing characters. The majority of the snakes with twenty-one to twenty-five scale-rows do have a sub-ocular, but as nearly half of those with nineteen scale-rows also possess the shield, the distinction is not as sharp as it should be to serve as a specific character.

NUMBER OF LABIALS ENTERING THE MARGIN OF THE ORBIT.

	Two Labials.	Three Labials.
Specimens with twenty-one to twenty-five scale-rows (42) . . . . .	36 (86 %)	6 (14 %)
Specimens with nineteen scale-rows (25) . . . . .	17 (68 %)	8 (32 %)

The majority of all the specimens have only two supralabials bordering the orbit, though the proportion of such is greater in those

having twenty-one to twenty-five scale-rows. This character is decidedly of little value in differentiating the two supposed species. Of still less value is the comparative length of the anterior and posterior chin-shields.

COMPARATIVE LENGTH OF ANTERIOR AND POSTERIOR CHIN-SHIELDS.

	Anterior Chin-shields the Longer.	Chin-shields Equal.	Posterior Chin-shields the Longer.
Specimens with twenty-one to twenty-five scale-rows (43).....	7 (16 %)	22 (51 %)	14 (33 %)
Specimens with nineteen scale-rows (26)	6 (23 %)	17 (65 %)	3 (12 %)

The shape of the loreal of the specimens with twenty-one to twenty-five scale-rows agrees well with the diagnosis of *L. albofusca*; but the loreal of the specimens having nineteen scale-rows is almost as often longer than deep as deeper than long.

SHAPE OF LOREAL.

	Longer Than Deep.	As Deep as Long.	Deeper Than Long.
Specimens with twenty-one to twenty-five scale-rows (42).....	26 (62 %)	13 (31 %)	3 (7 %)
Specimens with nineteen scale-rows (25)	6 (24 %)	11 (44 %)	8 (32 %)

The counts of the gastrosteges and urosteges which I have made extend the limits of numerical variation of these characters, and also serve to bring the snakes having seventeen to nineteen and those having twenty-one to twenty-five rows nearer to the same extremes. They are therefore of little value for specific differentiation.

NUMBER OF GASTROSTEGES AND UROSTEGES.

	Gastrosteges	Urosteges.
Specimens with twenty-one to twenty-five scale-rows (43)...	164-205	68-98
Specimens with nineteen scale-rows (26).....	170-203	73-95

The lateral spots vary to the same degree in both classes of specimens, making it impossible to use this character for diagnostic purposes.

If the distributional areas of the supposed species were separate such differences as appear to exist might mean a good deal, but the area of *L. annulata* is much more limited than, and entirely within, that of *L. albofusca*.

As there seems to be no combination of characters which definitely

distinguishes *L. albofusca* from *L. annulata* there is evidently only a single, variable species, *Leptodeira annulata* (Linnæus).

A tabulation has been made of the scale formulæ of the sixty-nine specimens examined by me and of those reported in the available literature of the two species. The results suggest that, though we may not be able to recognize more than one species in the assemblage, there may be tendencies toward the formation of subspecies in different parts of its range. But the entire number of *L. annulata* which has been collected is only a few score, and makes too small a series from which to draw any conclusions. These also come from widely separated localities, making it quite likely that, when collections have been made in intermediate regions, the apparent distinction between specimens from different localities may be bridged. I do not, therefore, regard these tabulations as more than interestingly suggestive.

SCALE-CHARACTERS OF SPECIMENS FROM VARIOUS REGIONS.

Locality	Scale-rows.	Gastrosteges.	Urosteges.
Mexico and Central America.....	21-25	164-211	71-97
Ecuador.....	19 <sup>2</sup> -23	183-198	68-89
Colombia, Venezuela, and Guiana.....	19-23	170-194	75-95
Brazil.....	19-21	186-205	76-98
Bolivia.....	19-21 <sup>3</sup>	170-196	73-98
Peru.....	17 <sup>4</sup> -21	179-190	88-91
Uruguay and Paraguay.....	21	176-202	72-95

The specific characters of *Leptodeira annulata* may be summarized as follows:

Rostral once and a quarter to twice as broad as deep, scarcely visible from above; internasals shorter than the prefrontals; frontal once and one-fourth to once and two-thirds as long as broad, as long as, or a little longer than, its distance from the tip of the snout, shorter than the parietals; loreal of nearly equal dimensions; one pre-ocular (rarely two), in contact with, or narrowly separated from, the frontal; frequently a small subocular below the pre-ocular; two post-oculars (rarely three); temporals 1, 2, (rarely 1, 3); eight upper labials (rarely seven), the fourth and fifth (or less frequently, the third, fourth, and fifth) bordering the orbit; five or six (rarely four) lower labials in contact with the anterior chin-shields; anterior and posterior chin-shields of nearly equal length.

<sup>2</sup> A single specimen reported by Steindachner.

<sup>3</sup> A single specimen reported by Griffin.

<sup>4</sup> A single specimen reported by Boulenger.

Scales usually in nineteen to twenty-three rows, occasionally in seventeen or twenty-five rows, the vertebrales sometimes slightly enlarged; gastrosteges one hundred and sixty-four to two hundred and eleven; anal divided; urosteges sixty-eight to one hundred and seven.

Yellowish above, with one or two rows of reddish brown spots, which are often confluent into an undulating or zigzag band, or form cross-bars; a lateral series of spots of extremely variable size, sometimes scarcely visible; often a dark median line on the occiput; a dark streak behind the eye; lower surface white, or occasionally with fine brown dots; lower surface of tail frequently brownish.

*Habitat*.—From Mexico to Argentina.

# ANNALS

OF THE

# CARNEGIE MUSEUM

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VOL. XI, NOS. 3 AND 4.

## EDITORIAL NOTES

SINCE Parts 1 and 2 of Volume XI of the ANNALS were issued the twenty-first anniversary of Founder's Day has been held. The celebration occurred on Thursday, April 26, which had been designated by the Governor of the State to be set apart to the honor of France. Colonel Samuel Harden Church, President of the Board of Trustees, presided. The invocation was made by the Rev. Robert MacGowan, D.D., of the Bellefield Presbyterian Church. Mr. Augustus K. Oliver, the newly elected Secretary of the Board, read the annual report, followed by a telegram containing the congratulations of Mr. Andrew Carnegie, the Founder, which was greeted with prolonged applause. A forceful address was made by Mr. George W. Perkins dealing with the necessity for self-denial, economy, and increased production of food-stuffs, in view of our entrance upon the war. Mme. Ester Ferrabini at this point was introduced, appearing robed in the tricolor of France. She sang "La Marseillaise" and received an ovation such as has probably never been accorded before to a singer in the great Hall of Music. Her singing was followed by a most inspiring address delivered by the Hon. James M. Beck upon the theme "Our Debt to France," during which he was repeatedly applauded. At the conclusion of his address a letter of salutation jointly signed by Messrs. Viviani, Joffre, and Jusserand was read, together with a letter from Mr. Arthur James Balfour, expressing regret that his duties at Washington prevented his attendance at the celebration. Mme.

Ferrabini was again called for, and once more sang the *Marseillaise*, and was again greeted with tumultuous applause. Upon the whole the celebration was one of the most successful which has been held.

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THE Annual Report of the Director of the Museum was submitted to the Board of Trustees on March 31, 1916. In its printed form it contains 108 pages. Copies were issued to the correspondents of the Museum in the month of June.

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ON the night of June 2 the Director of the Museum started on a journey to Utah to inspect the work which is being carried on at the so-called "National Dinosaur Monument," the quarry opened by the Carnegie Museum a number of years ago, from which have already been taken up the remains of a considerable number of dinosaurs, as has been heretofore stated in successive issues of the ANNALS. The Director interrupted his journey at Emporia, Kansas, where on June 6 he delivered the commencement oration before the College of Emporia. He will always cherish pleasant memories of his visit to this thriving town and of the noble men and women whose acquaintance he was permitted to form. The onward journey to his destination was uneventful, and the Director is happy to report that he found the work at the quarry in good condition.

Steps must be taken as soon as possible to bring into the Museum the specimens which we have obtained during the last year or two. They are contained in a large number of crates and boxes, which have been slowly accumulating and are now ready for shipment.

The stay of the Director at the quarry was limited to the time which was necessary in order to make a thorough investigation of the work and to consult with Mr. Earl Douglass, who is in charge. After his visit he returned to his desk as promptly as possible, and was fortunate in the fact that heavy rains had laid the dust and cool air made traveling across the plains more comfortable than is often the case.

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MR. AND MRS. FLOYD N. BARBER have kindly donated to the Museum the collection of fossils and a large portion of the scientific library made by Mrs. Barber's father, the late J. W. Pike, who was well known during the latter half of the last century as a public lecturer upon scientific and political subjects. He contributed exten-



sively to the columns of various agricultural journals published in the middle West, and was a regular correspondent for a long time of the *New York Evening Post*. He was deeply interested in paleontology and reckoned among his friends and correspondents Dr. Samuel H. Scudder, Professor O. C. Marsh, Professor Leidy, and Professor Edward D. Cope, for all of whom he at various times gathered specimens. The collection turned over to the Museum by Mr. and Mrs. Barber is especially valuable because it contains a large series of fossils from Mazon Creek, Grundy County, Illinois, a classic locality, which has in later years been more or less exhausted. There are also many specimens of fossil invertebrates collected from various horizons in New York, Ohio, Indiana, Illinois, and Kentucky. The collection of books contains a great many volumes and parts of volumes, which will fill lacunæ in the library of the Museum, more particularly sets of the Geological Surveys of the various States and Territories, early numbers of which are now somewhat difficult to secure.

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MR. W. E. CLYDE TODD and Mr. O. J. Murie, accompanied by Mr. Alfred Marshall, of Chicago, started at the end of April on an expedition to the peninsula of Labrador. This expedition is financed jointly by the Carnegie Museum, the National Geographic Society of Washington, and Mr. Marshall, who accompanies it. The expedition made its point of departure from the Bay of Seven Islands, whence it was their intention to go northward by river and lake until they should reach Ungava. After reaching the latter point it is their intention, if possible, to cross the divide between Ungava Bay and the eastern shore of Hudson Bay, returning along the eastern coast of Hudson Bay to James Bay, whence they will return southward along a route already familiar to Mr. Todd and Mr. Murie from previous excursions. The Director of the Museum received a letter from Mr. Todd as they were on the point of starting north from the Bay of Seven Islands. Since then nothing has been heard from the expedition, nor is it likely that anything can be heard from them until they again reach the abodes of civilized men. They went abundantly equipped with provisions and hoped to avoid the misfortunes of one or two other parties who in times past essayed the exploration of the interior of Labrador.

MR. AND MRS. O. E. JENNINGS left about the middle of June to continue their botanical researches in the region north of Lake Superior, and two letters have been received from them reporting success. The last letter received from Dr. Jennings indicates that they had reached a point further north than any hitherto attained by them on the occasion of previous journeys, well within the drainage area of Hudson Bay. Mr. Jennings reports the discovery of a dwarf white water-lily not mentioned in any of the manuals and probably constituting a well-defined new species, a new *Lonicera*, and a number of new varieties in other genera.

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MR. O. A. PETERSON in June went to Saltsville, Virginia, to examine a locality which, according to report, gave promise of being rich in Pleistocene vertebrates. The result of his visit was somewhat disappointing. He discovered that the deposit is apparently secondary, consisting of the bones of *Mastodon*, *Cervalces*, and *Megalonyx*, which have been apparently washed out from some other locality and deposited in the bed of an ancient stream, in which they were more or less rolled and water-worn. There was no means of ascertaining the place of original deposit, though from the number of bones discovered in a fragmentary condition Mr. Peterson reaches the conclusion that, though hidden to-day, it must have been rich in vertebrate remains.

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FROM Mr. M. A. Carriker, Jr., letters have been received announcing the successful results of a collecting expedition made by him at high elevations on the eastern spur of the Andes in the United States of Colombia. He has succeeded in obtaining large collections of birds from localities hitherto not visited, or if visited, only hurriedly explored. Advices received from Mr. Carriker of shipment of the first consignment of specimens, received early in the year, led us to expect the advent of the specimens at the Museum long before the date of this note, and we had begun to believe that possibly the collection had been sunk by a German raider. Letters coming to hand in the month of July created a feeling of relief, as we were apprised that through a mistake the collections had not been shipped, but were still safe on *terra firma*. It will still be some time before they can reach us.

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MR. S. M. KLAGES has been collecting in the vicinity of Cayenne,

French Guiana, and in the back parts of the colony. His activities so far have been largely confined to the Mana valley, where he reports that he has found a rich and varied avifauna. At this writing two small shipments have been received from him and a third is reported to have arrived within recent days in New York. Owing to the war communication with South American localities is becoming more or less interrupted and delayed. At the present time (the first week in August) a shipment made in April is only just reported as having arrived in New York. It would under normal conditions have arrived months ago.

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MRS. E. N. BIGELOW has presented to the Museum, in memory of her husband, a large and beautiful Sèvres vase, which was purchased by Mr. Bigelow at the World's Fair in Chicago, and which he highly prized on account of its beauty.

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WE are indebted to Mr. B. Preston Clark, of Boston, for the gift of a large number of lepidoptera and other insects, collected on Aru and in the Philippine Islands.

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FROM the estate of the late Miss Lydia S. Hays the Museum has received by bequest five hundred and nineteen netsukes, one hundred and fourteen ojimes, and forty-four inros, which beautifully illustrate the artistic skill of Japanese artisans who engage in the production of these objects. Many of them are truly works of art, exquisite in design and wonderful in execution.

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A GROUP of ten Sicilian figures, dating from the Sixteenth Century, representing the "Adoration of the Magi," which were collected for the Museum by the late Mrs. J. H. McHenry, were recently presented to the Museum by her father, Mr. Herbert DuPuy. They have been arranged and are now exhibited in the Museum. In grouping these images various pictures of this scene by old masters were consulted, and the arrangement is conformed as nearly as possible to that given by mediæval painters. The group has attracted a great deal of attention on the part of visitors.

ON March 15 we completed the installation of the aëroplane in which Mr. Calbraith Perry Rodgers made his memorable flight across the continent from Sheepshead Bay to Los Angeles, California. The aëroplane, together with a portrait of Mr. Rodgers, and a map delineating his route, were presented by his mother as a memorial of her son. It is appropriate that this aëroplane, in which a daring Pittsburgher made the first flight across the continent, should be preserved in the city in which Professor Samuel P. Langley, while a professor in the Western University of Pennsylvania, made his first scientific investigation of the laws of flight, which laid the foundation for the conquest of the air. The modern science of aëronautics had its birth in the city of Pittsburgh, and the Director of the Carnegie Museum recalls with pleasurable emotion his long friendship with Professor Langley, with whom he was associated personally and officially, and his acquaintance with Calbraith Perry Rodgers, dating from his infancy. He well remembers a snowy winter afternoon when, coming out from the city on the street-car line he was chatting with his mother's cousin, who was accompanied by Calbraith, then a little boy. As they neared their destination Miss Munson exclaimed: "How shall I ever get up to the house through the snowdrifts with this little boy!" The difficulty was quickly solved by lifting the little fellow upon my shoulder and marching up the hill with him to the warmth of his mother's home. I little dreamed then that the curly-headed boy whom I was carrying on my shoulder should later be borne on the circumambient air of the globe across the continent from sea to sea through the perfection of a device even then being thought out by one of my friends.

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THE H. W. Johns-Manville Company has presented to the Museum a very large and most interesting collection representing the mineral asbestos and all the various products which are manufactured therefrom by this enterprising and highly successful firm. The collection is beautifully installed in the Hall of Minerals, and from the outset has attracted a great deal of attention on the part of visitors.

## VII. LIST OF THE COLEOPTERA COLLECTED ON THE ISLE OF PINES BY GUSTAV A. LINK, SR., 1912-1913.

BY DR. W. J. HOLLAND, ASSISTED BY DR. E. A. SCHWARZ.

The coleoptera collected by Mr. Link were, with few exceptions, not numerous in individuals representing a given species, and the entire number of species in the collection is so small as to reveal that his activities were somewhat desultory, and that he made no very sustained effort to gather the insects of this order. The fauna of the Isle of Pines, so far as the beetles are concerned, is not essentially different from that of Cuba, but it is highly probable that, when larger collections are made, there will be discovered a number of forms which will be at least sub-specifically distinct from those of the larger island.

After the specimens brought home by Mr. Link had been classified in a preliminary manner by the writer, he invoked the aid of his amiable friend, Dr. E. A. Schwarz, whose knowledge of West Indian beetles is very great, and in a large number of cases the latter was able to specifically determine the minuter and more obscure forms, which the writer lacked time to carefully study.

As a preliminary list of the beetles of the island the present short paper may serve to pave the way for more complete lists in the future, and may serve to awaken some resident of the country to the pleasant task of making a large and complete collection of its coleoptera.

To Dr. L. O. Howard, of the Bureau of Entomology in the Department of Agriculture, thanks are due for having kindly allowed Dr. Schwarz to take up the study of the specimens I submitted to him, and thus to augment the value of this list by his authoritative determinations. To Mr. C. W. Leng, of New York, I am indebted for the determination of the Lampyridæ, of which family he has made a most thorough study, and upon which he is our leading authority.

### Order COLEOPTERA.

#### Family CICINDELIDÆ.

#### Genus CICINDELA Latreille.

##### 1. *Cicindela tortuosa* Dejean.

*Cicindela tortuosa* DEJEAN, Spéc. Gén. Col., I, 1825, p. 87.

Two specimens collected at Los Indios in October.

## Family CARABIDÆ.

## Genus SELENOPHORUS Dejean.

2. *Selenophorus pyritosus* Dejean.

*Selenophorus pyritosus* DEJEAN, Spéc. Gén. Col., IV, 1834, p. 84.

Three examples, Nueva Gerona, March, 1913.

3. *Selenophorus chalybeus* Dejean.

*Selenophorus chalybeus* DEJEAN, Spéc. Gén. Col., IV, 1834, p. 110.

Two specimens taken at Nueva Gerona in March and one on May 31, 1913.

4. *Selenophorus discopunctatus* Dejean.

*Selenophorus discopunctatus* DEJEAN, Spéc. Gén. Col., IV, 1834, p. 92.

Three specimens, Nueva Gerona, March, 1913. ("Correctly identified." E. A. Schwarz.)

5. *Selenophorus*? sp?

One female example taken at Los Indios in September. ("In this genus it is absolutely necessary to have the male sex to determine even the genus." E. A. Schwarz.)

## Family DYSTICIDÆ.

## Genus LACCOPHILUS Leach.

6. *Laccophilus americanus* Aubé.

*Laccophilus americanus* AUBÉ, Spéc. Gén. Col., Vol. VI, 1838, p. 422.

One specimen, Nueva Gerona, March, 1913.

## Family HYDROPHILIDÆ.

## Genus HYDROPHILUS Fabricius.

7. *Hydrophilus intermedius* Jacquelin-Duval.

*Hydrophilus intermedius* JACQUELIN-DUVAL, in Sagra's Hist. Nat. de Cuba, VII, 1857, p. 22.

A male taken May 3 and a female taken May 8 at Nueva Gerona.

## Genus DACTYLOSTERNUM Wollaston.

8. *Dactylosternum abdominale* (Fabricius).

*Sphæridium abdominale* FABRICIUS, Syst. Eleuth., I, p. 94.

Six specimens taken at Nueva Gerona, June 1, 1912.

Family STAPHYLINIDÆ.

Genus CREOPHILUS Kirby.

9. *Creophilus villosus* (Gravenhorst).

*Staphylinus villosus* GRAVENHORST, Mon. Col. Mic., 1806, p. 160.

One example taken at Los Indios, September 19, 1912.

Family PHALACRIDÆ.

Genus PHALACRUS Paykull.

10. *Phalacrus politus* Melsheimer.

*Phalacrus politus* MELSHEIMER, Proc. Acad. Nat. Sci., Phila., II, 1844, p. 102.

One specimen, Nueva Gerona, May 31.

Family COCCINELLIDÆ.

Genus CYCLONEDA Crotch.

11. *Cycloneda sanguinea* (Mulsant).

*Daulis sanguinea* MULSANT, Spéc. des Col., 1850, p. 326.

Ten specimens, the dates of capture ranging from May to November.

12. *Cycloneda oculata* (Fabricius).

*Coccinella oculata* FABRICIUS, Syst. Ent., I, pt. 1, 1792, p. 287.

Three examples, Nueva Gerona, June and July.

Genus SCYMNUS Klug.

13. *Scymnus roseicollis* Mulsant.

*Scymnus roseicollis* MULSANT, Opuscles Entom. III, 1853, p. 142.

One specimen taken at Nueva Gerona, May 8. (Det. E. A. Schwarz)

Family HISTERIDÆ.

Genus HISTER Linnæus.

14. *Hister cœnosus* Erichson.

*Hister cœnosus* ERICHSON, in Klug's Jahrbücher der Insektenkunde, 1834, p. 34.

One example, Nueva Gerona, May.

Genus CARCINOPS Marseul.

15. *Carcinops* sp? near *tenellus* Erichson.

One specimen taken at Los Indios, October. ("This may or may not be *C. tenellus*." E. A. Schwarz.)

## Family NITIDULIDÆ.

## Genus CARPOPHILUS Stephens.

16. *Carpophilus dimidiatus* (Fabricius).

*Nitidula dimidiata* FABRICIUS, Syst. Eleuth. I, 1801, p. 354.

Two specimens taken at Los Indios in November. (Det. E. A. Schwarz.)

## Genus PALLODES Erichson.

17. *Pallodes ruficollis* Reitter.

*Pallodes ruficollis* REITTER, Verh. Ver. Brünn, XII, 1873, p. 135.

Six specimens taken at Nueva Gerona, May, 1912.

## Family ELATERIDÆ.

## Genus CALAIS Castelnau.

18. *Calais patricius* (Jacquelin-Duval).

*Alaus patricius* JACQUELIN-DUVAL, in Sagra's Hist. Nat. de Cuba, VII, 1857, p. 33, Pl. VII, fig. 15.

One specimen taken at Los Indios, September.

## Genus HEMIRHIPUS Latreille.

19. *Hemirhipus fascicularis* (Fabricius).

*Elater fascicularis* FABRICIUS, Mantissa, I, 1787, p. 171.

One example, Nueva Gerona, July.

## Genus MONOCREPIDIUS Eschscholtz.

20. *Monocrepidius lividus* (DeGeer).

*Elater lividus* DEGEER, Hist. des Ins., IV, 1774, p. 162, Pl. XVIII, fig. 13.

Two, one from Nueva Gerona, the other from Los Indios, both taken in June.

21. *Monocrepidius bifoveatus* Chevrolat.

*Monocrepidius bifoveatus* CHEVROLAT, Ann. Soc. Ent. France (4), V, 1865, p. 603.

Four specimens, Nueva Gerona, May, and one taken June 1, 1912.

## Genus BLAUTA Leconte.

22. *Blauta cribraria* (Germar).

*Elater cribraria* GERMAR, Zeitschr. Ent., V, 1844, p. 178.

One specimen, Nueva Gerona, June 1, 1912.



Genus DICREPIDIUS Eschscholtz.

23. **Dicrepidius ramicornis** Beauvois.

*Elater ramicornis* BEAUVOIS, Ins. Rec. en Afrique et Amérique, 1805, p. 10.

Two specimens, one taken at Los Indios in September, 1912, and the other at Nueva Gerona in March, 1913. (*Det.* E. A. Schwarz.)

Genus PYROPHORUS Illiger.

24. **Pyrophorus noctilucus** (Linnæus).

*Elater noctilucus* LINNÆUS, Syst. Nat., Ed. X, 1750, p. 404.

Eleven specimens, all of which were taken in March, except two, which were taken in July.

25. **Pyrophorus lychniferus** Germar.

*Pyrophorus lychniferus* GERMAR, Zeitschr. Ent., III, 1841, p. 32.

Four examples, two collected at Nueva Gerona in March, and two at Los Indios in May.

26. **Pyrophorus havaniensis** (Castelnau).

*Stilpnus havaniensis* CASTELNAU, Hist. Nat. Col., I, 1840, p. 236.

Seven specimens taken at Nueva Gerona and Los Indios in May.

27. **Pyrophorus hesperus** Candèze.

*Pyrophorus hesperus* CANDÈZE, Monogr. Elater., IV, 1863, p. 18.

One specimen, Nueva Gerona, July.

28. **Pyrophorus** sp.?

Two specimens, Nueva Gerona, July, somewhat resembling *P. physoderus* Germar ("which it certainly is not," E. A. Schwarz), but much narrower, and otherwise differing from that species. They are too small and too narrow to be referred to *P. lychnus* Candèze.

Family BUPRESTIDÆ.

Genus PSILOPTERA Solier.

29. **Psiloptera straba** Chevrolat.

*Psiloptera straba* CHEVROLAT, Ann. Soc. Ent. de France, 1867, p. 575.

One specimen taken at Nueva Gerona, July 31, 1912. (*Det.* E. A. Schwarz.)

30. **Psiloptera torquata** (Dalman).

*Buprestis torquata* DALMAN, Analecta Entomologica, 1823, p. 54.

One, Nueva Gerona, August 30.

## Genus ACTENODES Lacordaire.

31. *Actenodes sobrina* (Mannerheim).*Chrysobothris sobrina* MANNERHEIM, Bull. Soc. Imp. Nat. Moscou, VIII, 1837, p. 79.

A single specimen, taken at Nueva Gerona, July 13, 1912.

## Family MALACHIIDÆ.

## Genus ATTALUS Erichson.

32. *Attalus?* sp.?

One specimen, McKinley, July 24, 1912.

The specimen has the tibia armed with a long spur, as is the case with *Attalus* (?) *calcaratus* Gorham (cf. *Biologia Centrali-americana*, Coleoptera, Vol. III, pt. 2, p. 319). ("This little Malachiid cannot even be named generically from the single specimen; at any rate it is not advisable to describe it, though undoubtedly new." *E. A. Schwarz*.)

## Family LYCIDÆ.

## Genus THONALMUS Bourgeois.

33. *Thonalmus aulicus* (Jacquelin-Duval).*Calopteron aulicum* JACQUELIN-DUVAL, in Sagra's Hist. Nat. de Cuba, VII, 1857, p. 77, Pl. VII, fig. 18.

Two specimens taken May 31 at Nueva Gerona.

## Family LAMPYRIDÆ.

## Genus PYGOLAMPIS Dejean.

34. *Pygolampis apoplectica* (E. Olivier).*Photinus apoplecticus* E. OLIVIER, Bull. Soc. Zoöl. France, XXIV, 1899, p. 92.One specimen caught at Nueva Gerona in June. (*Det.* C. W. Leng.)

## Genus CALLOPISMA Motschulsky.

35. *Callopisma demissa* (E. Olivier).*Lychnuris demissa* E. OLIVIER, Bull. Soc. Zoöl. France, XXIV, 1899, p. 90.Four examples taken from September to November at Los Indios. (*Det.* C. W. Leng.)

## Genus LECONTEA E. Olivier.

36. *Lecontea gamma* (Jacquelin-Duval).*Photinus gamma* JACQUELIN-DUVAL, in Sagra's Hist. Nat. de Cuba, VII, 1857, p. 38.One specimen taken at Los Indios in September. (*Det.* C. W. Leng.)

Family PTINIDÆ.

Genus TETRAPRIOCERA Horn.

37. *Tetrapriocera tridens* (Fabricius).

*Apate tridens* FABRICIUS, Ent. Syst., I, 1792, p. 362.

Two specimens taken at Los Indios, one in October, the other in November.

Family LUCANIDÆ.

Genus NELEUS Kaup.

38. *Neleus interstitialis* (Eschscholtz).

*Passalus interstitialis* ESCHSCHOLTZ, Nouv. Mém. Soc. Nat. Moscou, I, 1829, p. 18.

A large series of specimens obtained March 27, 1913, from a rotting log on the Caballos Mountains.

Family SCARABÆIDÆ.

Genus ONITICELLUS Ziegler.

39. *Oniticellus cubiensis* Castelnau.

*Oniticellus cubiensis* CASTELNAU, Hist. Nat. Col., II, 1841, p. 10.

One individual, Nueva Gerona, September 10. (*Det.* E. A. Schwarz.)

Genus ATHYREUS MacLeay.

40. *Athyreus castaneus* Guérin-Ménéville.

*Athyreus castaneus* GUÉRIN-MENEVILLE, Icones Reg. Anim., 1838, p. 88, Pl. XXII, fig. 7.

One example, Los Indios, September, 1912.

Genus PHYLLOPHAGA Harris.

41. *Phyllophaga subsericans* (Jacquelin-Duval).

*Ancylonycha subsericans* JACQUELIN-DUVAL, in Sagra's Hist. Nat. de Cuba, VII, 1857, p. 56.

Five specimens, four taken in July and one in March.

Genus RUTELA Latreille.

42. *Rutela formosa* Burmeister.

*Rutela formosa* BURMEISTER, Handb., IV, pt. 1, 1844, p. 383.

One specimen, Nueva Gerona, July 13. It is much darker and greener than the series of specimens in the Ulke Collection from Key West. This is due to the widening of the dark bands and lines on the elytra, these lines being quite narrow in the specimens from Florida.

Genus *DYSCINETUS* Harold.43. *Dyscinetus picipes* (Burmeister).

*Chalepus picipes* BURMEISTER, Handb., V, 1847, p. 79.

Five specimens, three from Nueva Gerona, taken in May, June, and July, and two taken at Los Indios in September.

Genus *STRATEGUS* Hope.44. *Strategus titanus* (Fabricius).

*Scarabæus titanus* FABRICIUS, Syst. Ent., I, 1792, p. 13.

A single female of this species, which is common in Cuba.

45. *Strategus anachoreta* Burmeister.

*Strategus anachoreta* BURMEISTER, Handb., V, 1847, p. 134.

A long series of females and a single male; Caballos Mountains, July. Mr. Link informed me that he collected most of the specimens from an abandoned cistern left upon the mountains by turpentine-gatherers. The cistern was open and full of water, into which the beetles had fallen and been drowned, and Mr. Link fished them out.

Genus *PHILEURUS* Latreille.46. *Phileurus quadrituberculatus* (Palisot de Beauvois).

*Scarabæus quadrituberculatus* PALISOT DE BEAUVOIS, Ins. Afr. et. Amer., p. 42, Pl. 1b, fig. 5.

One male found crawling on a log at Nueva Gerona, March 27, 1913.

## Family CERAMBYCIDÆ.

Genus *STENODONTES* Serville.47. *Stenodontes chevrolati* Gahan.

*Stenodontes chevrolati* GAHAN, Ann. & Mag. Nat. Hist. (6) VI, 1890, p. 23.

A long series of both males and females collected from a log of some kind of hard wood, which Mr. Link found rotting on the Caballos Mountains, March 27, 1913. The wood was soft and full of large white grubs, which Mr. Link thinks were the larvæ of this same species. The collector says that if he had possessed an axe at the time he might have gathered a peck of the beetles.

Genus DENDROBLAPTUS Chevrolat.

48. **Dendroblaptus barbiflavus** Chevrolat.

*Dendroblaptus barbiflavus* CHEVROLAT, Rev. Zoöl., 1864, p. 180.

One specimen taken under the bark of a pine tree, June 27, 1912.

In the Academy of Natural Sciences in Philadelphia in the Poey Collection there is a specimen of the species under consideration, bearing the number 956, corresponding in the Manuscript Catalog of the Collection to the name we cite above. There is a broken specimen of the same insect in the collection of the American Museum of Natural History in New York. So far as the writer knows these specimens and the one before him are the only examples of this rare insect available for study at the present time in the United States.

Genus STRONGYLASPIS Thomson.

49. **Strongylaspis corticaria** (Erichson).

*Ergates corticarius* ERICHSON, Schomb. Reise, III, 1848, p. 571.

One specimen taken at Nueva Gerona, July 31.

Genus ELATEROPSIS Chevrolat.

50. **Elateropsis rugosa** Gahan.

*Elateropsis rugosa* GAHAN, Ann. & Mag. Nat. Hist. (6) VI, 1890, p. 28.

Ten specimens, nine taken in June and July, and one in March. They were mostly captured when on the wing.

Genus MONODESMUS.

51. **Monodesmus callidioides** Serville.

*Monodesmus callidioides* SERVILLE, Ann. Soc. Ent. France, 1832, p. 161.

Three specimens taken respectively in March, July, and September.

Genus CRIOCEPHALUS Mulsant.

52. **Criocephalus cubensis** Mutchler.

*Criocephalus cubensis* MUTCHLER, Bull. Am. Mus. Nat. Hist., XXXIII, 1914, p. 345.

Seven specimens, two taken in March, the rest from June to October. (Det. A. E. Schwartz.)

Genus ELAPHIDION Serville.

53. **Elaphidion irroratum** (Linnæus).

*Cerambyx irroratus* LINNÆUS, Syst. Nat. Ed., XII, II, 1767, p. 633.

Four specimens captured in March, June and July.

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54. *Elaphidion signaticolle* Chevrolat.*Elaphidion signaticolle* CHEVROLAT, Ann. Soc. Ent. France (4), II, 1862, p. 161.

One specimen taken by Graf, May 8, 1910.

Genus *CHLORIDA* Serville.55. *Chlorida festiva* (Linnæus).*Cerambyx festivus* LINNÆUS, Syst. Nat., Ed. X, 1758, p. 389.

One example taken on the wing at Los Indios in September.

Genus *NEOCLYTUS* Thomson.56. *Neoclytus cordifer* (Klug).*Clytus cordifer* KLUG, Preis-Verz. Insekten, 1829, p. 13.

One specimen taken at Los Indios in September.

Family *CHRYSOMELIDÆ*.Genus *GLYPTOSCELIS* (*Heteraspis* Blanchard).57. *Glyptoscelis* sp. nov. near *G. nana* Suffrian.

Seven specimens, taken at Nueva Gerona, six in May and one in July. (Det. E. A. Schwarz.)

Genus *COLASPIS* Fabricius.58. *Colaspis smaragdula* Olivier.*Colaspis smaragdula* OLIVIER, Entomologie, VI, 1808, p. 883, Pl. I, fig. 9.

One specimen taken at Los Indios in November.

Genus *HALTICA* Geoffroy.59. *Haltica jamaicensis* (Fabricius).*Galeruca jamaicensis* FABRICIUS, Ent. Syst., I, Pt. II, 1792, p. 16.

One specimen taken at Nueva Gerona, May 31. (Det. E. A. Schwarz.)

60. *Haltica occidentalis* Suffrian.*Haltica occidentalis* SUFFRIAN, Wieg. Archiv., 1868, I, p. 197.

Six, Nueva Gerona, May. (Det. E. A. Schwarz.)

61. *Haltica* (*Crepidodera*) *asphaltina* Suffrian.*Haltica asphaltina* SUFFRIAN, Wieg. Archiv., 1868, I, p. 201.

A single specimen taken at Nueva Gerona. (Det. E. A. Schwarz.)

Genus CEROTOMA Chevrolat.

62. **Cerotoma denticornis** (Fabricius).

*Crioceris denticornis* FABRICIUS, Syst. Eleuth., I, p. 457.

One specimen taken at Nueva Gerona, September 10, 1912. (Det. E. A. Schwarz.)

Family BRUCHIDÆ.

Genus PACHYMERUS Thunberg & Latreille.

63. **Pachymerus gleditsiæ** (Linnæus).

*Bruchus gleditsiæ* LINNÆUS, Syst. Nat., Ed. XII, 1767, p. 605.

Two specimens taken at Los Indios in September. (Det. E. A. Schwarz.)

Genus ZABROTES Horn (*Spermophagus* Schöenherr).

64. **Zabrotes** sp. (?)

Two specimens, Los Indios, November. (Det. E. A. Schwarz.)

Genus BRUCHUS Linnæus.

65. **Bruchus relictus** Suffrian.

*Bruchus relictus* SUFFRIAN, Wiegmann's Archiv, XXXV, 1870, I, p. 156.

Two specimens, Nueva Gerona, May. (Det. E. A. Schwarz.)

Family TENEBRIONIDÆ.

Genus BLAPSTINUS Latreille.

66. **Blapstinus punctatus** (Fabricius).

*Blaps punctata* FABRICIUS, Ent. Syst., I, 1792, p. 109.

A single example, taken at Los Indios in September.

Genus PYANISIA Castelnau.

67. **Pyanisia tristis** Castelnau.

*Pyanisia tristis* CASTELNAU, Hist. Nat. Col., II, 1840, p. 236.

Four specimens taken at Nueva Gerona, March, 1913.

Family MONOMMIDÆ.

Genus HYPORRHAGUS.

68. **Hyporrhagus marginatus** (Fabricius).

*Tritoma marginatum* FABRICIUS, Ent. Syst., II, 1792, p. 506.

*Sphæridium abdominale* FABRICIUS, Syst. Eleuth., I, 1792, p. 94.

One specimen, Los Indios, September. (Det. E. A. Schwarz.)

## Family MORDELLIDÆ.

## Genus MORDELLISTENA Costa.

69. **Mordellistena nigricans** (Melsheimer).

*Mordella nigricans* MELSHEIMER, Proc. Acad. Nat. Sci. Philada., II, 1840, p. 313.

One specimen, Nueva Gerona, May 31.

## Family ATTELABIDÆ.

## Genus ATTELABUS Linnæus.

70. **Attelabus armatus** Gyllenhal.

*Attelabus armatus* GYLLENHAL, in Schœnherr's Gen. Curc., I, 1833, p. 208.

A single specimen taken at Nueva Gerona, June.

## Family OTIORHYNCHIDÆ.

## Genus PACHNÆUS Schœnherr.

71. **Pachnæus litus** (Germar).

*Cyphus litus* GERMAR, Ins. Spec. Nov., 1824, p. 431.

Fifteen specimens taken at Nueva Gerona in June.

## Genus LACHNOPUS Schœnherr.

72. **Lachnopus hispidus** Gyllenhal.

*Lachnopus hispidus* GYLLENHAL, in Schœnherr's Gen. et Spec. Curc., II, 1834, p. 34.

Four examples, Nueva Gerona, June.

## 73. Gen? sp.

("This insect is quite unknown to me and to Mr. Pierce, but a larger series is necessary to determine its generic status." *E. A. Schwarz*.)

One specimen captured at Nueva Gerona in July.

## Family CURCULIONIDÆ.

## Genus BARIS Germar.

74. **Baris azurea** (Boheman).

*Baridius azureus* BOHEMAN, in Schœnherr's Gen. et Spec. Curc., III, 1836, p. 668.

One specimen, Nueva Gerona, June.

75. **Baris exigua** Casey.

*Baris exigua* CASEY, Ann. N. Y. Acad. Sci., VI, 1892, p. 508.

One single individual taken at Los Indios in November.



Genus CALANDRA Clairville.

76. **Calandra oryzæ**.

*Curculio oryzæ* LINNÆUS, Amœn. Acad., VI, 1763, p. 395.

One specimen, Los Indios, November.

Family IPIDÆ.

Genus XYLEBORUS Eichoff.

77. **Xyleborus fuscatus** Eichoff.

*Xyleborus fuscatus* EICHOFF, Berl. Ent. Zeitschr., 1867, p. 400.

Fourteen specimens taken at Los Indios in October.

78. **Xyleborus** sp.?, near *pubescens* Zimmermann.

Cf. Zimmerman, *Synopsis Scolytidæ*, Trans. Am. Ent. Soc., II, 1868, p. 145.

Thirteen specimens taken at Los Indios in October. (*Det.* E. A. Schwarz.)

79. **Xyleborus** sp.?

One specimen taken at Los Indios in October. (*Det.* E. A. Schwarz.)

80. **Xyleborus** sp?

One specimen from Los Indios, taken in October. (*Det.* E. A. Schwarz.)

## VIII. RHYNCHOTA OF THE ISLE OF PINES.

BY OTTO HEIDEMANN AND HERBERT OSBORN.<sup>1</sup>

Suborder **HEMIPTERA-HOMOPTERA.**

Family *FULGORIDÆ.*

Subfamily *DICTYOPHARINÆ.*

Genus *DICTYOPHARA* Germar.

### 1. *D. recurvirostris* Stål. (Osborn *det.*)

One specimen taken at McKinley, July 24. The reference to this species is made in spite of the fact that the only individual at hand<sup>2</sup> differs slightly from the description. (2)

<sup>1</sup> The Editor of the ANNALS OF THE CARNEGIE MUSEUM, who is also the Curator of Entomology in that institution, has decided to attribute the following list jointly to Mr. Otto Heidemann and Dr. Herbert Osborn. When it had been determined to publish an account of the collection of Rhynchota made on the island by Mr. Link, a rough preliminary classification according to families was made by the writer and his assistant, Mr. Hugo Kahl. The specimens were then submitted to Mr. Otto Heidemann, of the U. S. Department of Agriculture and the U. S. National Museum, for final study and identification. The greater portion of the Hemiptera-Heteroptera had been already identified by Mr. Heidemann when his labors were interrupted by his untimely death. Part of the Hemiptera-Homoptera had also been determined by Mr. E. H. Gibson, who was associated with Mr. Heidemann. At the suggestion of Mr. Gibson, and with the concurrent advice of Dr. L. O. Howard, the collection was turned over to Dr. Herbert Osborn, of the Ohio State University, with the request that he would report upon them. This he kindly consented to do, and a list of identifications with notes has been recently received. In its final form the present writer is responsible for the arrangement of the paper and for the description of *O. linki*, the task of describing which was relegated to him by Dr. Osborn, who determined it to be new to science. At the suggestion of Dr. Osborn it has been decided to accompany each species with the name of the person who identified it. Though these insects are not conspicuous, they play an important rôle, and it is of interest to have even a partial list of the species which occur upon the Isle of Pines, from which hitherto very few, if any, species have been reported.

W. J. HOLLAND.

<sup>2</sup> The numbers in parentheses ( ) after each species are the field-numbers identifying the specimens in our first "rough list."

## Genus RHAMPHIXIUS Fowler.

2. *R. pallidus*, Osborn, sp. nov.

Smaller and lighter colored than *championi*, eyes shorter. Length 6 mm.

Vertex reduced to a line between the eyes, margins elevated, separating anteriorly and sloping to the truncate tip. Front widening to clypeus, with a sharp median carina on the lower portion. Eyes ovate, emarginate above the eyes. Color pallid greenish yellow, the ocelli orange, eyes pallid brown, scutellar carinae more greenish, abdomen greenish, legs pallid, with tips of tarsi dark.

One specimen, Columbia, Aug. 1. The legs and tips of elytra are mutilated. While barely possible that this may be the male of *R. championi* described from Guatemala from a female, the difference in color, and shape of eyes, as well as the smaller size, precludes the reference to that species. (Type in Carnegie Museum.) (3)

## Subfamily FLATINÆ.

## Gen. ORMENIS Stål.

3. *O. albipennis* var. *brevis* Van Duzee. (Osborn *det.*)

A single specimen taken at Nueva Gerona, July 25. (9)

4. *O. linki* sp. nov. (Holland *descripsit*).

Tegmina in expanded specimens semitranslucent pale brownish testaceous, with the costal margin for about three-fourths of its length from the base creamy white. Just behind this white margin at the base the brown color of the wing is intensified, forming a line of darker brown. At the lower outer angle of the tegmina there are a few obscure darker brown markings, and near the base above the inner margin there are a number of raised pustular prominences, which are dark at their apices. In unexpanded specimens the tegmina appear more or less opaquely dark brown, save on the anterior light margin. The hind wings are whitish, shaded outwardly with pale pinkish, the veins dark brown. Head short, eyes circular and prominent, as broad as the pronotum. Mesonotum broader than long, concavely emarginate on either side in front, rounded behind. Scutellum small and regularly triangular. Body and legs in dried state pale testaceous, probably green in life. Length 3.5 mm.; width at shoulders 1 mm.; expanse of tegmina when spread 8 mm.

Type in Carnegie Museum, from McKinley, July 24.

This is one of the smallest species of the genus, being less than two-thirds the size of *O. pruinosa*.

Eighteen specimens were taken: four at Santa Fé, July 23; twelve at McKinley, July 24; one at Nueva Gerona, July 25, and one at Columbia, August 1. Four of the specimens have been donated to the U. S. National Museum. (10)

Subfamily CIXIINÆ.

Genus MNEMOSYNE Stål.

5. *M. cubana* Stål. (Osborn *det.*)

A single specimen, Nueva Gerona, Sept. 9.

Although represented by only one individual, there seems to be no doubt that this represents Stål's species. (4)

Genus MYNDUS Stål.

6. *M. crudus* Van Duzee. (Osborn *det.*)

One example, Santa Fé, July 23. (7)

Genus OLIARUS Stål.

7. *O. complectus* Ball. (Osborn *det.*)

A male taken at Nueva Gerona, July 25, and a female caught at the same place, September 10. This is a common species in the United States. (5)

8. *O. lunatus* (Fabricius). (Osborn *det.*)

One specimen captured at Santa Fé, July 23. (6)

Subfamily DELPHACINÆ.

Gen. STENOCRANUS Fieber.

9. *S. dorsalis* Fitch. (Osborn *det.*)

One example captured at Nueva Gerona, July 25. There seems to be no distinct character by means of which to differentiate the specimen from the nearctic species. (8)

Family CERCOPIDÆ.

Genus LEPYRONIA Serville.

10. *L. angulifera* Uhler. (Kahl *det.*)

Of this insect sixty-six specimens were collected, as follows: fifteen at Santa Fé, July 23, twenty-two at McKinley, July 24, five at Nueva

Gerona, July 25, twenty-four at Columbia, August 1. Eight specimens have been donated to the U. S. National Museum. (11)

Family *MEMBRACIDÆ*.

Genus *STICTOCEPHALA* Stål.

11. *S. rotundata* Stål. (Gibson *det.*)

Four specimens: one taken at McKinley, July 24, one at Nueva Gerona, July 25, two, ♂ and ♀, at Columbia, Aug. 1. One has been given to the U. S. National Museum. (1)

Subfamily *BYTHOSCOPINÆ*.

Genus *AGALLIA* Curtis.

12. *A. fumosa* Uhler. (Gibson *det.*)

Forty-one specimens taken at Nueva Gerona, September 9-11. Eight specimens have been deposited in the U. S. National Museum. (27)

Family *CICADELLIDÆ*.

Subfamily *CICADELLINÆ*.

Genus *CICADELLA* (Latreille.)

13. *C. similis* Walker. (Osborn *det.*)

One hundred and fifty-nine specimens: eleven at Santa Fé, July 23; three at McKinley, July 24; one hundred and forty-five at Nueva Gerona, July 25. Nine specimens have been presented to the U. S. National Museum. This is a very abundant species throughout the West Indies, Central America, and southern Mexico. (12)

Genus *KOLLA* Distant.

14. *K. hasti* Ball. (Osborn *det.*)

Twenty-one specimens: three at Santa Fé, July 23; one at McKinley, July 24; fifteen at Nueva Gerona, July 25; two at Columbia, August 1. Five of these have been given the U. S. National Museum.

Genus *DRÆCULACEPHALA* Ball.

15. *D. sagittifera* Uhler. (Osborn *det.*)

Sixteen specimens: one at McKinley, July 24; fourteen at Nueva Gerona, July 25; one at Columbia, August 1. Four specimens have been presented to the U. S. National Museum. (13)

16. *D. minor* Walker. (Gibson *det.*)

Eighteen specimens: eight at Santa Fé, July 23, seven at McKinley, July 24; six at Nueva Gerona, July 25-27; one at Columbia, August 1. Four have been donated to the U. S. National Museum. (18)

## Subfamily JASSINÆ.

## Genus SPANGBERGIELLA Signoret.

17. *S. vulnerata* Uhler. (Gibson *det.*)

A single specimen taken at Columbia, August 1.

## Genus DELTOCEPHALUS Burmeister.

18. *D. obtectus* Osborn & Ball. (Osborn *det.*)

One example caught at Nueva Gerona, July 25.

19. *D. flavicosta* Stål. (Osborn *det.*)

A single specimen taken at McKinley, August 1.

20. *D. colonus* Uhler. (Gibson *det.*)

One, captured at Santa Fé, July 23.

## Genus PHLEPSIUS Fieber.

21. *P. cinereus* Van Duzee.

Two examples, captured at Nueva Gerona, July 25.

## Genus ACINOPTERUS Van Duzee.

22. *A. acuminatus* Van Duzee. (Osborn *det.*)

Two, one at McKinley, July 24, and one at Columbia, August 1.

## Genus CHLOROTETTIX Van Duzee.

23. *C. viridia* Van Duzee. (Osborn *det.*)

Eighteen specimens: eight at Santa Fé, July 23; seven at Nueva Gerona, July 25-27; three at Columbia, August 1. Four have been given to the U. S. National Museum. (26)

## Genus BALCLUTHA Kirkaldy.

24. *B. abdominalis* Van Duzee. (Osborn *det.*)

One, McKinley, July 24. (21)

## Genus EUSCELIS Brullé.

25. *E. exitiosa* Uhler. (Osborn *det.*)

One, taken at McKinley, July 24, one at Nueva Gerona, July 25, and two at Nueva Gerona, Sept. 14.

They belong to the form described by Uhler as *picturatus*, between which and typical *exitiosa* there seems to be no real difference, except in the darker color. (16), (17), (20)

Suborder **HEMIPTERA-HETEROPTERA.**

Family *PENTATOMIDÆ*.

Subfamily *CYDNINÆ*.

Genus *THYREOCORIS* Schrank.

26. ***T. minuta*** Uhler. (Heidemmann, *det.*)

A single specimen caught at Santa Fé, July 23. (28)

Subfamily *PENTATOMINÆ*.

Genus *MORMIDEA* Amyot & Serville.

27. ***M. albisignis*** Stål. (Heidemmann, *det.*)

One specimen taken at Columbia, August 1. (32)

28. ***M. angustata*** Stål. (Heidemmann, *det.*)

Ninety-seven specimens: eight, taken at Santa Fé, July 23; fifteen at McKinley, July 24; twenty-one at Nueva Gerona, July 25; and fifty-three at Columbia, August 1. (33), (34)

29. ***M. linki*** Heidemann, *sp. nov.*

Approaching *M. ypsilon*, but narrower, the humeral spines strong and directed forward; the raised ivory-white submargin of the scutellum straight. Length 6.5–7 mm. Width of humeri 3 mm.

Head longer than wide, tylus slightly passing the jugæ; antennal joints 3–4–5, subequal; prothorax with lateral border deeply sinuate, the spines strong and directed outward and forward; scutellum with a strongly raised polished ivory area parallel to the margin, narrowing and disappearing before the apex. Color light yellowish, marked with black. Two stripes of black punctures on the head and thorax; the humeral angles and spines, disk of scutellum, elytra, except narrow border, black. Membrane light, unspotted. Antennæ and legs yellowish, with numerous black points. Beneath yellowish, with a stripe of black punctures on thorax in line with the eyes and the black spiracles. Black spots on the pro-, meso-, and metathorax, followed by stripe of black punctures on the abdomen. A median row of black points on abdomen.

Forty-one specimens: twelve from Nueva Gerona, June 1–July 25; four from Santa Fé, July 23; eleven from McKinley, July 24; fourteen from Columbia, August 1.

Described from eight specimens, taken at Columbia and McKinley, which were submitted to Mr. Heidemann for study and determination, and to which he gave the above specific name, having decided that they were new to science. The description here supplied will serve to distinguish the species, which Mr. Heidemann had intended to name in honor of the collector, the late Mr. Gustav A. Link. (Types in Carnegie Museum, paratypes in U. S. National Museum). (H. O.)  
(35), (36)

Genus SOLUBEA Bergroth.

(*Æbalus* Stål)

30. **S. pugnax** (Fabricius) (Heidemann *det.*)

One specimen from Nueva Gerona, July 25. This species is common in the southern United States. (31)

Genus EUSCHISTUS Dallas.

31. **E. ursus** Van Duzee. (Heidemann *det.*)

One specimen from Columbia, August 1. (30)

Genus THYANTA Stål.

32. **T. perditor** (Fabricius). (Heidemann *det.*)

One taken at Nueva Gerona, July 25; and another caught at Columbia, August 1. This is a common species throughout the nearctic and neotropical regions of America. (29)

Family COREIDÆ.

Subfamily MYCTINÆ.

Genus ACANTHOCERUS Palisot de Beauvois.

(*Hymenophora* Amyot & Serville)

33. **A. (Hymenophora) lobata** Burmeister. (Heidemann *det.*)

One specimen, Nueva Gerona, June 1. (42)

Subfamily ANISOSCELINÆ.

Genus LEPTOGLOSSUS Guérin.

34. **L. phyllopus** (Linnæus). (Heidemann *det.*)

Two taken at Nueva Gerona, August 21. (41)



Subfamily CHARIESTERINÆ.

Genus CHARIESTERUS Laporte.

35. **C. gracilicornis** Stål. (Osborn *det.*)

One male from Santa Fé, July 23; one female from Nueva Gerona, July 25. (43)

36. **C. sp.** (?)

One specimen, a nymph, from Santa Fé, July 23. (39)

Subfamily ALYDINÆ.

Genus LEPTOCORISA Latreille.

37. **L. filiformis** (Fabricius). (Heidemann *det.*)

One specimen, Nueva Gerona, July 25. (40)

Genus HYALYMENUS Amyot & Serville.

38. **H. pallescens** Stål. (Osborn *det.*)

One, Santa Fé, July 23; one, McKinley, July 24; one, Nueva Gerona, July 25, one, Columbia, August 1. (44)

Subfamily CORIZINÆ.

Genus CORIZUS Fallén.

39. **C. sidæ** (Fabricius). (Osborn *det.*)

Two males and two females, Nueva Gerona, September 10. (37), (38)

Family LYGÆIDÆ.

Subfamily PACHYGRONTHINÆ.

Genus ŒDANCALA Amyot & Serville.

40. **O. cubana** Stål. (Osborn *det.*)

Ninety specimens: five, Santa Fé, July 23; twenty-five, McKinley, July 24; six, Nueva Gerona, July 25; fifty-four, Columbia, August 1. Eight specimens have been donated to the U. S. National Museum. (49)

41. **O. crassimana** (Fabricius). (Osborn *det.*)

Thirty-one specimens: nine, Santa Fé, July 23; fifteen, McKinley, July 24; two, Nueva Gerona, July 25; five, Columbia, August 1. Six have been given to the U. S. National Museum. (50)

## Subfamily APHANINÆ.

## Genus PAMERA Say.

42. **P. longula** Dallas. (Osborn *det.*)

Thirty-five specimens: two, Santa Fé, July 23; nineteen, McKinley, July 24; one, Nueva Gerona, July 25; thirteen, Columbia, August 1. Five have been sent to the U. S. National Museum. (45)

43. **P. parvula** Dallas. (Osborn *det.*)

Ten specimens: nine, Nueva Gerona, July 25; one, Columbia, August 1. Four presented to the U. S. National Museum. (46)

44. **P. vicinalis** Dallas. (Osborn *det.*)

One specimen, Nueva Gerona, September 10. (47)

45. **Gen.? sp.?**

Nymph, McKinley, July 24. (48)

## Subfamily LYGÆINÆ.

## Genus ONCOPELTUS Stål.

46. **O. varicolor** (Fabricius). (Heidemann *det.*)

One, Nueva Gerona, June 1. (52)

## Family PYRRHOCORIDÆ.

## Genus LARGUS Hahn.

(*Euryophthalmus* Laporte)

47. **L. sellatus** Guérin. (Heidemann *det.*)

Four specimens: one, Nueva Gerona, June 1; one, McKinley, July 24; two, Los Indios, September and October. (51)

## Genus DYSDERCUS Amyot &amp; Serville.

48. **D. mimus** Say. (Heidemann *det.*)

Two specimens, Nueva Gerona, September 10. (53)

49. **D. suturellus** Herrich-Schæffer. (Heidemann *det.*)

One, Los Indios, November. (54)

50. **D. sanguinarius** Stål. (Heidemann *det.*)

Nine specimens, all taken at Nueva Gerona, June 1 to July 31. One specimen sent to the U. S. National Museum. (55), (56), (57)

Family *REDUVIIDÆ*.

Subfamily APIOMERINÆ.

Genus APIOMERUS Hahn.

51. *A. hirtipes* (Fabricius). (Heidemann *det.*)

Eight specimens taken at Nueva Gerona from June 1 to July 31.  
Two presented to the U. S. National Museum. (60)

52. *A. sp.?* (Osborn *det.*)

One mutilated specimen from Columbia, August 1. Perhaps an  
undescribed species. (61)

Subfamily HARPACTORINÆ.

Genus ZELUS Fabricius.

53. *Z. rubidus* Lepeletier & Serville. (Heidemann *det.*)

One example, Nueva Gerona, September 9. (62)

Family *CAPSIDÆ*.

Division MIRARIA.

Genus TRIGONOTYLUS Fieber.

54. *T. breviceps* Jakolov. (Heidemann *det.*)

Five specimens: four from Nueva Gerona, July 23 and August 7,  
one from McKinley, July 24. Two donated to the U. S. National  
Museum. (58)

55. *T. ruficornis* Fallén. (Heidemann *det.*)

Twelve specimens: four, Santa Fé, July 23; two, McKinley, July 24;  
six, Nueva Gerona, July 25 to 27. Three sent to the U. S. National  
Museum. (59)

Family *NAUCORIDÆ*.

Genus PILOCORIS Stål.

56. *P. femoratus* (Palisot de Beauvois). (Heidemann *det.*)

One, captured at Nueva Gerona, July 31. (63)

## IX. THE MAMMALS OF THE ISLE OF PINES.

By W. J. HOLLAND.

The indigenous mammalian fauna of the Isle of Pines is extremely limited. We have no means of knowing whether at the time of the first colonization there existed on the island species which have now become extinct. There is every reason to believe that in Cuba and the other larger Antilles there survived until quite recently a number of forms, the remains of which in a subfossil state have been discovered in various localities. The only such deposit thus far found upon the Isle of Pines was discovered by Mr. Link in a small cave near the northeastern coast in a little hill at the foot of the Sierra Caballos. These fragments partly encrusted with lime formed by drippings from the roof of the cavern were cleansed by Mr. O. A. Peterson and at my request he prepared a report upon them, which I insert after this article. Four of the seven species enumerated by him are still living upon the island, the other three are believed to be extinct. There can be no doubt that from a geological standpoint the deposit on the floor of the cave is quite recent, and assigning these remains the greatest antiquity which may be attributed to them, they do not go further back in time than the late Pleistocene.

In the following list I leave out of account the mammals in domestication, which have been introduced by Europeans.

Order **SIRENIA** (SEA-COWS).

Family **MANATIDÆ** Gray.

Genus **MANATUS** Brünnich.

1. **Manatus manatus** (Linnæus).

The *Manatee* is known to occur in the lagoons about Sigüanea Bay. An effort to secure a license to take a specimen for the Museum was made by Mr. Link, but was unsuccessful.

Order **GLIRES** (RODENTS).

## Family MURIDÆ.

## Genus EPIMYS Trouessart.

2. **Epimys alexandrinus** (Is. Geoffroy). THE ALEXANDRIAN RAT.

Two specimens (C. M. Cat. Mammals, Nos. 2596 and 3401) are referable to this form, which, spreading westward from Egypt to the Iberian Peninsula, no doubt found its way to the Antilles through Spanish shipping.

3. **Epimys decumanus** (Pallas). THE NORWAY RAT.

A specimen (C. M. Cat. Mamm., No. 3402) is apparently an immature individual of this species. The tail is relatively shorter than in the Alexandrian Rat.

## Family OCTODONTIDÆ Waterhouse.

## Genus CAPROMYS Desmarest.

4. **Capromys pilorides relictus** G. W. Allen.

Of this subspecies of *C. pilorides* Say there are three adult females (C. M. Cat. Mamm., Nos. 2404–2406) which were taken by the Links on the banks of the Majagua River in October and November, 1912. They were found on the mangrove bushes in the swampy places which border the stream.

5. **Capromys prehensilis gundlachi** Chapman.

Of this form five adults and three young were returned to the Museum by Mr. Link. (C. M. Cat. Mammals, Nos. 2125, ad. ♂, 2126, ad. ♀, 2127, ad. ♂, 2128, juv. ♀, 2129, juv. ♂, 2130, ad. ♀, 2131, ad. ♂, 2599, juv. ♀). These creatures, like the other species, are arboreal, but live in the upland forests on dry stations, and do not appear to frequent the mangrove swamps.

Order **CHIROPTERA** (BATS).

## Family VESPERTILIONIDÆ.

## Genus EPTESICUS Rafinesque.

6. **Eptesicus fuscus cubensis** Gray.

Only one specimen of this species (C. M. Cat. Mamm., No. 2394) was taken.

Family PHYLLOSTOMIDÆ.<sup>1</sup>

## Genus MACROTUS Gray.

7. *Macrotus waterhousii minor* (Gundlach).

This species is represented by twenty specimens (C. M. Cat. Mamm., Nos. 2376, 2379, 2381-2390 inc., 2393, 2396-2400, inc., and 2402). They were taken at various localities and dates.

## Genus ARTIBEUS Leach.

8. *Artibeus jamaicensis parvipes* Rehn.

Fourteen specimens, many of which are young, were collected by Mr. Link. The adults are represented in the series by C. M. Cat. Mamm., Nos. 2600-2607; the young by Nos. 2377, 2379, 2380, 2391-2392, and 2395.

<sup>1</sup> I am indebted to Mr. H. E. Anthony, of the American Museum of Natural History, for the correct determination of the bats, which I submitted to Dr. J. A. Allen with the request that he would name them. Dr. Allen wrote me that he had turned them over to Mr. Anthony, whose intensive studies in this group enabled him to perform the task with unexampled celerity. I sent the animals to him in New York on Saturday, and the next Tuesday I had the list of names, and on the following day the specimens were back in my hands again. For the kindness of these gentlemen I desire to express my very sincere thanks.

W. J. HOLLAND.





FIG. 1. Approach to the cave (entrance marked by a white cross) in which the Messrs. Link discovered a deposit of subfossil bones.



FIG. 2. The entrance to the cave (marked by a white cross). Mr. John Link standing in the foreground.



X. REPORT UPON THE FOSSIL MATERIAL COLLECTED  
IN 1913 BY THE MESSRS. LINK IN A CAVE IN  
THE ISLE OF PINES.

BY O. A. PETERSON.

(PLATE XXXVI.)

The cave visited by Mr. G. A. Link, Sr., and his son, Mr. John Link, is in a small limestone hill some fifteen or twenty feet above its base (see white cross in cut on Plate XXXVI). Its existence is not generally known, even to the natives of the island. The material has recently been freed from its incrustation of lime. It is in a semi-petrified condition, and some of it may well belong to the late Pleistocene.

Two or three fresh-water snails, too poorly preserved to be identified, and a few limb-bones of snipes and small herons are represented in the collection. Crania and lower jaws of rodents and bats are more numerous and are more easily identified. On the occasion of a recent visit to the American Museum of Natural History I submitted this material to the inspection of Dr. J. A. Allen and Mr. E. H. Anthony, who gave me every facility to compare the specimens with the large material which they have succeeded in accumulating. For their great kindness in lending me their assistance I wish to express my hearty thanks.

Order **GLIRES** (RODENTS).

Family OCTODONTIDÆ Waterhouse.

Genus CAPROMYS Desmarest.

1. **Capromys** sp. (? *nana* Allen.)

A maxillary preserving the cheek-dentition, and representing a young individual (No. 3937) is all the material referable to this genus found in the cave. From the slightly worn teeth and the absence of the last molar I judge that this fragment may represent an immature specimen of *C. nana* described by G. W. Allen in the *Proceedings of the New England Zoölogical Club*, Vol. VI, 1917, p. 54. The last molar, however, was probably smaller and the whole dentition is more tilted backward than in the species recently described by Mr. Allen.

Family CHINCHILLIDÆ.<sup>1</sup>

Genus BOROMYS G. S. Miller.

2. *Boromys torrei* Allen.

Five specimens (Nos. 3938–3942), including skulls and portions of skulls, are referred to this genus. The specimens are placed with *Boromys* because the crania have the supplemental groove at the base of the antorbital foramen, which according to Dr. Miller is the chief cranial character distinguishing *Boromys* from *Brotomys* and *Homopsomys*.<sup>2</sup> The two latter genera have not this excavated groove of the floor of the orbital process. In size the specimens appear to agree best with *B. torrei*.

## Family MURIDÆ.

Genus EPIMYS Trouessart.

3. *Epimys alexandrinus* Is. Geoffroy.

Four lower jaws, Nos. 3943–3946, were compared very carefully by Mr. H. E. Anthony, of the American Museum, and the writer. That the specimens belong to this murine genus there can be no doubt. These rami were not incrustated with lime, a fact of interest in connection with the probable age of this cave material.

## Order INSECTIVORA.

Family NESOPHONTIDÆ Anthony.

Genus NESOPHONTES Anthony.

4. *Nesophontes micrus* Allen.

This genus and species is represented by two specimens, a poorly preserved skull, No. 3934, and a mandibular ramus, No. 3935. Nothing can be added to the complete description given by Anthony<sup>3</sup> based upon the material representing this new family, which has been collected and is preserved in the American Museum of Natural History, where the author of the genus is engaged in systematically studying it.

<sup>1</sup> See Anthony, H. E., *Bull. Am. Mus. Nat. Hist.*, Vol. XXXVII, 1917, p. 186.

<sup>2</sup> *L. c.*, p. 187.

<sup>3</sup> *Bull. Am. Mus. Nat. Hist.*, Vol. XXXV, 1916, p. 725, Pl. XXXII.

Order **CHIROPTERA**.

Family PHYLLOSTOMIDÆ.

Genus MACROTUS Gray.

5. **Macrotus waterhousii minor** (Gundlach).

A single fairly well preserved skull, No. 3936, is placed here. The size of the elevated parietal region, the narrow and cylindrical muzzle, and the relatively large  $P^1$  are features of this specimen, which show agreement with this species of *Macrotus* which now inhabits the island.

Genus ARTIBEUS Leach.

6. **Artibeus jamaicensis parvipes** Rehn.

Ten skulls, one pair of lower jaws, and a number of limb-bones (C. M. Cat. Foss. Vert., Nos. 3922-3933) are referred to this species. So far as the present material shows  $M^3$  is constantly lacking. In his "Catalogue of the Chiroptera" Dobson has shown that the presence or absence of the minute  $M^3$  can scarcely be considered as having even specific value. The skulls of the present collection are smaller than those of average specimens of *A. perspicillatus* and are therefore referred to the form named *parvipes* by Rehn, which is common in Cuba and on the Isle of Pines.

(See Allen, *Bull. Mus. Comp. Zool.*, Vol. LIV, 1911, p. 235, Rehn, J. A. G., *Proc. Acad. Nat. Sci. Philadelphia*, Vol. LIV, p. 639.)

Genus BRACHYPHYLLA Gray.

7. **Brachyphylla nana** Miller.

Six skulls (C. M. Cat. Foss. Vert., Nos. 3916-3921) were found in the floor-deposits of this cave. When directly compared with the types of *B. nana* by Mr. Anthony and the writer, these specimens were seen to be identical, and without hesitation are referred to this Cuban form.

XI. A NEW SPECIES OF FERN (*POLYSTICHUM*  
*JENNINGSI*).

BY L. S. HOPKINS.

(PLATE XXXVII.)

***Polystichum Jenningsi* sp. nov.**

Stipe 2.2–2.4 dm. long, chaffy on entire length, with scales of various sizes, deeply grooved on outer side, the groove continuing along the rachis and into the midrib of pinnæ. Rachis densely clothed with pale linear-lanceolate scales, which are lighter than those of the stipe. Blade 1.7–2 dm. wide, 7.6–8.6 dm. long, proliferous, lanceolate, pinnate, with the lower pinnæ again pinnate only so far as the first pair of pinnules is concerned. Pinnæ, lowest pair 2–2.5 cm. wide, 9–10 cm. long, broadest at the base, pinnatifid, gradually becoming serrate towards the acuminate apex, the under surface bearing numerous pale chaff-like scales, the upper (outer) surface sparsely covered with pale linear (almost capillary) scales, the lowest pair being at about right angles to the rachis, while those of the middle portion of the leaf point obliquely upward; pinnules serrate, with each serration ending in a spine 0.25–1.5 mm. long, sori 1–12 on each segment, large, midway between midrib and margin, strongly confluent when mature.

Type in the Herbarium of the Carnegie Museum, Pittsburgh, Pa. Paratype, collected at the same time and place, number 2991 in my herbarium. Type locality, Nisqually River, near Longmire Springs, Mt. Ranier National Park, Washington.

The new species is easily separated from most members of the genus. In fact its size alone would probably distinguish it at once from all save the var. *inciso-serratum* of *P. munitum*, as it is easily larger than all other species, which occur in the United States. The dimensions given are the actual measurements of the two fronds which have been studied. The plant probably varies somewhat on either side of the dimensions given. It could never be confused with the species *P. lonchitis*, *P. munitum*, and *P. acrostichoides*, which are simply once-pinnate. It is equally distinct from those species which are fully



*Polystichum Jenningsi* L. S. Hopkins. (Type.)  $\frac{2}{3}$  nat. size. No. 9950. (O. E. Jennings Coll.)



bi-pinnate, *P. aculeatum* and *P. Braunii*. Its greater size, being from two to three times as large, separates it from *P. californicum*, *P. Lemmoni*, and *P. scopulinum*. In its general appearance it probably resembles *P. Andersoni* most closely, but is much larger in every way, while it is densely clothed with scales on the under surface of the leaf and sparsely so on the upper surface, whereas *P. Andersoni* is smooth.

The specific name "*Jenningsi*" is given in honor of its collectors, Dr. O. E. and Grace K. Jennings.

At present it is only known from the type-locality.

STATE NORMAL COLLEGE,  
KENT, O.

XII. NOTES UPON THE GENUS LEUCOPHENGHA MIK  
(DIPTERA) WITH DESCRIPTIONS OF SOME NEW  
SPECIES FROM SOUTH AMERICA, WEST AFRICA,  
AND THE PHILIPPINE ISLANDS.

BY HUGO KAHL.

The genus *Leucophenga* was established by Professor Mik<sup>1</sup> for the European *Drosophila maculata* Dufour<sup>2</sup> and he felt justified in doing so, because the costa reaches only to the apex of the third vein; he does not mention anything about the chaetotaxy, but remarks: "Schon Léon Dufour hielt die Art für den Typus einer eigenen Gattung." Dufour described the imago, puparium, and nymph<sup>2</sup> and later the larva.<sup>3</sup> Schiner first separated the species of *Drosophila* into two groups with reference to the length of the costa and includes in the first group the single species *Drosophila maculata* Dufour with costa reaching only to third vein.<sup>4</sup> In 1893 Professor Strobl discovered another European species, a female from Styria, and named it *Leucophenga quinquemaculata*<sup>5</sup> and in his specific description he touches upon the chaetotaxy as follows: "Beborstung des Thorax und Schildchens genau wie bei *maculata*; ebenfalls 2 Sternopleural, 4 Schildchenborsten, etc." Two sternopleural and four scutellar bristles apparently belong to all the species of *Drosophilinæ*, at all events they occur in all the species before me of the genera *Stegana*, *Phortica*, *Drosophila*, and *Scaptomyza*, in *Drosophila amæna* Loew<sup>6</sup> and *Drosophila procnemis* Williston,<sup>7</sup> in *Zaprionus vittiger* Coquillett<sup>8</sup> and in

<sup>1</sup> *Wien. Entom. Zeitg.*, V Jahrg. (1886), p. 317.

<sup>2</sup> *Ann. des Scienc. Natur.*, 2e Série, Tome XII, Zoöl. (1839), p. 50, figs. 91-98.

<sup>3</sup> *Mém. Soc. Lille*, 1845, p. 201-208.

<sup>4</sup> *Fauna Austriaca* (Diptera), II (1864), p. 275.

<sup>5</sup> *Wien. Entom. Zeitg.*, XII Jahrg. (1893), p. 283 with footnote.

<sup>6</sup> *Berl. Ent. Zeitschr.* ("Dipt. Amer. Septentr. Indig.," Cent. II, 96), VI (1862), p. 230.

<sup>7</sup> *Trans. Entom. Soc. London* ("On the Diptera of St. Vincent"), 1896, p. 412.

<sup>8</sup> *Proc. U. S. N. Mus.*, XXIV (1902), pp. 31-32, but the article concerned was published Sept. 27, 1901). There are in the Carnegie Museum two specimens of *Zaprionus vittiger* Coquillett from Lolodorf, Kamerun, taken Oct. 29 and Nov. 1, 1913, by Rev. A. I. Good. There are three fronto-orbital bristles, of which the proclinate and largest one is situated unusually far below the lower reclinate, which



*Leucophenga*. *Blæsochætophora* Czerny, *Cyrtonotum* Macquart, and *Astæinæ* Loew I do not include in the discussion. Professor Strobl in a footnote to the article cited adds another character to the genus, which is very important, as it does not agree with my studies of the species of *Leucophenga* at my disposal, and I herewith copy his note: "*Leucophenga* Mik, Wiener Entomolog. Ztg., 1886, pag. 317. Diese schon von Schiner (Collect. Schin. i. Litt.) als *Argyrolampra* von *Drosophila* gesonderte Gattung zeichnet sich durch die zwischen der 3. und 4. Längsader auffallend dünnere Randader aus, dass die Randader nach der 3. Längsader aber ganz erlösche, könnte ich weder von meinen 9 Exemplaren der *maculata*, noch von meiner neuen Art behaupten; ferner (*maculata*, wahrscheinlich auch *quinquemaculata*) durch den Silberglanz des männlichen Thoraxrückens; besonders aber dadurch, dass die Stirn nur 1 mittlere Randborste und knapp hinter ihr, etwas näher dem Auge, eine ebenso grosse besitzt; es fehlt also die 3., hintere Randborste der echten *Drosophilen* (z. B. *unimaculata*, *transversa*, *phalerata*, *funnebris*); bei einigen *Drosophila*-Arten (*costata* Zett., *nigrimana* Mg.) steht die vordere Randborste ganz nahe den Fühlern, bei den übrigen ungefähr in der Stirnmitte." All the species of *Leucophenga* described below (as well as the North American *L. quadrimaculata* Walker and *L. maculosa* Coquillett) have three strong fronto-orbital bristles with the uppermost one nearer the vertex than in the true *Drosophila*, or at least midway between the inner vertical and the lower reclinate bristles, except in *L. goodi* sp. nov. from Kamerun, in which the upper reclinate bristle is distinctly nearer to the lower reclinate than to the inner vertical. In the true *Drosophila* there are also three fronto-orbitals, two of which are strong, with a lower one proclinate, an upper reclinate, and between them, or at the level with the proclinate, a small or even exceedingly minute (rarely

is a little nearer to the upper reclinate than to the proclinate; two noto-pleurals (Coquillett calls them "posthumeral" after Osten-Sacken); prescutellars not differentiated from the quite strong setulæ of mesonotum; one well-developed presutural (Coquillett calls this bristle erroneously "the anterior one" of five supra-alars); the supra-alars and postalars (Coquillett's "supra-alar bristles") situated as in *Leucophenga*; the anterior supra-alar small, but differentiated from the setulæ of mesonotum; the posterior postalar quite well developed; third antennal joint (present in one of my specimens only) not so long as given by Coquillett for his specimens, but appears hardly longer than wide; the postverticals well developed, converging; the costa broken through twice, as is the case in *Drosophilinæ*. That my determination is correct there can be no doubt, although the localities are very distant (Coquillett's specimens came from Cape Colony).

strong<sup>9</sup>) reclinate bristle, which is closer to the proclinate bristle and situated somewhat nearer the eye; this minute bristle, or setula, is more or less evident for instance in *D. melanogaster* Meigen (= *ampelophila* Loew and *uvarum* Rondani); and in *D. repleta* Wollaston (= *punctulata* Loew and *adspersa* Mik) it is very distinct. In *D. quinaria* Loew it is very minute and in *D. dimidiata* Loew<sup>10</sup> this setula is exceedingly minute, but yet distinct from the orbital row of minute hair-like setulæ. I have seen neither *L. maculata* Dufour nor *L. quinquemaculata* Strobl of Europe and to therefore contradict the statement by so eminent a dipterologist as Professor Strobl, that these two species have only two fronto-orbital bristles and that they do not possess the third or upper fronto-orbital bristle, might seem perhaps presumptuous, but, as Professor Strobl does not mention the vertical bristles, I am almost inclined to suspect that he has overlooked the third or uppermost fronto-orbital, considering it one of the vertical bristles; it would, indeed, be a very peculiar fact that the two European species should have only two fronto-orbitals, while the third or uppermost fronto-orbital, which is always strong in *Drosophilinæ*, should be missing, whereas the many species of *Leucophenga* before me from very distant localities all have three strong fronto-orbitals. Whether or not my suspicion is correct concerning the statement of Professor

<sup>9</sup> *Drosophila obesa* Loew from Texas is described by its author as having three strong fronto-orbital bristles: "fronte latissima præter setas verticis utrinque setis tribus validis armata" (*Berl. Ent. Zeitschr.*, XVI (1872), p. 102 (Cent. X, 85).

<sup>10</sup> *Berl. Ent. Zeitschr.*, VI, 1862, p. 230 (Cent. II, 95). *Drosophila dimidiata* appears not to have been recorded since Professor Loew described it from Illinois. I have captured it on several occasions on windows and on tree-fungi at Pittsburgh, Pennsylvania, the first time Aug. 18, 1906, and in later years during all the months from July 20–Oct. 21; it is a true *Drosophila*. As the original description does not touch upon the chætotaxy I use this occasion to do so and to add a few other remarks. It is a beautiful species with eyes in life of a pure and clear, rather prettily dark purple color (in the field I wrote on two specimens "Eyes crimson"); face with a prominent carina; thorax strongly convex; scutellum convex; abdominal black marks variable; the lower reclinate fronto-orbital bristle exceedingly minute; the postverticals well developed, touching at tips; a second quite well-developed humeral; the presutural and the anterior supra-alar well developed, though much smaller than the posterior supra-alar and anterior postalar bristles; the posterior postalar minute, but distinct; the anterior dorso-central very minute, situated unusually near the strong posterior one and easily overlooked; prescutellar pair not developed, that is, not differentiated from the setulæ of mesonotum; the lateral pair of scutellar bristles only about half the size of the decussate apical pair.

Strobl, those who have access to the European species can determine,<sup>10a</sup>

The chætotaxy of the genera of the *Drosophilinæ* is much alike with modification in size of certain groups of bristles. Thus *Leucophenga*, *Phortica*, and *Stegana* have three strong fronto-orbitals; weak, hair-like postverticals, except in *L. ambigua* *sp. nov.*; and the posterior pair of acrostichals well developed. *Drosophila* has two strong fronto-orbitals<sup>9</sup> and a third small to very minute one between them, postverticals strongly developed, while the posterior acrostichals can usually not be differentiated from the minute setulæ of the mesonotum. In a small species of a true *Drosophila* from Bolivia before me the hindmost pair of acrostichals (prescutellar pair) is quite differentiated, but yet the postverticals are strong, even for so small a species. *Drosophila graminum* Fallén, *adusta* Loew, and several allied species have properly been placed in a separate genus, *Scaptomyza* Hardy, both on account of the habits of their larvæ as leafminers, and of their long, narrow wings, their wing-venation, acrostichals in few, regular rows, occiput convex (not concave) and the two dorso-centrals far apart. Czerny has erected the genus *Chymomyza* for *D. costata* and *D. fuscimana*; and the American species *D. amæna* Loew and *procnemis* Williston should be referred to this genus. Both species are more active in their motions than true *Drosophila*, and I have often observed them during their walk on windows moving their wings in the manner of Sepsids and Ortalids. Their wings are quite long and narrow; legs rather long; mesonotum not so convex as in *Drosophila*; postverticals extremely minute, hairlike; no prescutellars; three strong fronto-orbitals, two of which are reclinate, one proclinate (the proclinate pair strongly converging); the upper reclinate about the middle of front and the lowermost reclinate situated closer to the eye and quite near the anterior border of the front; the proclinate bristle is situated some distance above and inward of this lower reclinate bristle, which on account of its nearness to the eye corresponds with the middle fronto-orbital (the lower reclinate) in the other genera; front with its sides strongly diverging upwards, and face comparatively narrow.

<sup>10a</sup> After this article was ready to go to press I discovered that I had overlooked the fact that Becker has added a third species of *Leucophenga* to the European fauna, *L. leucostoma*, from Hungary, which he describes in the *Annales Historico-Naturales Musei Nationalis Hungarici*, Vol. VI, 1908, p. 320. As I do not at present have access to his description, I am unable to state whether he has dealt with the chætotaxy of this and the other European species and has confirmed or refuted the statements of Professor Strobl concerning the fronto-orbital bristles.

*Drosophila costata* Zetterstedt<sup>11</sup> and *D. nigrimana* Meigen<sup>12</sup> may belong in the same group as *amæna* and *procnemis*, judging from the statement by Professor Strobl above cited that they have the lowermost fronto-orbital situated very near the antenna and closer to the eye (he does not mention the directions of the bristles); *D. costata* has the evident black costa and black front legs much as in *procnemis*, but the latter has the last four joints of front tarsi whitish. *D. procnemis* has eyes in life pale, rather than dark, purplish, with a slightly shining reflection of green or bluish green in certain lights, especially below. I have taken this species at sap on trunks of *Robinia pseud-acacia* Linnæus together with *Aulacigaster rufitarsis* Macquart and *Traginops irrorata* Coquillett and on windows, at Lawrence, Kansas; on windows at Urbana, Illinois; and at sap of trunks of *Acer rubrum* Linnæus together with the same species as above of *Aulacigaster* and *Traginops* and on windows at Pittsburgh, Pennsylvania. There is a specimen of *D. procnemis* in the Carnegie Museum from Chapada, Matto Grosso, Brazil, collected in Oct., by H. H. Smith (Carn. Mus. Acc. 2966). It is absolutely identical with North American specimens, and though by an accident it has been quite broken up, enough still remains to clearly identify it beyond a doubt. *Drosophila amæna* Loew is a common North American species with eyes in life quite light blood-red; I have taken this pretty species on windows and at sap on trunks of different trees at Lawrence, Kansas, at Urbana, Illinois, at Pittsburgh and Ohio Pyle, Pennsylvania; and there are specimens in the Carnegie Museum from Westmoreland Co., Pennsylvania, and Cheat Mts., W. Va., collected by H. H. Smith.

Before giving the characters of *Leucophenga* I desire to explain certain terms used, not as new expressions, but that there may not be the slightest misconception of my definitions.

*Supra-alar bristles* (anterior supra-alar bristles of Osten-Sacken<sup>13</sup>): I designate as such those along the upper edge of the supra-alar cavity, anterior to the transverse ridge (alar frenum of Osten-Sacken<sup>13</sup>)

*Post-alar bristles* (posterior supra-alar bristles of Osten-Sacken<sup>13</sup>): I thus designate those on the post-alar callus, with the *strong anterior bristle* situated at the top of the transverse ridge (alar frenum), which divides the supra-alar cavity, and the *posterior bristle* close to the

<sup>11</sup> *Dipt. Scandin.*, VI (1847), p. 2552.

<sup>12</sup> *System. Besch. Europ. Zweifl. Ins.*, VI (1830), p. 87.

<sup>13</sup> *Trans. Ent. Soc. London*, 1896, Part III, p. 413.

scutellar bridge, usually very minute and easily overlooked in the *Drosophilinæ*, though sometimes quite well developed, as for instance in *Stegana coleoptrata* Scopoli and *Leucophengia ambigua* sp. nov. In the *Drosophilinæ* the post-alar callus is ill-defined, but in the *Diptera Calyptrata*, for instance the *Tachinidæ*, it is well-developed, and it is distinctly seen that the bristle at top of the transverse ridge belongs to the post-alar callus. Osten-Sacken in his masterly work on chætotaxy<sup>13</sup> calls these two groups of bristles only *supra-alars* in the *Diptera Acalyptrata*, but I have preferred to designate them by separate names as above; if, however, the expression *supra-alars* alone is used for these two groups of bristles, then it is necessary to clearly define their position, and it is not sufficient to merely say "two, three, etc. supra-alars present," because it is of no small importance to know whether or not there exist any bristles, large or minute, between the one at the top of the transverse ridge, mentioned above, and the scutellum, inasmuch as some genera have a bristle there, while others do not. For instance the genus *Sepedon* has none there, the genus *Tetanocera* has one (both genera belong to the *Sciomyzidæ*).

*Prescutellar bristles*: I have preferred to retain this expression for a well-developed pair of posterior acrostichals, usually situated somewhat nearer the scutellum than are the posterior pair of the dorso-central bristles.

*First segment of abdomen*: I apply this term to the small segment below the basal declivity; in designating the color of the abdomen it is necessary to define it from the second segment, which is the first large segment.

#### Genus LEUCOPHENGIA Mik.

*Generic characters*: Shape of head, thorax and abdomen as in true *Drosophila* and *Phortica*, but the concavity of the upper occiput apparently more evident than in *Drosophila* and in this respect more like *Phortica*. Wings rather broadly ovate, more or less distinctly pointed (indistinctly so in *L. ambigua* sp. nov.) with the *costa* reaching only to the apex of the third longitudinal vein, ultimate section of fourth vein gradually thinner towards apex (*L. ambigua* sp. nov. somewhat

*Note*: The exotic species at my disposal were received more or less improperly packed in pill-boxes, and I have for that reason used the greatest caution in defining the characters, and it has even been necessary to omit some, which I might otherwise have employed. The types of *L. argenteo-fasciata* and *L. ambigua* were received pinned and *L. bistriata* glued to a card.

of an exception); costa broken through twice, immediately beyond the humeral cross-vein and before the apex of the first vein; alula developed; discal and second basal cells united, yet the place of the missing, separating cross-vein is indicated by some color or transparency, but it is not a cross-vein as in *Phortica* and *Stegana*. Face not nasute. Oral vibrissæ present; *three strong fronto-orbital bristles*, the lowermost proclinate, the two upper ones reclinate; the lower reclinate bristle is situated near the proclinate and slightly closer to the eye; the upper reclinate is removed towards the vertex or about midway between the lower reclinate and the inner vertical bristles and not below the level of the lower ocellus (except in *L. goodi sp. nov.*, where the upper reclinate is distinctly nearer to the lower reclinate than to the inner vertical and seemingly slightly below the level of the lower ocellus); two diverging verticals (that is two pairs of verticals, the inner pair converging, the outer pair diverging); two postverticals, exceedingly minute, hairlike, strongly convergent (slightly so in *L. argenteofasciata sp. nov.*) or decussate at tips (in *L. ambigua sp. nov.* the postverticals are strongly developed); one pair of strong, proclinate, and divergent ocellars; two posterior dorso-centrals, the hindmost one of which is the strongest; one pair of well-developed prescutellars, much weaker and shorter, however, than the posterior dorso-central; one humeral (except in *L. ambigua sp. nov.*); two strong notopleurals; one presutural, usually small; two supra-alars, the posterior strong, the anterior small, situated closely behind the transverse suture and apparently lower down; two postalars, the anterior strong, of the size of the posterior supra-alar and situated at the top of the transverse ridge which divides the supra-alar cavity, the posterior postalar very minute (except in *L. ambigua sp. nov.*), situated exterior to, but near the anterior end of the scutellar bridge; two diverging sterno-pleurals, the anterior weaker and situated at the sterno-pleural suture, the posterior situated a little lower down; four marginal scutellar bristles; otherwise the scutellum is bare. Mesonotum covered with minute setulæ in indistinct rows. Sterno-pleura with small hairs placed somewhat in a row from the anterior sterno-pleural bristle downwards (in *L. ambigua sp. nov.* some besides are irregularly scattered); otherwise the metathoracic and pleural regions are bare. Abdomen covered with small setulæ, and a row of longer setulæ before the apical margin of each segment. Front in the middle with minute hairs, apparently in two rows extending from the antennæ towards the ocelli, and a row

of equally minute, but stiff, setulæ close to the eye from the lower edge of the front to the lower reclinate fronto-orbital bristle (or sometimes beyond it). In *L. ambigua* sp. nov. the central rows are not so placed, but apparently in three transverse rows, as minute black setulæ.

## KEY TO THE SPECIES OF LEUCOPHENGIA MIK DESCRIBED BELOW

1. Postvertical bristles minute, hairlike.....2  
Postvertical bristles very strong; wings without spots; second vein straight.  
*ambigua* sp. nov.
2. Second vein distinctly curved apically; wings with brown spots; abdomen without black spots.....3  
Second vein straight, or indistinctly curved; wings with or without spots; abdomen with or without black spots.....5.
3. Wings with a basal and apical spot and an irregular median band, spots and band brown; abdomen blackish with a silvery band.....*argenteo-fasciata* sp. nov.  
Wings with brown, separate spots at base, on apex of second vein, and on anterior and posterior cross-veins.....4.
4. Spot on apex of second vein longitudinally oblong; apex of third vein brown; abdomen silvery white; length 2.5 mm.....*argenteiventris* sp. nov.  
Spot on apex of second vein longitudinally oblong; apex of third vein brown; abdomen yellowish (unicolored?); length 3 mm.....*hasemani* sp. nov.  
Spot on apex of second vein spherical; apex of third vein yellow, not infuscated; abdomen blackish brown with yellow spots; length 3 mm.....*maculosa* Coquillett.
5. Wings from base with two diverging brown stripes; second vein straight.  
*bistriata* sp. nov.  
Wings otherwise marked.....6.
6. Abdomen yellow with black spots in longitudinal series.....7.  
Abdomen otherwise marked.....8.
7. Wings with two brown spots, one at base and one at apex of marginal cell.  
*quadrifasciata* Walker.  
Wings hyaline without spots.....*ornativentris* sp. nov.
8. Abdomen blackish, base and apex pale yellow; wings subhyaline, brown along costa.....*goodi* sp. nov.  
Abdomen blackish, unicolored; wings mostly brown anteriorly; second vein straight.....*brunneipennis* sp. nov.

1. *Leucophengia argenteo-fasciata* sp. nov.

*Diagnosis:* Head and antennæ yellow, palpi large, black. Mesonotum and scutellum brown-red; legs and halteres yellow. Abdomen above black with a silvery-white transverse band. Wings yellowish hyaline with a large basal and apical spot and a median transverse band, all dark brown, second vein gently curved on its apical half. Length 3.5 mm.

*Description:* Head with front almost orange-yellow, in certain oblique lights white, and the fronto-orbital stripes concolorous; front as high up as the upper fronto-orbital bristle of almost equal width, rather broad, one-third as wide as the head and with the median rows of hairs yellow; antennæ and lower occiput pale yellow; the upper concave occiput blackish with the orbits broadly yellow; face grayish white with a very slight, transversely convex carina; third joint of antennæ almost twice as long as wide, evenly rounded at apex; arista with basal half yellow, the apical half and the rays dark brown; the rays about eight above and about four below; palpi prominent, quite broad, black with small setulæ on lower side to apex; cheeks extremely narrow, hardly perceptible.

Mesonotum and scutellum rather dark brown-red, very slightly shining, the former with its minute setulæ changing to red or black in different lights. The scutellum strongly convex, its apical margin and underside yellow; metathorax shining, dark honey-yellow; the pleura pale brownish red; legs yellowish, the anterior pair somewhat paler; middle and posterior tibiæ, at least, with a minute pre-apical bristle, differentiated from the very minute tibial setulæ; halteres yellow.

Abdomen with dorsum opaque black, slightly shining apically, the small black setulæ appearing in certain lights pronouncedly reddish, especially on the apical segments; the small first segment and venter yellow, the latter with some rather long hairs on each segment; second dorsal segment with a black, transverse spot at each corner of the yellow base and behind it a transverse black band, the anterior edge of which is concave in the middle and its posterior border reaching as far as the pre-apical row of the longer setulæ, behind which row the segment is silvery-white; the base of the third segment is narrowly white, and silvery in certain lights; the hypopygium is reddish brown.

Wings distinctly pointed, yellowish hyaline; the yellowish more evident on the anterior half, the hyaline on the posterior half; a light brown spherical spot on anal vein; a large spot at base and apex and a transverse band between them, all dark brown; the outlines of the two large spots and the crossband are as follows: beginning at the apex of the first vein, *the outline of the brown basal spot* follows the first vein to the junction of the second and third veins, crosses the first basal cell into the middle of the discal cell, along the middle of which it extends to a little beyond the anterior cross-vein, then parallel with this cross-vein to the third vein, following it to the anterior cross-vein, whence it runs straight to the second vein and thence obliquely to the apex of first vein; *the outline of the brown apical spot* begins at costa a little beyond the apex of second vein, runs slightly concave to the third vein and thence to the apex of third vein in an evenly convex curve, reaching posteriorly beyond the middle of the first posterior cell, and is bordered anteriorly by the costa; the brown of this spot is diluted in the region of the costa and becomes more intense along the third vein; *the median transverse band* is apparently made up of two spots, the anterior one large, oval, directed longitudinally with its tip towards the apex of the wing, the posterior one is transverse scarcely half as wide as the former, and both spots join each other broadly in the middle of the first posterior cell; the outline of the band runs from apex of second vein in an oblique, convex curve, inwards to the middle of first posterior cell, then outwards in a convex curve across the fourth vein, continuing in a slightly concave curve to the apex of the fifth vein; the inner outline of the band begins at the middle of the penultimate



section of the costa, runs in a slightly convex curve to the middle of first posterior cell, then in a gentle convex curve to the fifth vein, where the outline runs a little inwards and across the fifth vein to its apex; the posterior cross-vein is equally surrounded on each side by the posterior portion of this band.

The third longitudinal vein ends in the very apex of the distinctly pointed wing; second vein curves gently and distinctly on its apical half; the distance between the tips of the second and third veins at least two and a half times the distance between the tips of third and fourth veins, which are almost parallel in their apical portion; first posterior cell slightly wider at the middle than at apex (a usual occurrence in *Drosophilinae*); the distance between anterior and posterior cross-veins is one half longer than the first section of the third vein; the posterior cross-vein about the length of, or slightly longer than, the ultimate section of fifth vein; anal vein strong, straight, stops almost abruptly, reaching about halfway towards the posterior margin of the wing; veins black, the thinned apical portion of fourth vein yellowish, and the fifth vein through the hyaline part appears reddish yellow.

The fronto-orbital, vertical, and ocellar bristles of almost equal size; the upper reclinate fronto-orbital is distinctly nearer to the inner vertical than to the lower reclinate, and only slightly higher up than the lower ocellus; the uppermost pair of the occipito-orbital fringe of setulae lengthened, appearing as a small pair of diverging posterior verticals; the postverticals minute, but distinct and very slightly converging; a small seta near the eye on the lower occipital orbit distinctly differentiated from the setulae of the orbital fringe; between the two sternopleural bristles is seen a very minute setula; the anterior dorso-central bristle is much shorter and weaker than the posterior one, and of the size of the prescutellar pair, which is situated distinctly nearer the scutellum than the strong posterior dorso-central bristle, and the distance between the prescutellars is distinctly less than the distance between either of them and the nearest posterior dorso-central; the four scutellar bristles, of the same strength as the posterior dorso-central, with the apical ones converging and with the lateral ones a little longer, diverging; the posterior postalar minute, but distinct; the anterior supra-alar and the presutural of same size, small, but distinctly differentiated from the setulae of mesonotum. All bristles black.

*Habitat:* Brazil, Santarem, 1♂, Coll. H. H. Smith, Carn. Mus. Acc. 2966. Type in Carnegie Museum, Pittsburgh.

## 2. *Leucophengia brunneipennis* sp. nov.

*Diagnosis:* Head yellow with upper occiput mostly blackish; palpi black. Mesonotum and scutellum dark brown-red; legs yellow. Abdomen with dorsum black. Wings anteriorly dark brown, fuscous posteriorly; posterior cross-vein broadly surrounded by dark brown; second vein straight to costa. Length 3 mm. or a little less.

*Description:* Head with front reddish yellow, somewhat brownish at vertical portion and with the orbital stripes concolorous with the rest of front, which is rather narrow, less than one-third the width of head, of equal width of the face from the oral vibrissae to the upper reclinate fronto-orbital bristle; lower occiput pale

yellow, the upper concave occiput blackish with the orbits narrowly yellow; face light yellowish white or yellowish gray, with a very slight, transversely convex carina; cheeks extremely narrow, hardly perceptible; (antennæ are missing). The mouthparts were demolished and not recognizable, but one of the palpi was still loosely attached and before it was lost together with the rest of the mouthparts, the writer made the following note: "palpi black, apparently cylindrical, clothed with short hairs, not conspicuous in size."

Mesonotum and scutellum dark brown-red, almost opaque, the former with the minute setulæ black, the latter strongly convex. Under side of scutellum and metathorax reddish yellow, shining, with the sides of the latter at base of wings fuscous; the pleura lighter than the mesonotum, but not conspicuously so; legs yellow with a brownish tint; the middle and posterior tibiæ with a minute pre-apical setula (halteres are missing).

Abdomen black, slightly shining on basal two-thirds, very shining on the last segments (may be the whole abdomen is very shining in well-preserved specimens); the small first segment and venter brownish yellow; sides of second segment dark honey-brown.

Wings quite distinctly pointed, dark brown on anterior half, fuscous on the posterior half and with the posterior cross-vein broadly and conspicuously bordered with deep brown, which color extends into the first posterior cell and below widens a little along both sides of fifth vein, reaching its apex; the dark brown and the fuscous hyaline is limited by the fourth vein and the brown encroaches upon the discal cell along the first section of fourth vein; there is a fuscous hyaline, transverse dash from the base of the first posterior cell, which dash, gradually narrowed, reaches the marginal cell slightly beyond the second vein; apex of the submarginal cell along the costa also fuscous hyaline; first posterior cell along the fourth vein and at its apex narrowly fuscous hyaline, except the deep brown at posterior cross-vein; second posterior cell the most diluted space of the wing and the darkest brown of the wing surrounds the posterior cross-vein.

The third longitudinal vein ends at the apex of the pointed wing; second vein in its apical two-thirds straight; the distance between the tips of second and third veins hardly two and one-third times the distance between the tips of third and fourth veins, which are parallel in their apical course; the first posterior cell is only very slightly wider at its middle than at its apex; the distance between the anterior and posterior cross-veins is hardly more than one-third longer than the first section of third vein; posterior cross-vein slightly longer than the ultimate section of fifth vein; the anal vein does not stop abruptly, but continues as a curved fold nearer the posterior margin; veins blackish brown, with the thinned apical portion of fourth vein diluted.

The fronto-orbital, vertical, and ocellar pair of bristles of almost equal size, with the upper reclinate fronto-orbital and the outer vertical bristles a little more robust; the upper reclinate situated slightly nearer to the inner vertical than to the lower reclinate and a little higher up than the lower ocellus; an upper pair of setulæ of the occipito-orbital fringe a little larger and diverging; postverticals very minute, hair-like, strongly convergent, touching at tips; on lower occipital orbit near the eye a small weak setula, differentiated, however, from the minute setulæ of the orbital fringe. The anterior dorso-central is much shorter than the posterior dorso-

central bristle and about the size of the prescutellar bristles, which are situated nearer the scutellum than the strong posterior dorso-central, and with the distance between them much closer than between either of them and its nearest posterior dorso-central. The scutellar bristles strong, the apical pair decussate, the lateral pair divergent and slightly longer. The posterior postalar bristle very minute; the anterior supra-alar and the presutural bristles rather minute, but distinctly differentiated from the setulæ of mesonotum. Some of the hairs on the humeral callus are longer and setula-like. All the bristles are black.

*Habitat:* Bolivia, Las Juntas, Dec., 1913, 1♂, Coll. José Steinbach, Carn. Mus. Acc. 5081. Type in Carnegie Museum, Pittsburgh.

### 3. *Leucophenga hasemani* sp. nov.

*Diagnosis:* Head, antennæ, and palpi yellow, the latter conspicuously enlarged, compressed; upper occiput with a large, central, trifold, blackish mark. Mesonotum and scutellum light reddish yellow, opaque, the former with a thin whitish gray bloom in certain lights. Legs pale yellow. Ground-color of abdomen brownish yellow. Wings yellowish hyaline with two dark brown costal spots, one near the base, the other oval, lying longitudinally on apex of second vein; anterior and posterior cross-veins bordered with dark brown; apex of third vein and its surroundings fuscous; second vein distinctly curved at apex. Length 3 mm.

*Description:* Front of head opaque yellow; orbital stripes gray, in certain lights grayish white, which color seems more pronounced on the orbital stripes and ocellar region, but immediately above the antennæ the color is almost orange-yellow. Front quite broad, a little more than one-third the width of head, of equal width with the face from the oral vibrissæ to the upper reclinate fronto-orbital bristles. Face and lunula slightly whitish, the former slightly carinate between the antennæ. The upper occiput gently concave, yellow, with three basally connected oblong, dark brown spots, the middle one of which is a little lighter. Third antennal joint pale yellow, hardly longer than wide; arista with its rays brown, base yellow; the rays about six above and about three below. The palpi yellow, broad, compressed, conspicuously enlarged, with very minute setulæ below. Cheeks very narrow.

Mesonotum and scutellum light reddish yellow, the former in front darker in color; the latter paler in color and more yellowish. Scutellum very gently convex, apex pale. Mesonotum in certain lights, especially in front, showing a thin whitish gray bloom. Its minute black setulæ, some of which in certain lights appear reddish yellow, form about eight rows between the dorso-central bristles. Humeri, notopleura, and pleura paler. Legs pale yellow; tibiæ with a minute pre-apical bristle, or setula. Halteres yellow.

Abdomen with a distinct black spot on each anterior corner of second dorsal segment. The abdomen is in such condition that the colors cannot be satisfactorily

defined. The ground-color appears brownish yellow, but I suspect that in fresh and mature specimens there may be some dark marks.

Wings a little pointed; yellowish hyaline; a dark brown spot at base from the costa to fourth vein, covering the extreme apex of costal cell, base of marginal and submarginal cells, and the middle of first basal cell; an oval spot of same color along apex of second vein, covering the entire apex of marginal cell and extending into the middle of submarginal cell; the anterior cross-vein narrowly, the posterior one quite broadly, bordered with dark brown; apical portion of third vein distinctly infuscated and the infuscation extending over the apex of the submarginal cell, though diluted. Third vein ends exactly at the apex of the slightly pointed wing; second vein rather strongly curved at apex; the distance between the tips of second and third veins about twice the distance between the tips of third and fourth veins; first posterior cell hardly wider at middle than at apex; the distance between anterior and posterior cross-veins hardly one-fourth longer than the first section of third vein; the posterior cross-vein about the length of the ultimate section of fifth vein; anal vein quite strong, reaching slightly over halfway towards posterior margin; fourth vein thinned in its apical portion; costa fuscous, veins otherwise yellowish, but blackish where the brown marks are situated; the vein closing the anal cell also blackish.

The fronto-orbital, vertical, and ocellar bristles of almost equal size; the upper reclinate fronto-orbital appears to be only midway between the inner vertical and the lower reclinate and only slightly higher up than the lower ocellus; the uppermost setula of the occipito-orbital fringe is lengthened and diverging from the other setulæ of that fringe; postverticals minute, strongly convergent, touching at tips; on lower occipital orbit a small bristle-like setula, distinctly differentiated from the small setulæ of the occipito-orbital fringe; between the two diverging sternopleural bristles a minute setula; the anterior dorso-central bristle a little weaker than the posterior one and of almost equal size with the prescutellar pair, which are situated almost on a level with the posterior dorso-central; the presutural bristle shorter than the notopleurals, but almost as strong; the anterior supra-alar weak; the posterior postalar minute; the two apical scutellar bristles are decussate in the specimen. The bristles appear in certain lights more or less yellow, especially the lower fronto-orbitals, humeral, noto- and sterno-pleurals. Along the exterior side of middle coxæ a row of yellowish, bristly hairs, the uppermost the strongest.

*Habitat:* Brazil, Espirito Santo, Munez Freire, June 17, 1908, Collected by J. D. Haseman, Carn. Mus. Acc. 3579. Type in Carnegie Museum, Pittsburgh. The species is dedicated to my friend, the intrepid explorer, Dr. J. D. Haseman.

There is an extreme resemblance between this species and *L. maculosa* Coquillett<sup>14</sup> and I was strongly inclined to refer it to the latter species, which I had before me from Kansas, Illinois, and Pennsylvania, but considering the differences between the unique Brazilian specimen and *maculosa*, although they appear slight, I have preferred

<sup>14</sup> *Proc. Acad. Nat. Sc. Philadelphia*, 1895, p. 317.

to designate it as distinct, until more material may decide whether they actually are distinct or identical. It seems that the two reclinate fronto-orbital and the inner vertical bristles in *hasemani* are more equidistant, whereas in *maculosa* the upper reclinate is distinctly nearer to the inner vertical than to the lower reclinate; the brown basal wing-spot in *hasemani* is angulated outwardly, whereas in *maculosa* the exterior outline of this spot is straight; the spot at apex of second vein in *hasemani* is oval along the wing and its brown color borders the second vein, in the submarginal cell, to its apex, whereas in *maculosa* this spot is round with the brown color crossing the second vein at some distance from its apex into the submarginal cell; the distinct infuscation of the apical portion of third vein in *hasemani* is missing in the specimens of *maculosa* before me. Coquillett would not have failed to mention this infuscation if it had existed in the type. The condition of the abdomen of *hasemani* is such, that a fair comparison with the spotted abdomen of *maculosa* is out of the question.

#### 4. *Leucophenga maculosa* Coquillett.

*Drosophila maculosa* COQUILLETT, Proc. Acad. Nat. Sc. Philadelphia, 1895, p. 317.

*Drosophila maculosa* JOHNSON, Entom. News, Philadelphia, 1904, p. 162.

*Drosophila maculosa* JOHNSON, Bull. Am. Mus. Nat. Hist., XXXII, 1913, p. 88.

To Coquillett's description the following notes may be added, taken from specimens which the writer most certainly considers identical with *maculosa*:

Palpi much enlarged, compressed, yellow. Wings as in *L. hasemani*, but the spot on apex of second vein is round and does not definitely fill out the extreme apex of the marginal cell. Third vein yellow, not infuscated on apex, as in *L. hasemani*. The chætotaxy is the same as in *hasemani*, but the upper reclinate bristle is nearer to the inner vertical than to the lower reclinate and placed higher up than the lower ocellus. Thorax and scutellum rather reddish yellow, the latter with apex pale. The apical scutellar bristles are decussate, the lateral pair divergent. Abdomen may be very slightly, if at all, shining in life; the small first segment<sup>15</sup> yellow, the

<sup>15</sup> What Coquillett calls "first segment" of abdomen the writer has, for reasons given above, preferred to designate as *first and second* segments, and Coquillett's second corresponds with the writer's third, etc.

second segment yellow, except a small black spot above at each anterior corner, the three or four following segments, as seen from above, each with a pair of yellowish spots at base, larger and somewhat triangular on the third, smaller and rounded on the two or three following segments, and besides these yellow spots, the same three or four segments have each a large yellow spot near the lateral margins, but not seen from above. Compare with *hasemani*.

The type is from Florida. Mr. Johnson records it from Florida and New Jersey. The writer has taken it on windows and reared it from the same mushroom as *L. quadrimaculata* (see under that species) at Urbana, Illinois, and also has taken it on windows at Lawrence, Kansas, and Pittsburgh, Pennsylvania.

By a mere slip of the pen Mr. Johnson places *Drosophila vittata* Coquillett in the genus *Leucophenga*, instead of *Drosophila maculosa* Coquillett (Bull. Am. Mus. Nat. Hist., XXXII, p. 88 (1913)).

##### 5. *Leucophenga argenteiventris* sp. nov.

*Diagnosis:* Head and antennæ yellow. Palpi honey-yellow, compressed, quite large. Mesonotum and scutellum opaque, light reddish, densely covered with a white bloom. Legs pale yellow. Abdomen silvery white. Wings yellowish hyaline with two dark brown costal spots, one near the base, the other longitudinally oval on apex of second vein; anterior and posterior cross-veins bordered with dark brown; apex of third vein fuscous and bordered by same color; second vein slightly curved at apex. Length 2.5 mm.

*Description:* Head with front yellow and orbital stripes grayish. The front immediately above the antennæ is more orange-colored and its width is about one-third of the head. Face whitish yellow with a slight carina near the antennæ. The upper concave part of occiput blackish, with orbits narrowly, but along vertex widely, yellow. Third antennal joint pale yellow, rather short, hardly longer than wide. Arista yellow at base, otherwise together with its rays blackish brown. The rays are apparently six above, three or four below. Palpi (in the specimen) deep yellow, compressed, and quite large. Cheeks very narrow.

Mesonotum and scutellum opaque, pale yellowish red, and, as seen from front, covered with a white bloom, which is particularly in evidence on the distinctly convex scutellum. Mesonotum with the minute black setulæ in eight rows between the anterior pair of dorso-central bristles. Scutellum with pale margin. Humeri, notopleura, and pleura opaque, paler than the rest of thorax. Legs rather pale yellow; tibiæ with a minute preapical setula. Halteres yellow.

Abdomen darker in ground-color than mesonotum, brown-red, with the setulæ black. Viewed from front or side the abdomen is silvery white, best shown on segments two, three, and four. The extreme apex of abdomen is yellow. (The apical segments show some blackish or dusky in the specimen, but this may be caused by deterioration).

Wings a little pointed, yellowish hyaline, with the yellowish becoming gradually hyaline posteriorly; a dark brown spot at base from costa to fourth vein and covering extreme apex of costal cell, bases of marginal and submarginal cells, and middle of first basal; an oval spot of same color along apex of second vein, covering apex of marginal cell and extending about two-thirds into the submarginal cell; anterior cross-vein narrowly and posterior cross-vein quite broadly bordered with dark brown; apex of third vein and its immediate surroundings infuscated, this color in a diluted form extending into the apex of the submarginal cell.

Third vein ends in the slightly pointed apex of the wing; second vein curved at apex (apparently less so than in *hasemani*); distance between tips of second and third veins about twice the distance between tips of third and fourth veins; first posterior cell hardly wider at middle than at apex; the distance between anterior and posterior cross-veins hardly one-fourth longer than first section of third vein; posterior cross-vein about the length of the ultimate section of fifth vein; fourth vein thin in its apical course; costa fuscous, other veins yellowish, but blackish where the brown marks cover them; vein closing the anal cell blackish.

The fronto-orbital, vertical, and ocellar bristles of almost the same size, the latter only slightly weaker; the upper reclinate fronto-orbital bristle nearer to the inner vertical than to the lower reclinate and distinctly higher up than the lower ocellus; the uppermost setula in the occipito-orbital fringe is longer than and divergent from the other setulae in the fringe (this may be a feature common to all species); postverticals minute, strongly convergent, touching at tips; lower occipital orbit with the usual setula, differentiated from the other setulae in the lower occipito-orbital fringe; between the two diverging sternopleural bristles a minute setula; the anterior dorso-central bristle slightly weaker than the posterior one and of the same size as the prescutellar pair, which are situated on a level with the posterior dorso-central; the presutural and anterior supra-alar of almost the same size and distinct, though weaker than the humeral and notopleurals; the posterior postalar distinct, the two apical scutellar bristles decussate (in the specimen), the lateral ones diverging. As in *hasemani* the bristles appear in certain lights yellow, or yellowish brown, particularly the lower fronto-orbitals, humerals, and notopleurals; on middle coxae a yellowish brown bristle.

*Habitat:* Bolivia, Province del Sara, 350 meters above sea-level. The type is a female, unique, collected by José Steinbach, Carn. Mus. Acc. No. 5080.

The species is very close to *hasemani* and the description of one is almost a duplicate of the other, but this species is much smaller, and the pronounced white bloom of the mesonotum and scutellum and the silvery white abdomen serve to distinguish it.

For those who at some future time may desire to study the type of *argenteiventris* I must state, that after I had taken the description of the color, I relaxed the specimen on damp sand, so that I might study the venation of the wings, which were folded under the abdomen, but in doing so the moisture entirely effaced the clear white bloom of the mesonotum and scutellum and the silvery white of the abdomen, so that the type, as it stands, does not conform to the above description. It is important to remember this.

## 6. *Leucophengia ornativentris* sp. nov.

*Diagnosis:* Head yellow with upper occiput mostly blackish, antennae and palpi yellow, the latter neither enlarged, nor projecting.

Mesonotum and scutellum reddish, slightly shining. Legs and halteres yellow. Abdomen yellow, with dorsal black spots in three longitudinal series, confluent on third segment, the dorsal lateral margins broadly bordered with black from third segment to apex. Wings almost hyaline without spots; second vein almost straight at apex. Length slightly over 2 mm.

*Description:* Head with front, vertex, and basal joints of antennæ yellow; the color of the fronto-orbital stripes not differentiated (in the specimen) from that of the front; the ocellar spot black, grayish pollinose; third antennal joint and the face, which is not carinate, pale yellow, with a whitish gray pollen; front about one-fourth, or slightly more, as wide as head, of equal width throughout and with the face; third antennal joint hardly longer than wide, about the length of the two basal joints together; arista yellow at base, the remainder together with the rays blackish, five above and three below, alike in both antennæ; occiput with lower half yellow, the upper half, which is concave blackish, with the orbits narrowly, and a large spot at vertex, yellow; cheeks exceedingly narrow; palpi yellow, not projecting.

Mesonotum and the gently convex scutellum brownish yellow, slightly shining, the former with the minute setulæ blackish brown, in certain lights yellowish; metanotum honey-yellow; humeri and pleura pale yellowish. Legs pale yellow with the knees and last tarsal joint almost imperceptibly honey-yellow; tibiæ with a minute pre-apical bristle. Halteres yellow.

Abdomen brownish yellow, with the minute first and the second segments unicolorous; third, fourth, and fifth dorsal segments, each with three transversely placed black spots, resting on the apical margins; on the third segment the spots are large, coalescent on apical third, and covering the greatest portion of the segment as viewed from above; the median spot rectangular, reaching from base to apex, the two side-spots convex anteriorly and not quite reaching the base of the segment (the left side-spot lightly reaches following the apex of second segment); through the convexity of these two side-spots a yellow triangular enclosure is formed on each side at base of the median rectangular spot; fourth segment has the median spot almost rectangular, reaching the extreme base of the segment, and on each side of it and widely separated from it a rounded spot, not quite reaching the middle of the segment; the black marks of the third segment together with the median spot of the fourth form the shape of a Maltese cross; fifth segment with the three spots of about equal size, the median longitudinally oblong, all reaching scarcely midway towards the base of the segment; besides these spots seen from above, the lateral margins of dorsal segments four, five, and six are broadly bordered with black, which forms an uninterrupted band from apex of third segment; on fourth segment this band is acutely widened to the apex of the segment, and on fifth segment this band is narrowly separated from the dorsal side-spots. (Abdomen, including the black marks, slightly shining in the specimen.)

Wings somewhat yellowish hyaline, with merely a trace of grayish on costa and at extreme bases of marginal and submarginal cells. The third vein ends in the slightly pointed apex of the wing; the second vein is very slightly curved at apex; the distance between the tips of second and third veins about two and one-third



times the distance between tips of third and fourth veins, which are almost parallel in their apical course, but by no means diverging; distance between anterior and posterior cross-veins about one-third longer than the first section of third vein; posterior cross-vein at right angle with fourth vein and at least one-third shorter than the ultimate section of fifth vein; ultimate section of fourth vein, which is much thinned and pale in its apical course, hardly less than two and one-half times the length of the penultimate section.

The fronto-orbital, vertical, and ocellar bristles of almost the same strength; the two reclinate fronto-orbitals and the inner vertical almost equidistant, but the upper reclinate bristle is evidently not as near to the lower reclinate as to the inner vertical bristle; the upper reclinate (the uppermost fronto-orbital) situated as far down as the lower ocellus; postverticals very minute, slightly cruciate; on lower occipital orbit a small seta, differentiated from the setulæ of the occipito-orbital fringe; a minute setula between the two sternopleurals; the anterior dorso-central small, not larger than the prescutellar pair, which is situated slightly nearer to the scutellum than the posterior dorso-central; the presutural and the anterior supra-alar weak; posterior postalar very minute; the distance between the two apical bristles of scutellum not less than either of them to the nearest marginal bristles; all the bristles and the minute setulæ black, in certain lights with yellowish brown reflection, except the apical setæ of the abdominal segments, which retain the black color.

*Habitat:* Bolivia, Province del Sara, 350 meters above sea-level. Type, a male, collected by José Steinbach, Carn. Mus. Acc. No. 5080.

There are in the collection of the Carnegie Museum five other specimens from the same locality as the type (one dated Nov., 1912) and four from Las Juntas, Bolivia, Dec., 1913, all bearing the label Carn. Mus. Acc. No. 5081, and all collected by Mr. José Steinbach. They vary in the extension of the black marks on the dorsum of abdomen. Two specimens, one labelled as is the type, the other from Las Juntas, agree best with the type in the abdominal markings, but both have the median spot on fifth segment extended to the apex of fourth segment and the two large side-spots on third segment do not extend so close to the base. One specimen from Las Juntas has the side-spots of third segment coalescing in their entire width with the median spot. Two specimens, one from Las Juntas and the other labelled as is the type, and dated Nov., 1912, have the spots separated and not at all coalescing. Three specimens, labelled as is the type, and one from Las Juntas have the side-spots of fourth segment indicated merely by a small brown dash or dot, the side-spots of the third segment more coalescent with the median spot in three of them, but in the fourth (from Province del Sara) the whole of the third segment above is black and shows some black on each side of the second segment. The rays

of the arista as seen in eight of the specimens are six above, four or three below. In life the abdomen may be slightly shining, with the black markings opaque, and the mesonotum provided with a thin whitish bloom. Unfortunately the specimens were packed in small pill-boxes in such a way, that they could not be handled before being slightly relaxed, and the exact color may through this process have been damaged, as in my experiment with the type of *L. argenteiventris*. The celebrated French biologist, Léon Dufour, reared and described *L. maculata* of Europe and found that in some specimens the abdominal spots were coalescent and in others showing an extra spot on second segment.<sup>16</sup> Similar variations in *L. ornativentris* may be expected.

*L. ornativentris* agrees in many respects with the description of *L. frontalis* Williston, from St. Vincent, West Indies,<sup>17</sup> but is distinguished by its shorter antennæ, its broad black uninterrupted band on the lateral margins of the dorsum of abdomen, and by the comparative length of the ultimate and penultimate sections of fourth vein. The abdominal markings are also much like those of *Drosophila pulchra* Schiner from South America,<sup>18</sup> but this species is not a *Leucophenga*, as Schiner would certainly not have failed to mention that the costa reached to third vein only, as in his next species, *Drosophila insulana*, which is a *Leucophenga*.

#### 7. *Leucophenga* sp.

There is in the collection of the Carnegie Museum a specimen of *Leucophenga*, captured by Dr. J. D. Haseman at Sapucay, Paraguay, April 4, 1909, and bearing the label Carn. Mus. Acc. No. 3793. It is very much like *ornativentris*, but although the differences seem great enough I hesitate to give it a name, as it is immature and somewhat shrunk. The differences from *ornativentris* are a light brownish dash on apex of costal cell, extending through the bases of marginal and submarginal cells into first basal cell. The apical half of the second vein is bordered with light brownish; the ultimate section of fourth vein seems to be not more than twice the length of the penultimate section; the posterior cross-vein is not at right angles with the fourth vein, but runs obliquely outwards to the fifth vein; the third and fourth veins seem to be slightly divergent at apex, making the

<sup>16</sup> *Ann. des Science. Nat.*, 2e Série, Zoöl. Tom. XII, 1839, p. 51.

<sup>17</sup> *Trans. Ent. Soc. London*, 1896, Part III, p. 413.

<sup>18</sup> *Diptera, Reise der Novara*, 1868, p. 239.

first posterior cell rather wider at apex than at middle, but at any rate not narrower. In *ornativentris* the reverse is the case, the cell being slightly narrower at apex than at middle. In the specimen from Sapucay the third and fourth veins have a tendency to divergency, in *ornativentris* to convergency; the second vein seems straighter at apex than in *ornativentris*; the third antennal joint is a little longer, with the rays of the arista seven above and four below (seen only in one antenna); the extraordinary narrowness of the front is, no doubt, to be ascribed to its immature condition; the black spots on third abdominal segment are separated, the median spot not quite reaching the base and the two side-spots only halfway towards the base of the segment. *Drosophila pulchra* Schiner has also an oblique posterior cross-vein, but, as stated above under *ornativentris*, *D. pulchra* is not a *Leucophenga*.

There is in the collection of the Carnegie Museum still another specimen of *Leucophenga* captured by Dr. J. D. Hasegan at Bom Fim, Bahia, Brazil, Nov. 20, 1907, and bearing the label, C. Mus. Acc. No. 3441. It is much mutilated, with only the left wing present and even this with the apex missing, so that the course of the costa cannot be ascertained. From its chaetotaxy, I am, however, perfectly convinced that it is a *Leucophenga*, closely allied to the species from Sapucay. It is larger and more robust than the specimen from Sapucay, but with the same pattern of abdomen, arista with seven rays above and four below, alike in both antennae, the veins of the wing the same as far as can be seen, but the brownish dash at base of wing is more extended, and the whole marginal cell is tinted with light brownish, which extends in a diluted form into the apical portion of the submarginal cell.

I mention these two specimens above partially described for the sake of others, who may be fortunate in possessing specimens from those regions in perfect condition.

#### 8. *Leucophenga quadrimaculata* Walker.

*Drosophila quadrimaculata* WALKER, Insecta Saundersiana, Vol. I, Diptera, 1856, p. 410.

*Drosophila quadrimaculata* JOHNSON, Proc. Acad. Nat. Sc. Philadelphia, 1895, p. 339, and in Insects of New Jersey, 1900, p. 695.

*Leucophenga quadrimaculata* JOHNSON, Bull. Am. Mus. Nat. Hist., XXXII, 1913, p. 88.

Head yellow; upper occiput concave, black, except its narrowly yellow orbit. Antennae yellow, lightly grayish pollinose, with the

third joint hardly twice as long as wide and its arista, blackish apically and yellow at base, with at least six blackish rays above and four blackish ones below. The face has the grayish color of the antennæ and is very slightly keeled. Palpi yellow, not enlarged, or projecting; ocellar spot black, with grayish pollen. Mesonotum and scutellum rather light reddish brown, very lightly grayish-white pollinose in certain lights, the extreme apex of the latter yellowish. Pleura lighter than the mesonotum, and with the grayish-white pollen more in evidence. Legs pale yellow. Halteres yellow. Abdomen brownish yellow with black spots on all the dorsal segments, except the small first segment; these spots are placed in longitudinal, interrupted rows. The small first segment yellowish; the second segment with a large spot on each side, but at a considerable distance from the side-margin; third segment with a single spot in its middle, rectangular in shape and extending from base to apex, fourth segment with three large spots of almost equal size and larger than the spot on third segment, the side-spots with convex outline, the median spot almost quadrate, extending the whole length of the segment and twice as wide as the spot on the third segment; fifth segment with a narrow median longitudinal spot and on each side of it a small round spot near the apical margin; the following segments with black on each side. Besides the spots mentioned the extreme side-margins of dorsal segments four, five, etc. are broadly bordered with black, forming an uninterrupted stripe to apex of abdomen. Venter yellow.

Wings somewhat yellowish hyaline with two light brown costal spots, one transversely from apex of first vein, the other, better defined, in apex of marginal cell and extending across the apical portion of second vein. The costa extends only to the apex of the third vein, which ends in the very apex of the slightly pointed wing. Second vein with a very slight curvature at apex. The distance between the tips of second and third veins about two and one-third the distance between the tips of the third and fourth veins, which are almost parallel in their apical course. The distance between anterior and posterior cross-veins about one-third longer than the first section of third vein. Posterior cross-vein at right angles with fourth vein and about one-third shorter than the ultimate section of fifth vein. The ultimate section of fourth vein, which is very thin and pale in its apical course, is not more than two and one third times the length of the penultimate section.

The chætotaxy is as described above for the genus *Leucophenga*; the fronto-orbital, vertical, and ocellar bristles of same strength. The upper reclinate bristle appears to be very slightly nearer to the inner vertical than to the lower reclinate and situated slightly higher up than the lower ocellus. Postverticals very minute, slightly cruciate at tips; lower occipital orbit with a small seta, differentiated from the setulæ or ciliæ in the occipito-orbital fringe; the uppermost setula in that fringe is longer than, and diverging from, the others; a very minute setula between the two sternopleural bristles; the anterior dorso-central is very small, hardly as large as the prescutellar pair, which is situated a little nearer to the scutellum than is the posterior dorso-central; the presutural and anterior supra-alar small, but distinct; posterior post-alar minute, but distinct; the distance between the apical, decussate bristles of scutellum not less than the distance from either of them to its nearest lateral bristle; the lateral bristles of scutellum are diverging; bristles and setulæ black. Veins brownish, the color more intense at the brown spots; apical portion of fourth vein light. Length 2.5 to almost 3 mm.

The species is widely distributed. Walker simply records it "United States." The writer has taken it on windows and reared it from a mushroom of the family *Agaricaceæ* at Urbana, Illinois, 1893, and on windows at Lawrence, Kansas, and Pittsburgh, Pennsylvania. At the latter place also by sweeping in grassy, springy places the writer found it very abundant together with *Scaptomyza graminum* and *adusta* and the beautiful *Ephydrid*, *Hydrellia formosa* Loew, on the moist lawns at Hotel Rainier, Ohio Pyle, Fayette Co., Pa., associated with the more abundant *Hydrellia formosa* Loew. There are specimens in the Carnegie Museum from Westmoreland Co., Pa., collected by H. H. Smith and Rev. P. Modestus Wirtner, and from Cheat Mts., W. Va. and Green Co., N. Y., collected by H. H. Smith. Mr. C. W. Johnson records it from New Jersey and Florida.

Many years ago, while a member of the Faculty of the University of Kansas, the writer made the following marginal note on *Drosophila quadrimaculata* Walker in his copy of "Insecta Saundersiana": "Can this be a *Leucophenga*?" As Walker does not mention the length of costa, the writer's suspicion was only expressed on account of the spotted abdomen and the two costal spots of the wings, which agreed with a species of *Leucophenga* from Illinois and Kansas, which he had labelled *n. sp.*, and the writer's statement to Professor Aldrich

in his Catalogue of North American Diptera, 1905, p. 639 regarding the occurrence of the genus *Leucophenga* in North America was based on his supposed n. sp. and not on his suspicion that it was identical with Walker's species. When Mr. Johnson rediscovered and recorded Walker's species from New Jersey and Florida in 1895 and 1900 under the genus *Drosophila* the writer became doubtful as to his above mentioned "marginal note," but when Mr. Johnson in 1913 placed Walker's species in the genus *Leucophenga*, then the writer became doubtful about his supposed n. sp. and sent a specimen to Mr. Johnson asking whether it agreed with his conception of Walker's species and the specimen was returned with an affirmative answer. The writer is now absolutely as fully convinced as the eminent dipterologist, Mr. C. W. Johnson himself, that it is the true *Drosophila quadrimaculata* Walker and thus a *Leucophenga*, and to clear any doubts the writer has deemed it advisable to redescribe it, as has been done above.

The species has much resemblance to *frontalis* Williston and *ornativentris*, sp. nov., but differs from them in having spotted wings and a different maculation of the abdomen.

9. *Leucophenga bistriata* sp. nov.

*Diagnosis:* Head and antennæ yellow; upper occiput black; front, face, and third antennal joint with grayish white bloom; palpi large, leaf-like, black. Mesonotum dark brown-red. Pleura yellow with two brown spots. Scutellum blackish brown on basal two-thirds, yellowish white on apical third. Legs yellow. Halteres yellowish white. Abdomen black with yellowish base, but its extreme apex and a transverse, basal band on third segment whitish. Wings hyaline with two brown, longitudinal, diverging stripes from base, one costal, the other median; second vein straight apically; the distance between anterior and posterior cross-veins distinctly shorter than first section of third vein. Length 3 mm. (or a little less).

*Description:* Head with front and antennæ yellow, the former and third antennal joint in certain lights revealing as also the face a grayish white pollen, leaving only the basal joints of the antennæ and the immediate vicinity above them yellow. Front about one-fourth the width of head, of equal width, or very little wider at lower ocellus than at base. The upper strongly concave occiput blackish, with a yellow spot at vertex. The third antennal joint one and one-half as long as wide; the black arista with seven rays above and four below (observed in left antenna only). Face not carinate. Palpi prominent, broad, leaf-like, black, with a minute setula at apex. Cheeks extremely narrow.

Mesonotum slightly shining, quite dark brown-red, with a fuscous dash at humerus. Humeri, notopleura, and pleura yellowish, with a spot on mesopleura and upper border of sternopleura fuscous. Scutellum above opaque black, with the slightly shining apical third yellowish white; honey-yellow below, Metathorax honey-yellow. Legs pale yellow with the knees of the middle and posterior pairs slightly brownish yellow, and the tibiae of the hind legs (the only pair exposed for examination) with a minute pre-apical seta. Halteres yellowish white.

Abdomen black, shining, with the small first segment, the narrow basal edge and broad lateral margins of second dorsal segment, yellow. The yellow at base and lateral margins is separated from each other by the projecting black of the segment. Extreme apex of abdomen whitish; basal third of third segment whitish yellow, in certain lights silvery white, and extending across the entire width of the segment. Venter with the base, at least, yellow (the apical portion is concealed by the dorsal segments).

Wings somewhat grayish hyaline, with two dark brown, longitudinal, diverging stripes from base of wing, the anterior costal stripe, covering the entire marginal cell, except a light streak along basal portion of second vein; the posterior or median stripe, connected at base with the anterior or costal stripe, covering the first basal cell, except its apex anteriorly, and rather broadly continuous along fourth vein to the posterior cross-vein, encroaching lightly upon this cross-vein and upon the basal portion of the ultimate section of the fifth vein; apex of the submarginal cell broadly bordered with diluted brown; costal cell lighter.

The third vein ends at the very apex of the distinctly pointed wing; second vein straight in its apical half; the distance between the tips of second and third veins scarcely twice the distance between the tips of third and fourth veins, which are almost parallel in their apical course; the distance between anterior and posterior cross-veins distinctly shorter than first section of third vein; anal vein reaching more than halfway towards border of wing; fourth vein thin and pale in its apical course; costa and other veins blackish brown, but basal portion of ultimate section of third vein, basal two-thirds of penultimate section of fifth and apical portion of fourth veins, yellowish.

The fronto-orbital, vertical, and ocellar bristles of equal strength; the upper reclinate fronto-orbital is distinctly nearer to the inner vertical than to the lower reclinate fronto-orbital, and situated higher up than the lower ocellus; the uppermost setula in the occipito-orbital fringe is longer than, and diverging to, the other setulae in the fringe; lower occipital orbit with a small bristle-like setula, distinctly differentiated from those in the occipito-orbital fringe; postverticals small and hair-like, but distinct, strongly converging and touching at tips; between the two sternopleurals (of the posterior one only the scar remains) a minute setula; of the dorso-central bristles the anterior is shorter and weaker, and of the same size as the prescutellar pair, which is situated slightly nearer the scutellum than is the posterior dorso-central; the presutural is minute; the anterior supra-alar is small, but distinctly differentiated from the setulae of mesonotum (of the posterior postalars only the minute scars remain); of the four scutellar bristles the apical pair (probably strongly convergent in life) is situated on the yellowish white portion and the other pair on the dark portion of the scutellum; all bristles and setulae black.

*Habitat:* Philippine Islands, Mindanao, one male?, Carn. Mus. Acc. No. 5030.

This species is easily distinguished from any known species of *Leucophenga* by the markings of the wings and by the comparative length between the first section of third vein and the distance between anterior and posterior cross-veins.

10. *Leucophenga goodi* sp. nov.

*Diagnosis:* Head and antennæ yellow; upper occiput black; palpi black. Mesonotum dark brown, shining, anteriorly with a broad, longitudinal, yellow mark, which extends a little beyond the transverse suture. Scutellum opaque, dark brown, with the extreme apex yellow. Legs yellow. Halteres yellowish white. Abdomen black, with basal half above and apex yellow. Wings grayish hyaline with costal and marginal cells fuscous brown; second vein straight. Length 2 mm.

*Description:* Front yellow, almost one-fourth the width of head. Upper occiput apparently wholly blackish, except a small, yellow spot at vertex (the face can not be well examined on account of some mould). Third antennal joint a little longer than wide and slightly infuscated; arista black with about five rays above and three below. Palpi black, not prominent. Cheeks very narrow.

Mesonotum (slightly shining) and scutellum (opaque in the specimen) dark brown. The mesonotum in the middle from the blackish spot at neck to a little beyond the transverse suture broadly brownish yellow. The scutellum on apical portion and below honey-yellow and on its sides at base blackish. Sides of mesonotum honey-yellow. Pleura yellow with the dark brown on metathorax extending over the sternopleura. Legs pale yellow with the apical portions of middle and hind femora and tibiæ and their tarsi honey-yellow; middle and hind tibiæ, at least, with a very minute pre-apical setula. Halteres yellowish white.

Abdomen black, very slightly shining; with the small first segment entirely, and the second and third (as seen from above), apex of fifth narrowly, and apex of abdomen pale yellow. I am not certain about the color of the venter on account of the folding of the dorsal segments, but I perceive some yellow. The yellow basal segments appear in certain lights silvery.

Wings grayish hyaline with costal and marginal cells light fuscous brown, which extends in diluted tint on apical half of the submarginal cell; extreme base of marginal cell hyaline. The third vein ends at the apex of the slightly pointed wing; second vein almost straight; the distance between tips of second and third veins more than two and one-half the distance between tips of third and fourth veins, which are almost parallel in their apical course, but by no means diverging; the distance between anterior and posterior cross-veins is one-third longer than first section of third vein; the posterior cross-vein is not more than two-thirds of the ultimate section of fifth vein; ultimate section of fourth vein is not quite two and one-half the length of the penultimate section; anal vein reaches hardly half-way towards the border of the wing; fourth vein thin in its apical course; veins brown, but the penultimate section of fifth vein more brownish yellow.

The fronto-orbital, vertical, and ocellar bristles are about of the same size, but the lower reclinate fronto-orbital is slightly the weakest and the inner vertical the



strongest; the upper reclinate fronto-orbital bristle is quite remote from the vertex and distinctly nearer to the lower reclinate than to the inner vertical and slightly lower down than the lower ocellus; postverticals very minute, strongly convergent; the anterior dorso-central bristle is weaker and much shorter than the posterior and of same size as the prescutellar pair, which are situated a little nearer to the scutellum than is the posterior dorso-central; the minute presutural is difficult to distinguish from the setulæ of mesonotum; the anterior supra-alar minute; the posterior post-alar very minute (seen distinctly, however, on the left side of the specimen); of the four scutellar bristles the apical pair are missing, but the scars left indicate their existence; bristles and setulæ black.

*Habitat:* West Africa, Cameroons, Lolodorf, Nov. 1, 1913, one male, collected by A. I. Good. Carn. Mus. Acc. No. 5263.

This is the smallest species of *Leucophenga* before me and is dedicated to my friend, Rev. A. I. Good, through the efforts of whom and his distinguished father, the late Dr. A. C. Good, Dr. W. J. Holland, Director of the Carnegie Museum, has been enabled to so greatly extend our knowledge of the insect fauna of West Africa.

There are in the collection two other specimens taken by Rev. A. I. Good, Oct. 29, 1913, at the same locality as the type of *L. goodi*, but they are in too poor condition to be properly defined; both are a little larger than *goodi*. One of the specimens (with antennæ and left wing lost) has the mesonotum shining, brownish yellow, with dark brown at neck, and a large spot at the humerus and a large spot before the scutellum dark brown; scutellum shining; metathorax very shining, dark brown; the scutellum yellow below, the brown extends very little on the sides; abdomen has the second and third segments black; the color of the wing appears more intense than in *L. goodi*; face hardly carinate (this could not be examined in *L. goodi*). In the second specimen the head is too defective for description; mesonotum and scutellum brown-red, the former unicolor without any darker maculation, the latter with its base narrowly darker; abdomen as in the former specimen and so also the wings, but the third and fourth veins appear to be slightly diverging, which could not be clearly defined in the former specimen as its wing is folded a little longitudinally.

## 11. *Leucophenga ambigua* sp. nov.

*Diagnosis:* Head yellow with upper occiput black; upper half of fronto-orbital region, ocellar spot, face, and third antennal joint grayish pollinose. Palpi yellow, not prominent. Mesonotum and scutellum brown-red. Legs pale yellow. Halteres yellow. First and

second segments of abdomen yellow, third, fourth, and fifth segments black, with narrow yellow basal bands interrupted in the middle with black. Wings fuscous hyaline, the fuscous more pronounced in the anterior half; second vein perfectly straight. Postvertical bristles very strong. Length 4.5 mm.

*Description:* Front broad, about one-third the width of head, and its sides slightly diverging upwards. Fronto-orbital region gray, wide at vertex, gradually narrowed below and reaching only to immediately below the lowermost fronto-orbital bristle. Ocellar triangle gray, rest of front brownish yellow, but in certain lights the whole front appears gray. Front provided with minute black hairs, apparently placed in transverse rows, and with minute, black, orbital setulæ close to the eye from the lower reclinate fronto-orbital bristle to the lower edge of front. Face yellow, grayish pollinose, with a very slight, transversely convex carina. Antennæ yellow with third joint, except its base, grayish pollinose and about one and a half as long as wide; arista black, yellow at base, with seven rays above and four below (alike in both antennæ). Palpi yellow, not at all prominent. Upper occiput black with the vertical border and a spot in the middle yellow. Cheeks narrow. Mesonotum and scutellum a little shining, dark brown-red, in certain lights with a light yellowish, silky bloom. Mesonotum with the minute setulæ black. The scutellum with the extreme apex and underside pale yellowish. Metathorax and pleura lighter brown-red, in certain lights with a thin, grayish lustre. Sternopleura with some scattered minute hairs besides the row of minute hair-like setulæ, which runs from the anterior sternopleural bristle downwards. Legs yellow; middle and posterior tibiæ with a small, but distinct, preapical bristle. Halteres yellow.

Abdomen blackish, slightly shining on the basal, but more so on the apical segments. The small first segment entirely, and the second segment, except a black dot on each anterior corner and its extremely narrow black apical border, yellow; on each of the third, fourth and fifth segments a narrow, basal yellow band, interrupted with black in the middle (most widely on fifth segment) the bands not reaching the lateral margin. Venter yellow.

Wings fuscous hyaline, the fuscous more intense anteriorly, especially in costal and marginal cells.

The third vein ends at the very apex of the almost imperceptibly pointed wing; the second vein runs perfectly straight to the costa; the distance between the tips of second and third veins about two and a half times the distance between the tips of third and fourth veins, which are parallel in their apical course, and, as the third vein is only gently curved forwards, the first posterior cell is only a little narrower at apex than at middle; the distance between anterior and posterior cross-veins is one-third longer than the first section of third vein, and less than one-half of the length of the ultimate section of fourth vein; posterior cross-vein a little shorter than the ultimate section of fifth vein; anal vein long, reaching fully two-thirds of the distance to the hind margin of the wing; fourth vein not so unusually thin in its apical course as in the other species before me; all veins brown, none conspicuously lighter.

Oral vibrissæ strong; the fronto-orbital, ocellar, vertical and postvertical bristles

are all strong; the upper reclinate fronto-orbital is the longest and strongest bristle of the head and situated midway between the inner vertical and the lower reclinate fronto-orbital and a little higher up than the lower ocellus; the outer vertical bristle is stronger than the inner one, which is of the size of the lower reclinate fronto-orbital, and this latter bristle is situated further from the proclinate fronto-orbital than in any of the previous species; behind the regular pair of strong ocellar bristles are seen two pairs of minute, proclinate setulæ; the postvertical bristles strong, decussate, but smaller, however, than any one of the fronto-orbital, vertical, or ocellar bristles; one of the setulæ of the lower occipito-orbital fringe is more robust and bristle-like; the uppermost setula of the occipito-orbital fringe is stronger and diverging from the other setulæ in the fringe; along the posterior oral margin two small, distinct bristles, far apart from each other; the usual very minute setula between the sternopleural bristles present; the anterior dorso-central bristle only one-half the size of the posterior but of the same size as the prescutellar pair, which is situated hardly closer to the scutellum than is the posterior dorso-central; on the humerus there are, besides the minute, hair-like setulæ, two or three bristles, the middle one of which is the longest, but not as long or strong as the noto-pleurals; the presutural and the anterior supra-alar distinct, well developed, and of the size of the longest humeral; the posterior postalar is well developed; the apical pair of scutellar bristles cruciate, the lateral pair diverging and longer than the former; the apical scutellar bristles are much closer to each other than either of them to its nearest lateral bristle; two very minute and delicate prothoracic setulæ may be detected immediately above the front coxæ; all bristles and setulæ black.

*Habitat:* Cameroons, West Africa, eight specimens collected at Lolodorf, Oct. 29, 1913, by A. I. Good. The type bears the label Carn. Mus. Acc. No. 5264; seven designated as paratypes each have the label Carn. Mus. Acc. No. 5266.

This species is, indeed, an ambiguous *Leucophenga*, and I refer it to this genus, because the costa reaches only to the apex of the third vein; its strong postverticals are those of *Drosophila*. The cross-vein, separating the discal and second basal cells, is distinct in *Phortica* and *Stegana*, but missing, or obliterated in *Leucophenga*, *Drosophila*, *Scaptomyza*, and other genera. Instead of the cross-vein there is a more or less distinct, transparent, or pale, mark, which even extends across the first basal cell and this mark follows the bend of the wing; in *ambigua* this mark is more pronounced and has in certain lights almost the appearance of a cross-vein.

It is worth while to call attention here to the fact that the two following species, originally described as *Drosophila* belongs to the genus *Leucophenga*.

## 12. *Leucophenga insulana* Schiner.

*Drosophila insulana* SCHINER, Reise der Novara, Diptera, (1868) p. 240; from "Milu (einer der Nikobaren)."

Dr. Schiner says that it is "eine echte Drosophiline" and adds "die Randader nur bis zur Mündung der Cubitalader reichend; die Flügelspitze durch eine etwas vorgezogene Ecke deutlich markirt." Schiner's definitions clearly point out that it belongs to the genus *Leucophenga*.

### 13. *Leucophenga frontalis* Williston.

*Drosophila frontalis* WILLISTON, "On the Diptera of St. Vincent (West Indies)," Trans. Ent. Soc. Lond. 1896, Part III, p. 413. Professor Williston states definitely: "the costal vein terminates at the tip of the third vein."

*Leucophenga frontalis* WILLISTON, "Manual of North American Diptera," 1908, p. 302 in footnote to *Leucophenga*: "Including such species as *Drosophila frontalis* and perhaps others described as *Drosophila*."

The following observations are here incorporated as they relate to forms, one of which might be confounded with *Leucophenga* and the other may turn out actually to belong to this genus.

*Drosophila ornatipennis* Williston, "On the Diptera of St. Vincent (West Indies)," Trans. Ent. Soc. Lond., 1896. Part III, p. 407, Pl. XIII, fig. 151, wing.

The broad, almost ovate, at apex distinctly pointed maculated wing as given in fig. 151 is very suggestive of a *Leucophenga*, but any doubt that could possibly arise, has been removed by Professor Williston himself in his Manual of North American Diptera, 1908, p. 300, fig. 5, where, no doubt, the reproduction of the wing of *ornatipennis* is used in illustrating the wing of a *Drosophila*, and he points out definitely in this fig. 5 that *the costa reaches the apex of the fourth vein*, though this fact is far from being clear in the original fig. 151. Among the large number of not less than twenty-two new species of *Drosophila* described in the "Diptera of St. Vincent," we need not search for any species belonging to *Leucophenga*, except *frontalis*, for the distinguished author would have pointed out that fact, if the termination of the costa had shown any difference from typical *Drosophila*.

*Drosophila gigantea* Thomson. Kongl. Svenska Fregatten Eugenies Resa etc. Diptera, p. 596 (1868).<sup>19</sup>

<sup>19</sup> OSTEN SACKEN in his Catalogue of Diptera of N. Amer., 1878, on p. xliii gives this footnote: "Brauer, Bericht über die wissenschaftlichen Leistungen, etc. für 1868, contends, that although the title-page bears the year 1868, the volume was actually issued only in 1869; this, in order to secure the priority of the volumes of the Novara Expedition, which appeared in 1868."

CZERNY in *Wien. Ent. Zeitg.*, XXII, 1903, p. 126, footnote: "Nach Brauer" etc., "erschien Thomsons Werk erst im Jahre 1869."

ALDRICH in his Catalogue of N. Amer. Diptera, 1905, ignores the statements of the late Professor Brauer and the same has been done by Bigot, Van der Wulp, Kertész, Speiser, Hendel etc., and I find myself alone affected by Osten Sacken's footnote, I have recorded Thomson's work as published 1869 in my paper on *Mixogaster* and *Ceria* in *Kansas Univ. Quart.*, Vol. VI, No. 3, July, 1897, p. 141.

This species is recorded as from Buenos Aires. Notwithstanding its extraordinary size "*fere 6 mill.*" there is nothing in the description to show that it does not belong to the *Drosophilinæ*, except possibly the statement "*Thorax . . . seris dorsalibus nullis, lateralibus et basalibus distinctis.*" If Thomson by "*dorsalibus*" means the anterior portion of the mesonotum and by "*basalibus*" the posterior portion of the same, then the position of the species in the *Drosophilinæ* is evident. But some of his other statements would indicate that it is a *Leucophengia*, for instance: "*occipite excavato*"—"fronte . . . utrinque setis 3 nigris prædita"—"*nervis costali cum ramo submarginali cubiti in ipso apice alæ conjuncto.*" If it actually belongs to the *Drosophilinæ*, this latter statement would refer it to the genus *Leucophengia*. Should the type still be in existence in Stockholm, or elsewhere, it would be easy for a competent dipterologist to decide the matter.

XIII. ON SOME SPECIES OF RHAMDIA, A GENUS OF SOUTH AMERICAN SILURIDÆ, IN THE CARNEGIE MUSEUM.<sup>1</sup>

BY CARL H. EIGENMANN AND HOMER G. FISHER.

(PLATE XXXVIII.)

Genus RHAMDIA Bleeker.

1. *Rhamdia pentlandi* (Cuvier & Valenciennes).

7280a-j, C. M., 51-105 mm., Rio Perené at its source. 1909. Lola Vance.

Adipose 4-4.5; maxillary barbel to, or nearly to, origin of anal. D. 1.6; A. 12-15; pectoral spine a little longer than the snout, the outer hooks much the stronger.

2. *Rhamdia sapo* (Valenciennes).

7285a-c, C. M., Porto Alegre, July 19, 1909. J. D. Haseman.

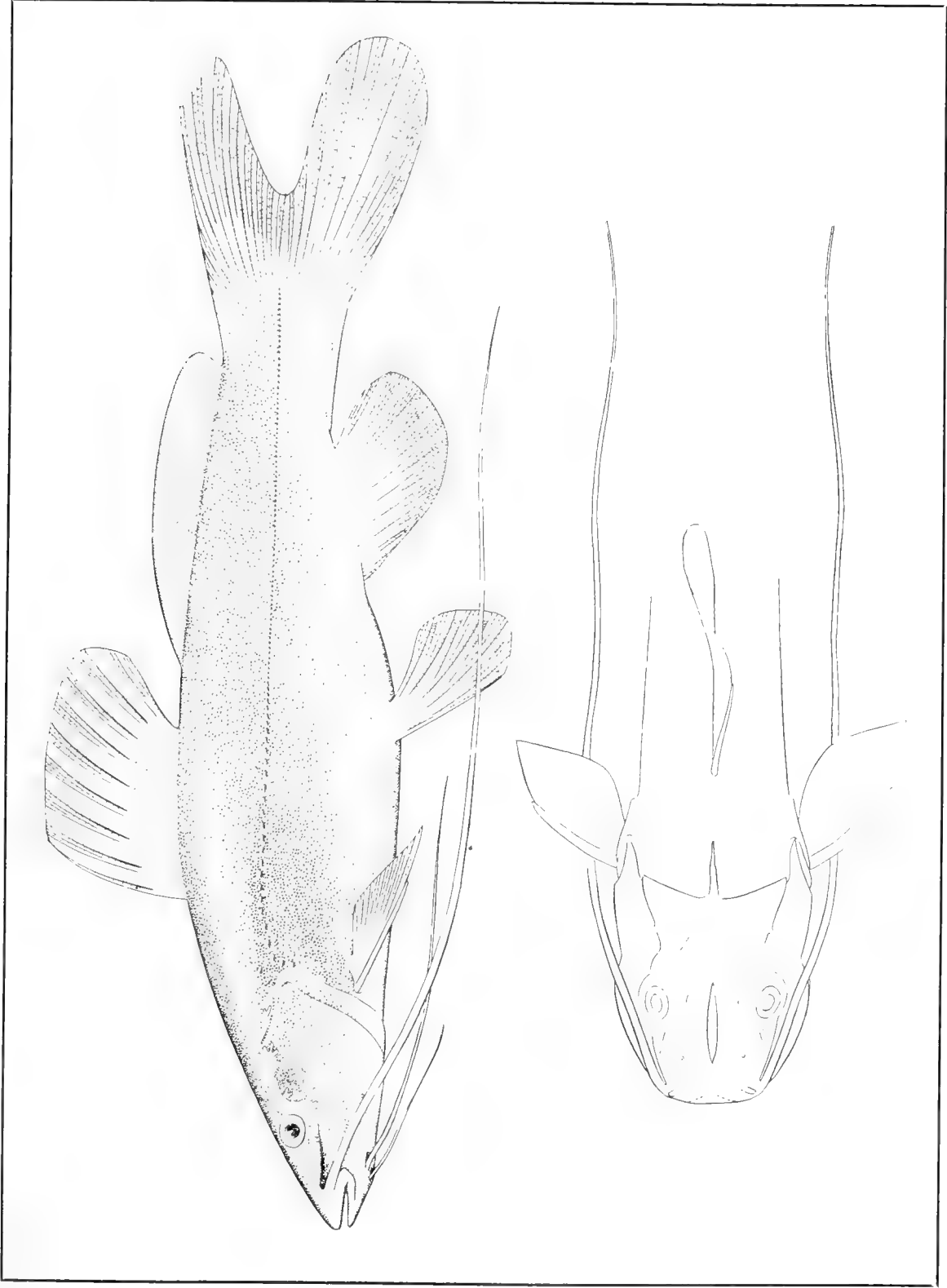
Dorsal 1.7 in two specimens, 1.8 in one; eye 6-6.5; interorbital 5.4 in the head in the smallest, 3.5 in the largest specimen. The maxillary barbel reaches to near the end of the adipose in the smallest, to the adipose in the middle-sized specimen, and a little further in the largest. The premaxillary teeth are 5.5 times as wide as deep.

3. *Rhamdia microps* sp. nov. (Plate XXVIII.)

7283a-d, C. M., 111-175 mm., Uruguayana, Feb. 7, 1909. Haseman.

The largest specimen is the type. Head 3.4-3.5; depth 4.5-5. D. 1, 7 in one, 1, 8 in three. A. 11-13. Eye six times in the length of the head in the smallest, seven and one-half times in the largest; interorbital three and one-half in the smallest, three in the largest; maxillary barbel reaching beyond base of middle caudal rays on one side of the smallest, to or beyond base of adipose in the largest; adipose fin a little over three times in the length; pectoral spine equals snout and eye in the largest example; dorsal spine three and one-half times in the length of the head in the largest. Pores of the head prominent

<sup>1</sup> Contribution from the Zoölogical Laboratory of Indiana University No. 148.



*Rhamdia microps* Eigenmann. Type. C. M. No. 7283.  $\times \frac{1}{5}$ .





even in the smallest; in clusters in the largest; depth of intermaxillary band of teeth nine times in its width. A well-marked hyaline band on the dorsal. Color plain, shading downward.

4. *Rhamdia hilarii* (Cuvier & Valenciennes).

7277a-j, C. M., 61-187 mm., Rio Das Velhas, May 10, 13, 1908. Haseman.

Dorsal spines, I, 7 in seven; and I, 8 in three specimens. Maxillary barbel extending to near the middle of the adipose in the smallest, to the second sixth of the adipose in the largest, not quite to end of dorsal in some of the others; pores of the top of the head conspicuous, aggregated; depth of premaxillary band of teeth about seven to eight times in its width; eye 5.5-6 times in the head, interorbital 4-4.5. A. 11-12.

7282a-b, C. M., 140-191 mm., Piracicaba, Sept. 7, 1908. Haseman.

In the depth of the premaxillary band of teeth these two specimens approach *R. sapo*. D. I, 7; I, 8; maxillary barbel not quite to end of base of dorsal; interorbital 3.4-3.5; premaxillary band of teeth  $4\frac{1}{2}$  and 6 (in smaller) times as wide as deep. Eye 6-6.5 in the head; pectoral spine  $2\frac{1}{3}$ .

From other localities in the basin of the upper Paraná, Rios Tieté and Grande and their tributaries there are the following:

7276a-b, C. M., 105-137 mm., Salto Avandava, Rio Tieté, Sept. 14, 1908. Haseman.

7289a-e, C. M., 72-125 mm., Sapina, Rio Tieté, Dec. 7, 1908. Haseman.

7287a, C. M., 246 mm., Jaguará, Rio Grande into Paraná. Haseman.

7311a, C. M., 61 mm., Mogy Guassú, into Rio Grande into Paraná, Aug. 25, 1908. Haseman.

7275a-b, C. M., 79-108 mm., Bebedoura, near Rio Grande, Sept. 1, 1908. Haseman.

In these specimens from the upper Parana basin, Rio Tieté, Rio Grande, and their tributaries, the dorsal formula is I, 6 in two (from Sapina); I, 7 in four; I, 8 in three. The maxillary barbel may reach to the middle of the adipose, usually it is shorter, sometimes not quite reaching to end of the base of the dorsal.

5. *Rhamdia sebæ* (Cuvier and Valenciennes).

- 7262*a-h*, C. M., 67-221 mm., Entre Rios, Rio Parahyba, June 1, 1908. Haseman.  
7267*a*, C. M., 210 mm., Campos, Rio Parahyba, June 14, 1908. Haseman.  
7269*a*, C. M., 90 mm., Barra da Pirahy, Rio Parahyba, July 12, 1908. Haseman.  
7286*a-c*, C. M., 42-104 mm., Jacarehy, Rio Parahyba, July 15, 1909. Haseman.  
7008*a*, C. M., 130 mm., Rio das Velhas, May 13, 1908. Haseman.  
7270*a*, C. M., 121 mm., San Joaquin, Sept. 4, 1909. Haseman.  
7265*a-b*, C. M., 175-234 mm., Pará, Dec. 24, 1909. Haseman.

The specimens referred to *R. sebæ* are from Entre Rios, Campos, Barra da Pirahy, Jacarehy, all in the Parahyba Basin, and from the Amazon basin. In all but two from Entre Rios the dorsal is I, 6. In the exceptions it is I, 7. The maxillary barbel extends beyond base of caudal in the young from San Joaquin, Rio das Velhas, Jacarehy, and Barra da Pirahy, to the second third of the adipose in the largest from the Rio Parahyba, beyond the middle in the largest from Para. In specimens of equal size the barbels seem to be a little shorter in the specimens from the Parahyba. Adipose 2.25-3 times in the length. Pectoral spine 2.5-1.66 times in the length, much longer in the adult than in the young. Eye 5-6.5 in the head.

6. *Rhamdia quelen* (Quoy and Gaimard).

This species is represented by specimens from localities on the coastal streams from the Rio São Francisco to Paranagua as follows:

- 7264*a-g*, C. M., 50-168 mm., Rio Coité, into R. São Francisco. Nov. 6, 1907. Haseman.  
7278*a*, C. M., 145 mm., Rio São Francisco, June 10, 1909. Haseman.  
7272*a-b*, C. M., 126 mm., Raiz da Serra, Rio Mogy, into Santos Bay. July 26, 1908. Haseman.  
7274*a-c*, C. M., 79-115 mm., Cubatão, 7 miles west of Santos, August 1, 1908. Haseman.  
7266*a-b*, C. M., 59-95 mm., Aqua Quente, Ribeira da Iguapé, Nov. 27, 1908. Haseman.  
7268*a-c* C. M., 31-174 mm., Iporanga, Ribeira da Iguapé, Dec. 1, 1908. Haseman.

7310a-c, C. M., 40-54 mm., Xiririca, Dec. 5, 1908. Haseman.

7288a-c, C. M., 30-155 mm., Morretes, near Paranagua, Jan. 4, 1908.  
Haseman.

The specimens from localities in the Paraguay basin are as follows:

7271a, C. M., 219 mm., Sapucay, April 5, 1909. Haseman.

7279a-f, C. M., 70-138 mm., Corumbá, May 2, 1909. Haseman.

7281a, C. M., 149 mm., Puerto Suarez, May 6, 1909. Haseman.

7284a-f, C. M., 95-121 mm., Villa Hays, April 13, 1909. Haseman.

7273a-b, C. M., 110-150 mm., San Matias, June 8, 1909. Haseman.

From the Tieté basin we have twelve specimens.

7263a-l, C. M., 53-175 mm., Mogy das Cruzes, Rio Tieté, July 19,  
20, 1908. Haseman.

In the specimens from the coastal streams, the São Francisco, Rio Coité, Parahyba, tributaries of Santos Bay, and Riberão, the dorsal is uniformly 1.6, the maxillary barbel extends to below some portion of the adipose.

In the specimens from the Paraguay basin the dorsal is 1.6 in sixteen specimens, 1.7 in but one from Corumbá. The maxillary extends to the origin of the adipose in the Sapucay specimen and in one from San Mateo, to below some part of the posterior half of the adipose in the rest.

In the specimens (No. 7263), from the Paraná basin at Mogy das Cruzes, the dorsal is uniformly 1.6. The maxillary is unusually short, reaching little beyond the origin of the dorsal in the next to the largest specimen, and little beyond the origin of the adipose in any of them. Interorbital 3-3.33 in the head. There is in all of these much variation in color.

XIV. NEW AND RARE SPECIES OF SOUTH AMERICAN  
SILURIDÆ IN THE CARNEGIE MUSEUM.<sup>1</sup>

BY CARL H. EIGENMANN.

(PLATES XXXIX-XLI.)

Genus PIMELODINA Steindachner.

1. *Pimelodina flavipinnis* Steindachner.

7253a, C. M., 210 mm., Manaos, Nov. 28, 1909. Haseman.

Maxillary barbel reaching slightly beyond tip of the caudal; adipose 2.22 in the length; depth six times in the length; greatest width of the head one and a half times in its length; eye one and two-third times in the interorbital; distance of adipose from dorsal equals the diameter of the eye; pectoral longer than the dorsal, which is equal to the head. First pectoral ray very flexible entirely to its tip, each of its segments with a main body and a prolongation from its upper outer corner, these prolongations of successive segments binding them together; frequently a spinule on the posterior face of the segments. No spots.

CHEIROCERUS<sup>2</sup> gen. nov.

Type, *Cheirocerus eques* Eigenmann.

This genus is like *Pimelodina* in all respects, except the first pectoral ray, which is developed as a pungent spine.

2. *Cheirocerus eques* sp. nov. (Plate XXXIX).

7254a-b, C. M., 68-117 mm., the larger one the type, Villa Bella, Oct. 5, 1909. Haseman.

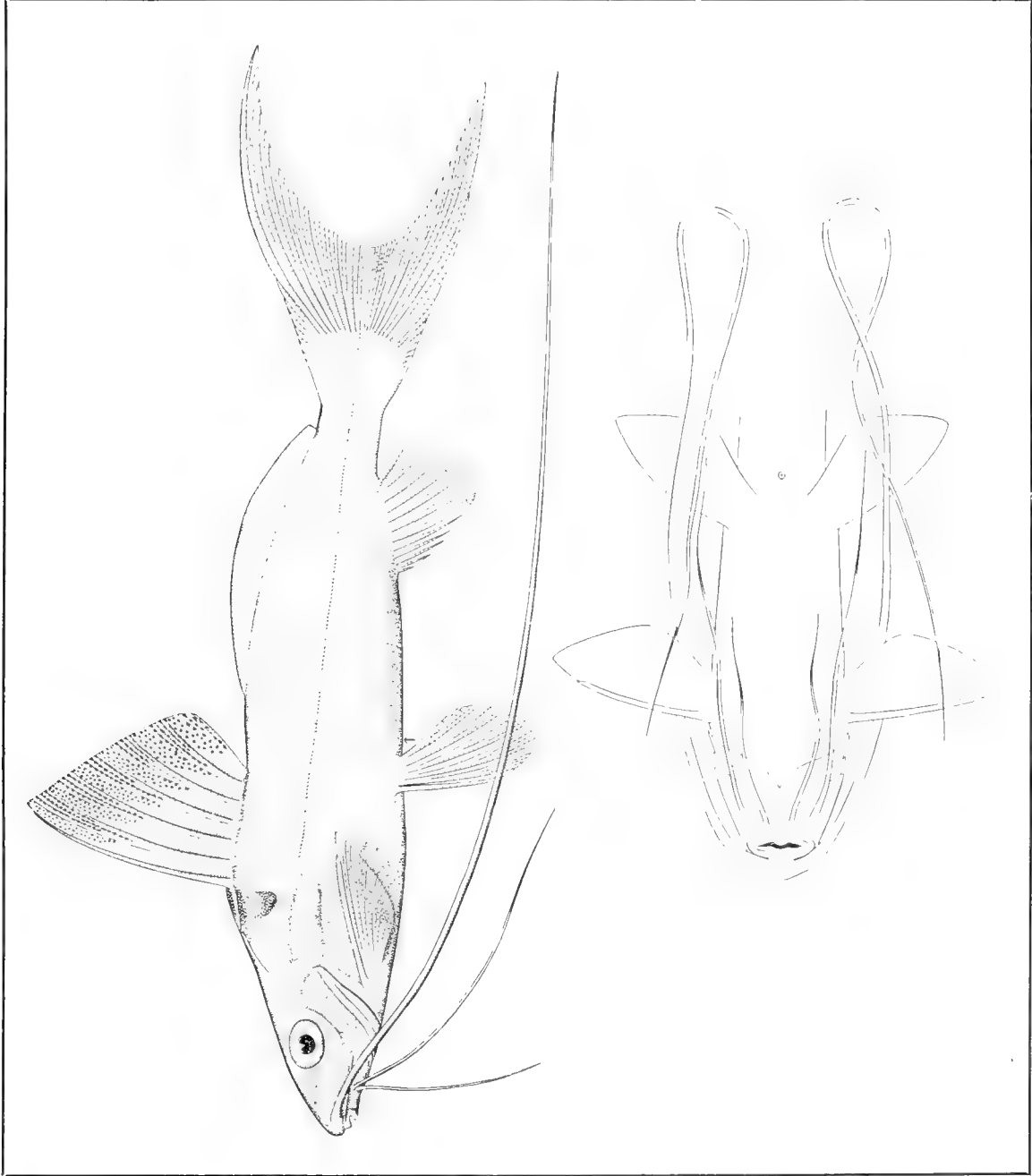
7255a-c, C. M., 95-110 mm., San Antonio, Nov. 3, 1909. Haseman.

7256a, C. M., 55 mm., Rio Mamoré, Sept. 19, 1909. Haseman.

Head 4.75-5; depth 5-5.75; D. 7; A. 11. Eye three times in the head in the smallest, four times in the largest specimen; interorbital four times in the head in the largest specimen, in others sometimes

<sup>1</sup> Contribution from the Zoölogical Laboratory of Indiana University, No. 151.

<sup>2</sup> χείρ'ῆ = a hand; κέρασ, το = 'a horn.



*Cheirocerus eques* Eigenmann. Type. C. M. No. 7254. 117 mm.



four and a half times; occipital process in contact with the dorsal plate; parietal fontanel narrow, separated by a broad bridge from the frontal fontanel. Maxillary barbel longer than the entire length; in the specimen, which is 55 mm. long, it measures 65 mm., in the specimen, which is 117 mm. long, it measures 126 mm.; postmental barbel extending about to the middle of the ventrals; adipose fin three to three and a quarter times in the length; first dorsal ray flexible, slightly longer, but coterminous with the second ray, 3.6-3.8 in the length. First pectoral ray pungent, with a very short, soft prolongation, and with about twenty-five recurved teeth on the posterior margin, graduate from the tip to the base, anterior margin with obscure recurved notches. Length of pectoral spine equals the head without the opercle. Caudal very deeply forked, the longest ray sometimes more than four times as long as the middle ray, the longest ray sometimes two and three-quarter times in the length. A black saddle, half or two-thirds as long as eyes, crosses the back in front of the dorsal spine and extends one-third down the sides. No other markings.

### 3. *Cheirocerus goeldi* (Steindachner).

*Pimelodina goeldii* STEINDACHNER, Akademischer Anzeiger, Vol. XLV, Feb., 1908, No. VII.

7252a-b, C. M., 91-98 mm., to base of caudal, about 118-129 mm. over all. Santarem, Dec. 15, 1909. Haseman.

This species is very closely allied to *P. eques*. The adipose is 2.7-2.66 in the length and the black saddle is replaced by a small triangular spot in front of the dorsal spine.

Head 5; depth 6; D. 7; A. 11; eye 4 in the head, interorbital 4; parietal fontanel narrow, with a constriction near its middle, which in larger specimens bridges over. Maxillary barbel longer than the entire fish, postmentals reaching to middle of ventrals.

First dorsal ray, which is the highest, 3.5 times in the length. Pectoral spine nearly equal to the length of the head, its armature similar to that of *C. eques*, but the spinules a little larger; a triangular black spot in front of the dorsal spine. This species hitherto has been only known from the type.

Genus ACENTRONICHTHYS Eigenmann & Eigenmann.

### 4. *Acentronichthys leptos* Eigenmann & Eigenmann.

5718a-h, C. M., 31-84 mm., Morretes, Jan. 3, 4, 1909. Haseman.

5719a-g, C. M., 50-119 mm., Iporanga, tributaries of Rio Riberão, Nov. 30 and Dec. 1, 1908. Haseman.

5720a-c, C. M., 80-82 mm., Raiz da Serra, Rio Mogy, July 28, 1908. Haseman.

Genus *HEPTAPTERUS* Bleeker.

There are three, possibly four species of this genus found in small streams between Santos and Buenos Aires. Three of the species are well marked, the fourth is doubtful.

5. *Heptapterus multiradiatus* von Ihering.

5716a-j, C. M., 35-101 mm., Mogy das Cruzes, Rio Tieté, July 20, 21, 1908. Haseman.

5717a-b, C. M., 44-102 mm., Alto da Serra, Tieté basin, São Paulo, Aug. 4, 1908. Haseman.

This species was described from specimens from Alto da Serra. It is distinguished by three dark longitudinal bands, the middle one along the middle of the sides, and by the extreme length of the anal which is

$$\frac{38}{1}, \frac{39}{1}, \frac{40}{3}, \frac{43}{1}, \frac{44}{1}, \frac{45}{1} \text{ in the specimens examined.}$$

The maxillary barbels extend to the middle of the pectoral, or are a little shorter.

6. *Heptapterus stewarti* Haseman.

This species is represented only by the type in the collections of the Carnegie Museum; No. 2850, C. M. It is distinguished by the almost uniform color and medium number (30) of anal rays.

7. *Heptapterus mustelinus* Valenciennes.

The length of the barbel of this species varies with age. In small specimens they may extend beyond the middle of the pectoral, in larger ones not to the gill opening. Valenciennes figures this species as having distinct cross-shades at the nape and at the dorsal. Such cross-shades are also found in a number of the specimens enumerated.

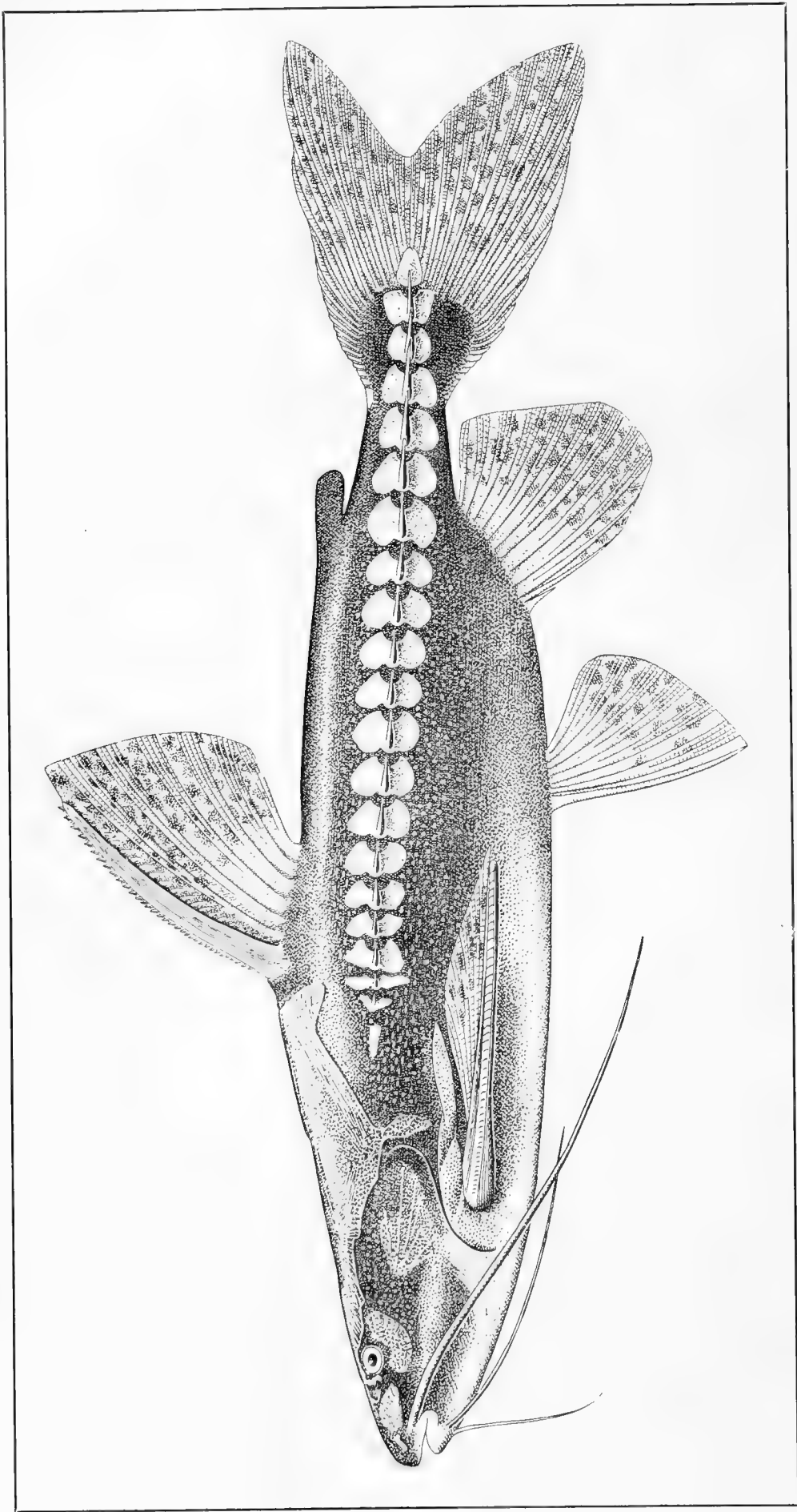
5713a-c, C. M., 87-159 mm., Santa Maria, Rio Vaccacahy-mirim, secondary tributary of the Rio Jacuhy which empties into the Lago das Patos at Rio Grande do Sul. Haseman.

5714a-j, C. M., 19-49 mm., Porto Alegre, Rio Grande do Sul, Jan. 19, 1909. Haseman.

5715a-g, C. M., 46-55 mm., Rio Negro at Santa Isabel, Uruguay, Feb. 12, 1909. Haseman.







*Doras lentiginosus* Eigenmann. Type. C. M. No. 7048. 357 mm. Santarem.

In these the anal counts are  $\frac{17}{3}, \frac{18}{3}, \frac{19}{8}, \frac{20}{3}, \frac{21}{2}, \frac{22}{1}$  number of anal rays.

7258a, C. M., 68 mm., Sapucay, April 2, 1909. Haseman.

7243a, C. M., 111 mm., Porto Alegre, Jan. 19, 1908. Haseman.

Steindachner refers the specimens described by the Eigenmanns (Occasional Papers, Cal. Acad. Sci., I, 143) from Maldonado to a distinct species *eigenmanni* (Sb. Acad. Wiss. Wien, CXVI, 1907, p. 487), and redescribed what he took to be *mustelinus* from Cubatão. These differ however in color from the typical *mustelinus* agreeing in this respect with:

5712a-f, C. M., 31-75 mm., Cubatão, 7 miles west of Santos, Aug. 1, 1908. Haseman.

These specimens are smaller than Steindachner's. They have the maxillary barbel reaching to or beyond the middle of the pectoral.

The anal is  $\frac{20}{2}, \frac{21}{1}, \frac{23}{2}, \frac{24}{1}$ . Steindachner found the maxillary barbels reaching to the end of the head in the young, only being shorter; 1.4 in the head, in the older. Our specimens agree with those of Steindachner in having a dark lateral band. He found but 16-18 anal rays.

It is quite possible that the specimens, recorded by Steindachner and above under 5712, represent a distinct unnamed species and that the specimens described from Maldonado represent another species, *eigermanni* distinct from *mustelinus*, but for the present I consider it best to refer all of these to the single species.

#### Genus DORAS Lacépède.

##### 8. *Doras lentiginosus* sp. nov. (Plate XL.)

7048a, C. M., type, 357 mm., Santarem, Dec. 15, 1909. Haseman.

7049a, C. M., paratype, 250 mm., Manáos, Nov. 18, 1909. Haseman.

Related to *D. uranoscopus* Eigenmann & Eigenmann and to *D. granulatus* Valenciennes.

Head 3.75; depth 5.4; D. 1.6; A. 12; scutes 21 and 22 (24 in the paratype); eye 5 in the snout, 5.5 in the interocular, 13 in the head (4, 4.5, 11 respectively in the paratype).

Maxillary barbel extending to posterior face of dorsal spine, postmental to below origin of pectoral; gape a little greater than inter-

ocular; head depressed, its height at the base of the occipital about equal to eye and postorbital portion of the head; dorsal spine nearly equal to length of head, the teeth on the two faces of about equal size; humeral process narrow, reaching to middle of the pectoral spine which is equal to the head and the opercular membrane, reaching nearly to

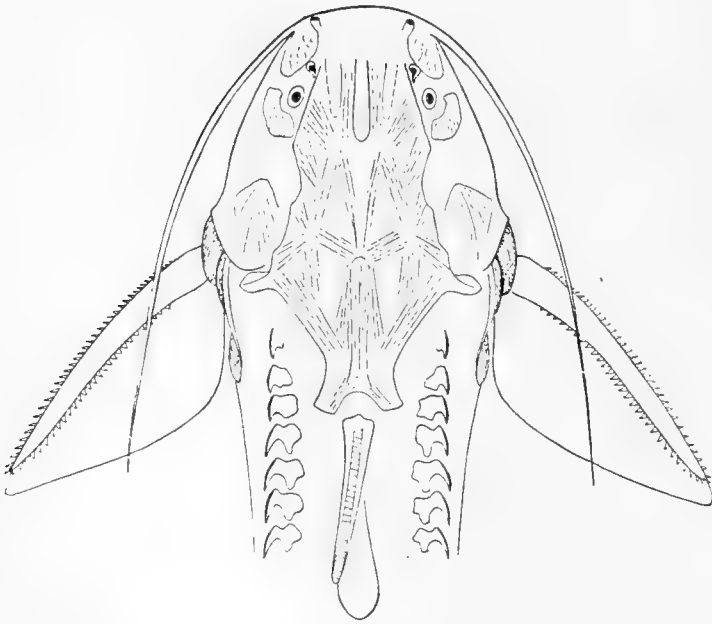


FIG. 1. *Doras lentiginosus* Eig.  $\frac{1}{3}$  nat. size. Type C. M. No. 7048.

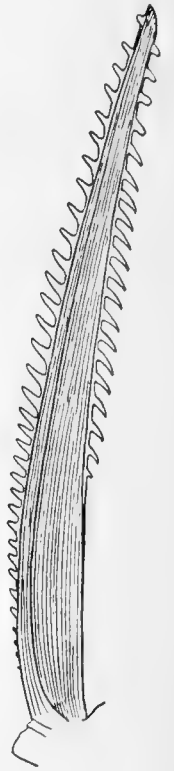
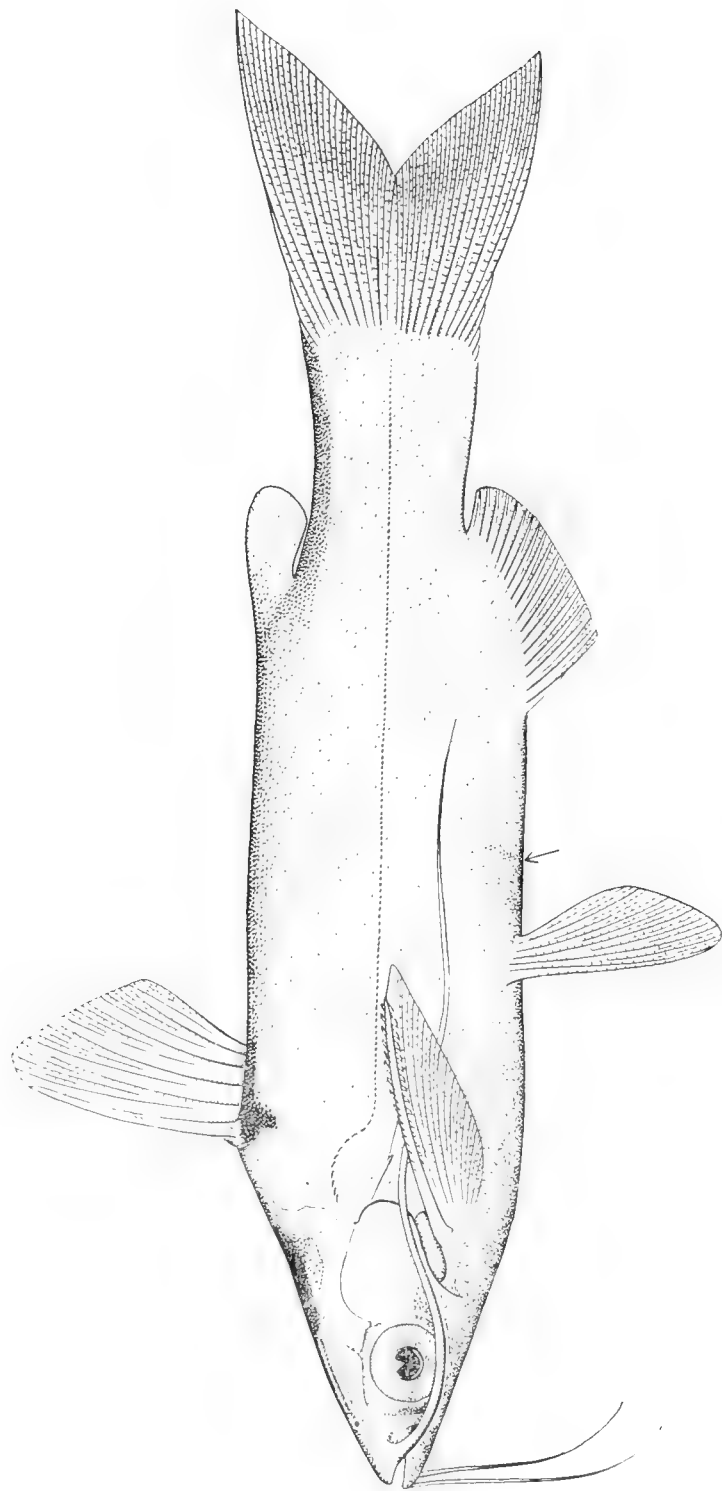


FIG. 2. Dorsal spine. Nat. size.

the ventrals which reach to the anal; anal with the seventh ray highest, the part in front as well as the part behind it truncate. Caudal fulcra very strong, extending to opposite the anterior margin of the fourth lateral scute counting from behind; caudal forked, the lobes a little shorter than the head; adipose fin short, fading out forward. Hooks of lateral scutes strongest just behind the adipose; the plate just below the end of the adipose highest, decreasing in height both backward and forward. Surface of the scutes striate, the striæ ending in spinules; naked portions of sides of head and body profusely covered with minute warts. Dark brown, mottled. Exposed surfaces of the bones of the head of the type with radiating or promiscuous granulations. Granulations much less developed in the paratype in which there is a well-developed median groove on the head and occipital process.





*Entemocorus benjamini* Eigenmann. Type. C. M. No. 7006.  $\times 2\frac{1}{2}$ . 59 mm.

**Entomocorus<sup>3</sup> gen. nov.**

Related to *Auchenipterus*, *Centromochles*, and *Trachycorystes*.

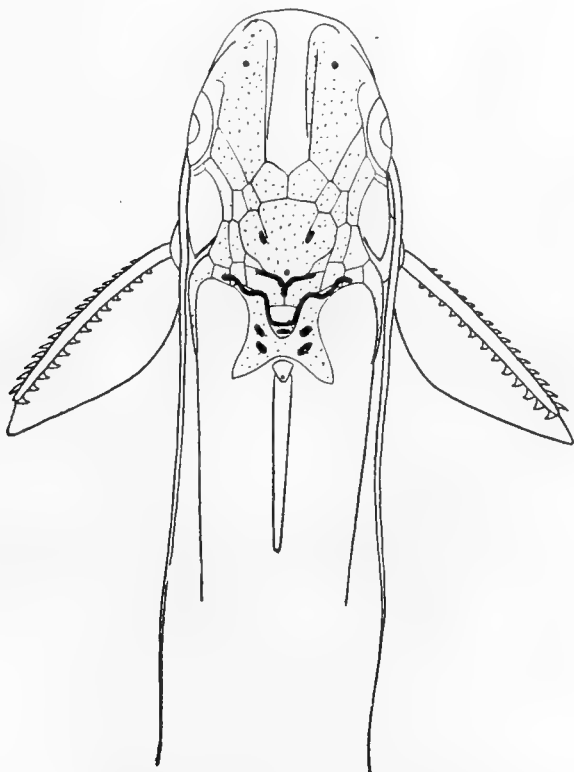
Adipose fin short; caudal moderately forked; anal moderate; ventrals with six rays, not adnate; pectoral spine serrate on both margins; the four mental barbels arranged in a nearly straight row or a row parallel with the edge of the lower jaw, not in pairs; maxillary barbels wiry at the base, fitted into a groove at the lower margin of the large eye.

9. **Entomocorus benjamini<sup>4</sup> sp. nov.** (Plate XLI).

7006a, C. M., type, 59 mm.; 7007a-f, C. M., paratypes, 55-64 mm., San Joaquin, Sept. 5, 1909. Haseman.

6773a-c, C. M., paratypes, 47 and 48 mm., Rio Santa Rita, June 12, 1909. Haseman

Head 4; depth 4-4.33; D. 1.5; A.  $\frac{17}{1}$ ,  $\frac{18}{2}$ ,  $\frac{19}{3}$ ; V. 6; eye 3-3.5 in the head; interorbital 2 in the head; width of the head slightly less than its depth at the base of the occipital process.



\* FIG. 3. *Entomocorus benjamini* Eig. Type C. M. No. 7006.  $2\frac{1}{3}$  nat. size.

<sup>3</sup> ἔντομος = notched, κόρυς, ἥ = a helmet.

<sup>4</sup> For Marcus Benjamin, Editor of the publications of the United States National Museum.

Maxillary barbel extending to tip of ventrals or origin of anal; mental barbels to base of pectoral, postmental very little shorter. Lower jaw scarcely included, snout rounded; upper jaw sharp-edged, a single series of teeth along the edge, lower jaw with about two series of teeth in front, with a single series on the side.

Posterior margin of the occipital bordered by a deep groove, a subparallel groove a little further back; top of head hard, reticulated, or pitted; dorsal plate without downward processes behind; origin of dorsal one-half as far from the snout as from the caudal, dorsal spine a trifle longer than head without the opercle, its anterior margin smooth, its posterior with minute hooks. Base of adipose equals eye or shorter; caudal forked, its middle rays half or two-thirds as long as the outer rays, which are 3.3-3.5 in the length; anal margin sloping, not emarginate; ventrals free from the belly, not reaching anal, about equal to the snout and eye; pectoral spine strong, as long as, or but little shorter than, the head, with about fifteen graduate recurved thorns along its posterior margin from the tip to near the base. Anterior margin with a similar number of shorter graduate teeth, more strongly antrorse than the posterior are retrorse. Humeral spine about reaching middle of the pectoral spine. Fontanel as long as the eye. Occipita and forward to fontanel black; a black ring surrounds the base of the dorsal, most marked at the predorsal fulcrum and continued along the back to the base of the caudal as a brown streak; sides and below silvery; tips of caudal lobes, especially the upper, usually with some dark.



XV. A LIST OF THE HYPOPTHALMIDÆ, THE DIPLOMYSTIDÆ, AND OF SOME UNRECORDED SPECIES OF SILURIDÆ IN THE COLLECTIONS OF THE CARNEGIE MUSEUM.<sup>1</sup>

BY HOMER G. FISHER.

(PLATE XLII.)

The present paper gives a list of the unrecorded species of Hypophthalmidæ, Diplomystidæ, and Siluridæ in the collections of the Carnegie Museum, exclusive of some species of the latter family. The omitted species of the Siluridæ are recorded in other papers in this volume, and in the Memoirs, Vol. VII, No. 4. The studies here given were made while the author was a student in Indiana University.

Family HYPOPTHALMIDÆ.

1. *Hypophthalmus edentatus* Spix.

6770*a-i*, C. M., nine, 117-175 mm., Pará, Jan. 22, 1910. Haseman.

6771*a-c*, C. M., three, 215-270 mm., Manáos, Nov. 15-18, 1909. Haseman.

7027*a-b*, C. M., two, the largest 305 mm., Manáos, Nov. 17 and 28, 1909. Haseman.

Family DIPLOMYSTIDÆ.

2. *Diplomystes papillosus* (Cuvier & Valenciennes).

6990*a*, C. M., one, 88 mm., San Juan, western Argentina, Feb. 25, 1909. Haseman.

6991*a-k*, C. M., eleven, Rio Colorado, Argentina, March 5, 1909. Haseman.

Family SILURIDÆ

Subfamily ARIINÆ.

3. *Genidens genidens* (Cuvier & Valenciennes).

7294*a-b*, C. M., two, 230-233 mm., São João da Barra, Parahyba, June 22, 1908. Haseman.

<sup>1</sup> Contribution from the Zoölogical Laboratory of Indiana University, No. 147.

ANN. CARN. MUS., XI, 27, OCT. 31, 1917.

7295a, C. M., one 110 mm., São Paulo, near Santos, July 29, 1908. Haseman.

7296a-b, C. M., two 197-264 mm., Santos, July 23, 1908. Haseman,

7297a-b, C. M., two, 69-135 mm., Cachoeira, near Bahia, April 13, 1908. Haseman.

7298a, C. M., one, 118 mm., No label. Haseman.

#### 4. *Selanaspis hertzbergi* (Bloch).

7303a, C. M., one, 220 mm., Maceió, on coast near mouth of Rio São Francisco, April 6, 1908. Haseman.

7304a-b, C. M., two, 120 mm., mouth of Rio Coité, south of Pará. Jan. 1, 1910. Haseman.

7305a, C. M., one, 165 mm., Coité, Jan. 10, 1910. Haseman.

7306a-f, C. M., six, 115-204 mm., Pará, Dec. 24, 1909. Haseman.

7307a, C. M., one, 167 mm., Santos, July 29, 1908. Haseman.

#### 5. *Arius spixii* (Agassiz).

7299a-b, C. M., two, 110 mm., No label. Haseman.

7300a, C. M., one, 225 mm., Jeapará, Dec. 12, 1908. Haseman.

7301a-b, C. M., two, 141 mm., Maceió, April 6, 1908. Haseman.

7302a-h, C. M., eight, 104-162 mm., Coité, south of Pará, Jan. 1, 1910. Haseman.

#### 6. *Netuma upsulonophora* (Eigenmann & Eigenmann).

7291a, C. M., one, 290 mm., Porto Alegre, Rio Grande do Sul, Jan. 17, 1909. Haseman.

#### 7. *Hexanematicthys rugispinis* (Cuvier & Valenciennes.)

7293a, C. M., one, 210 mm., Coité, South of Pará, Jan. 10, 1910. Haseman.

#### 8. *Sciadeichthys proöps* (Cuvier & Valenciennes.)

7052a, C. M., one, 690 mm., Penedo, Rio São Francisco, April 2, 1908.

#### 9. *Sciadeichthys parkeri* (Traill).

7292a, C. M., one, 191 mm., Coité, Jan., 1910. Haseman.

10. *Ælurichthys bagre* (Linnæus).

- 7131a-c, C. M., three, 210-380 mm., Pará, Jan. 15, 1910. Haseman.  
7013a, C. M., one, 380 mm., sea at Cachoeira, April 17, 1908. Haseman.

Subfamily CALLOPHYSINÆ.

11. *Callophysus macropterus* (Lichtenstein).

- 6988a, C. M., one, 265 mm., San Joaquin, Bolivia, Sept. 5, 1909. Haseman.  
7018a-b, C. M., two, 245-340 mm., Manáos, Nov. 28, 1909. Haseman.  
7019a, C. M., one, 340 mm., Cachoeira Theotônio, Rio Madeira, Oct. 30, 1909. Haseman.

Subfamily PIMELODINÆ.

12. ? *Pinirampus pirinampu* (Spix).

- 6040a-c, C. M., three, about 380 mm., Cachoeira Theotônio, Rio Madeira, Oct. 30, 1909. Haseman.

13. *Luciopimelodus agassizii* (Steindachner).

- 7251a, C. M., one, 139 mm., Pará, Jan. 19, 1910. Haseman.

This differs from the type of *Luciopimelodus* in having a pungent dorsal spine, but in our specimen there is evidence that the pungency is due to the fact that the tip has been broken off and it is a question whether the same is not true of Steindachner's typical specimen. It is nearly related to *L. platanus*.

Head 4.25; depth 4.75; D. 1.6; A. 15; eye 5.25; interorbital 4; snout very little longer than postorbital portion of the head; maxillary barbel reaching to very near caudal; postmental but very little shorter; occipital process very narrow, not reaching to the dorsal plate; a small oval fontanel at the base of the process; frontal fontanel large, with a bridge separating the posterior fifth. Adipose 2.7 in the length.

The fins are all pointed, the pectoral reaching the ventrals. First pectoral ray as in *Pimelodina flavipinna*. Caudal very deeply forked. Barbels slaty black except at base; dorsal and pectoral slaty; distal portion of ventral, anal, and margin of adipose similar.

14. *Luciopimelodus pati* (Valenciennes).

- 7239a, C. M., one, 284 mm., Buenos Aires, March 11, 1909. Haseman.

15. *Luciopimelodus platanus* (Günther).

6995a, C. M., one, 91 mm., to base of caudal, Rio Jaurú, emptying into Paraguay.

7240a, C. M., one, 206 mm., Asunción, March 31, 1909.

In the smaller specimen the eye is four times in the head; the inter-orbital five times; the snout a little longer than the postorbital part of the head; maxillary barbel extending to the end of the adipose.

16. *Platysilurus barbatus* Haseman.

7244a, C. M., one, 98 mm., Rio Mamoré, Sept. 19, 1909. Haseman.

7245a, C. M., one, 155 mm., Manáos, Nov. 28, 1909. Haseman.

The measurements are the length of the fish without the caudal filament, which in the case of the larger specimen is 160 mm. long.

*Imparfinis* Eigenmann & Norris.

This genus differs from *Rhamdella* principally in the non-development of a dorsal spine, the pectoral spine being also weak. It scarcely differs from *Chasmocranus*, in which there is no trace of a free orbital rim, while in the older specimens, at least of *Imparfinis piperatus*, there is a distinct free orbital margin. There is no free margin in *I. minutus* or in *I. mirini*. The head in *Chasmocranus* is extremely depressed.

17. *Imparfinis piperatus* Eigenmann & Eigenmann.

7257a-b, C. M., two, 110-126 mm., Morretes near Paranagua, Jan. 4, 1909. Haseman.

7259a-f, C. M., six, 68-222 mm., Cubatão, west of Santos, Aug. 1, 1908. Haseman.

7260a, C. M., one, 173 mm., Agua Quente, emptying into Rio Ribeira da Iguapé, Nov. 27, 1908. Haseman.

7261a-b, and 6928a, C. M., three, 63-214 mm., Raiz da Serra, Rio Mogy, flowing into Santos Bay, July 26-28, 1908. Haseman.

6930a, C. M., one, 87 mm., Iporanga, Ribeira da Iguapé, Dec. 1, 1908. Haseman.

These are very similar to *minuta*. The head is more depressed, the pectorals do not reach the ventrals, the maxillary barbels reach the middle of the pectoral in the smaller specimens, and are one and four-tenth times in the head in the largest. The caudal is shorter, the

lower lobe much shorter than the upper. The anal is longer, having twelve to fifteen rays. In all other respects similar to *minuta*.

18. *Imparfinis minuta* Lütken.

The type-locality of this species is the Rio das Velhas, a southern tributary of the Rio São Francisco. The following specimens may therefore be referred to this species without question.

6294a-d, C. M., four, 31-67 mm., Rio das Velhas, May 10, 1908. Haseman.

The maxillary barbel in the largest specimen reaches to near the tip of the ventrals. The eye is contained three and one-half times in the head and is greater than the interorbital. The anal rays counting everything number eleven. With less certainty the following may be referred to this species:

6296a-c, C. M., three, 26-50 mm., Jacarehy, Rio Parahyba, July 15, 1908. Haseman.

6925a-d, C. M., four, 29-44 mm., Mogy das Cruzes, Rio Tieté, July 19, 1908. Haseman.

In these the maxillary barbel extends nearly to the ventrals or to their second third. The diameter of the eye is four and one-quarter to five times in the head, equal to, or a little less than, the interorbital. The anal rays are ten or eleven.

Very similar to these is

6929a, C. M., one, 81 mm., Iporanga, Ribeira da Iguapé, Dec. 1, 1908. Haseman.

The maxillary barbel reaches to the middle of the ventrals. The eye is five times in the head and less than the interorbital. The anal is ten times in the length. The caudal lobes are nearly equal. In all the above-mentioned specimens the origin of the ventrals is under the middle of the dorsal, the pectorals reach the ventrals, the caudal lobes are equal. The eye in the smaller ones is without trace of a free orbital margin; in the larger specimen (No. 2929) there is a trace of a rim.

6927a-h, C. M., eight, 40-71 mm., Piracicaba, Tieté basin, Sept. 7, 1908. Haseman.

These specimens are much distorted and are not fair material for

comparison. The pectorals do not reach the ventrals, the maxillary barbels reach to the ventrals, or are shorter. The eye is four and one-half times in the head and a little less than the interorbital, the anal has eleven to thirteen rays.

19. *Imparfinis mirini* Haseman.

6932a, C. M., one, 61 mm., Piracicaba, Sept. 7, 1908. Haseman.  
Probably from the type-locality.

20. *Pseudopimelodus pulcher* Boulenger.

7120a-b, C. M., two, 27-41 mm., Salto Avanhandava, Rio Tieté, Sept. 15, 1908. Haseman.

The larger one of these specimens agrees in all but two points with Boulenger's description of *Pimelodus pulcher*. Boulenger says: "The band of teeth in the upper jaw is of moderate breadth, without prolonged lateral portion" and "Dorsal . . . with a strong serrated spine."



FIG. 1. *Pseudopimelodus pulcher* Boulenger.  
a. Pectoral spine;  
b. Dorsal spine;  
c. Premaxillary band of teeth.

In the larger specimen the depth of the premaxillary band of teeth is three and one-half times in its width, and there is a backward projecting angle. The dorsal spine has seven recurved notches along the entire posterior face and two on the anterior face near the tip. The pectoral spine has nine recurved hooks on its anterior margin, those on its middle largest, and seven along its posterior margin.

The smaller specimen is quite light, with four conspicuous black bars or bands, the first embraces all but the tip of the dorsal, the second embraces part of the adipose and base of the anal, the third extends across the end of the caudal peduncle and base of the caudal, and the fourth across the lobes of the caudal at the top of the middle rays, which are light.

The larger one is colored nearly identically like the specimen of *pulcher* figured by Boulenger (Proc. Zool. Soc., 1888).

21. *Pseudopimelodus villosus* Eigenmann.

7139a-c, C. M., three, 24-130 mm., Santarem, Dec. 15-19, 1909. Haseman.

22. *Pseudopimelodus parahybæ* Steindachner.

7140a, C. M., one, 59 mm., Rio Ribeira, Dec. 12, 1909. Haseman.

7141a-e, C. M., five, 20-27 mm., São João do Barra, Rio Parahyba, June 24, 1908. Haseman.

7142a-f, C. M., six, 23-29 mm., Campos, Rio Parahyba, June 15, 1908. Haseman.

6931a-i, C. M., nine, largest 62 mm., Uruguayana, Feb. 7, 1909. Haseman.

23. *Pseudopimelodus acanthocheira* Eigenmann & Eigenmann.

7119a-j, C. M., ten, largest 55 mm., Maciél, Rio Guaporé, July and August, 1909. Haseman.

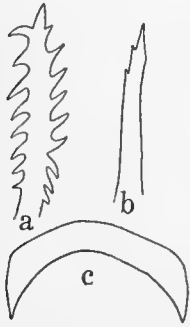


FIG. 2. *Pseudopimelodus acanthocheira* Eig. & Eig. a. Pectoral spine; b. Dorsal spine; c. Premaxillary band of teeth.

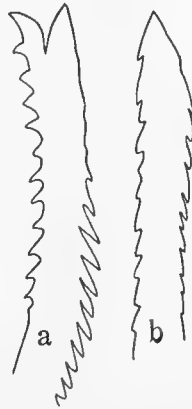


FIG. 3. *Pseudopimelodus zungaro* (Humboldt). a. Pectoral spine; b. Dorsal spine.

24. *Pseudopimelodus zungaro* (Humboldt).

7118a, C. M., one, 135 mm., Piracicaba, Sept. 9, 1908. Haseman.

25. *Cephalosilurus fowleri* Haseman.

6993a, C. M., one, 182 mm., Penedo, March 20, 1908. Haseman.

26. *Lophiosilurus alexandri* Steindachner.

6992a, C. M., one, 40 mm., Januaria, Dec. 12, 1907. Haseman.

27. *Typhlobagrus kronei* Ribeiro.

7290a-c, C. M., three, 100-133 mm., Caverna das Areas, Nov. 28, 1908. Haseman.

This species is very closely related to *Pimelodella transitoria* Ribeiro, from which it differs in no essential character except the absence of eyes.

28. **Conorhynchos conirostris** (Cuvier & Valenciennes).

7024a, C. M., one, about 400 mm., Januaria, Rio São Francisco, Dec. 18, 1907. Haseman.

29. **Conorhynchos glaber** Steindachner.

6994a, C. M., one, 52 mm., Cachoeira, Rio Paraguassú, April 14, 1908. Haseman.

Head 3.6; depth 5; D. 1.6; A. 22; eye three times in the head; snout longer than postorbital portion of head; interorbital four times in the head; maxillary barbel reaching to posterior margin of the eye; outer mental barbel to middle of pupil.

Snout decurved, blunt, the mouth inferior, width of premaxillary band of teeth but little greater than length of eye. Pectoral spine but little shorter than the rays, equal to snout and eye; anterior margin of the spine with two hooks near the tip, the rest slightly roughened, posterior margin with seven large thorns along most of the length, graduated from the second to the basal; dorsal spine equal to the length of the pectoral spine, with a few fine teeth on the basal half of the posterior surface, both surfaces with recurved notches near the tip; adipose fin free behind, six times in the head.

30. **Pimelodus ornatus** Kner.

7232a, C. M., one, 210 mm., Asunción, March 31, 1909. Haseman.

7233a, C. M., one, 185 mm., Rio Jaurú, flowing into Rio Paraguay, June 4, 1909. Haseman.

31. **Pimelodus clarias** (Bloch).

From the São Francisco basin.

7206a-c, C. M., three, 82-107 mm., Pirapora, Dec. 15, 1907. Haseman.

7050a, C. M., one, 290 mm., Penedo, March 20, 1908. Haseman.

7207a, C. M., one, 143 mm., Januaria, Dec. 12, 1907. Haseman.

7208a-b, C. M., two, 98-144 mm., Cidade do Barra, Dec. 6, 1907. Haseman.

7209a-g, C. M., seventeen, 104-240 mm., Joazeiro, Nov. 27, 28, 29, 1907. Haseman.

7210a-c, C. M., three, 120-179 mm., Lagoa Pereira, Dec. 23-26, 1907. Haseman.

7211a-f, C. M., six, 95-184 mm., Rio das Velhas, May 11, 1908. Haseman.



The specimens from the main part of the Rio San Francisco from Piraporá to Joazeiro resemble very closely specimens from the Rio Magdalena. They are uniform in color, and but faintly spotted.

Those from the mountain tributary, Rio das Velhas, and the lowland Lagoa Pereira are conspicuously marked with three rows of spots. The spots in the Rio das Velhas specimens are larger (ten to eleven in the middle row) than in the Pereira specimens (eleven to fifteen in the middle row). One of the specimens from the Rio das Velhas has much larger eyes than the others.

From the Rio Itapicurú.

7212a, C. M., one, 169 mm., Itapicurú, March 2, 1908. Haseman

This specimen has short maxillary barbels. They extend to end of dorsal, the caudal fin is leathery, the rays being much branched.

About eight irregular rows of small spots, there being about twenty-five spots in the middle row. In general appearance it resembles the Rio das Velhas form, with the large spots broken up into much smaller ones.

From Ribeira da Iguapé.

7225a-b, C. M., two, 185-200 mm., Iporanga, Dec. 1, 1908. Haseman.

The specimens from Iporanga are like the one from the Itapicurú, except that the spots are larger and in only three rows along the sides.

From the La Plata basin.

7213a-o, C. M., fifteen, 45-160 mm., Villa Hays, April 11, 13, 1909. Haseman.

7214a-b, C. M., two, 161-169 mm., Caceres, May 22-24, 1909. Haseman.

7215a-d, C. M., four, 51-145 mm., Corumbá, April 28, May 9, 1909, Haseman.

7216a-c, C. M., three, 118-184 mm., Asunción, March 31, 1909. Haseman.

7226a-o, C. M., fifteen, 48-77 mm., Uruguayana, Feb. 5, 7, 1909. Haseman.

The specimens (7226) are typical for the variety *macrospila* as described by Eigenmann & Eigenmann, *South American Nematognathi*, 1890, p. 175.

7227a, C. M., one, 110 mm., Itapura, Rio Tieté, Sept. 27, 1908. Haseman.

This specimen agrees in every detail with the one from the Rio Itapicurú.

7230a-b, C. M., two, 90-105 mm., no label. Haseman.

7231a, C. M., one, 205 mm., João d'El-Rei, Rio das Mortes, flowing into Rio Grande, which empties into the Paraná, May 17, 1908. Haseman.

7228a, C. M., one, 205 mm., Rio Mogy Guassú, tributary of the Rio Grande, a tributary of the Paraná, Aug. 25, 1908. Haseman.

From Rio Grande do Sul.

7229a-k, C. M., eleven, 161-259 mm., Porto Alegre, Jan. 17, 20, 22, 1908. Haseman.

The specimens from Porto Alegre in general resemble specimens from British Guiana. The maxillary barbels are variable; in some specimens they reach the end of the ventrals and in others they reach the end of the adipose. In color they show distinctly the silvery appearance which is overlaid with brown above. They have six rows of spots along the sides, the fourth row from the dorsal having about twenty spots. The spots are smaller than in specimens from the Rio San Francisco, being about the size of the lens of the eye. These specimens agree in every particular with a paratype of *Pimelodus ortmanni* Haseman (Ind. Univ. Mus. No. 13328) from the Rio Iguassú. Hence we conclude that *Pimelodus ortmanni* Haseman is a synonym of *Pimelodus clarias* (Bloch).

From the Amazon basin.

7217a-l, C. M., twelve, 63-160 mm., Santarem, Dec. 6, 1909. Haseman.

The specimens from Santarem have long maxillary barbels, in some cases reaching the end of the caudal. Most of the specimens are evenly and moderately pigmented. A few, however, have the pigment in three bands extending the entire length of the body. In general they resemble the form from the São Francisco basin.

7218a-e, C. M., five, 77-172 mm., San Joaquin, Sept. 4-5, 1909. Haseman.

These resemble the evenly colored specimens from Santarem.

7219a, C. M., one, 181 mm., Pará, Dec. 24, 1909. Haseman.

7220a-c, C. M., three, 69-86 mm., Palo Grande Falls, Rio Mamoré, Sept. 30, 1909. Haseman.

7221a, C. M., one, 96 mm., Maciél, Rio Guaporé, July 26, 1909. Haseman.

The specimen from Maciél has long barbels, reaching the base of the caudal. In general form and also in color it seems to be identical with the specimens obtained by Dr. Eigenmann in the Rupununi, British Guiana. The specimen has three bands about the width of the eye along the entire length of the sides. These bands toward the head show indications of breaking up into spots. There is an intensely black bar at the base of the dorsal spine and the free margin of the adipose is dusky.

7222a-b, C. M., two, 86-138 mm., Berlin, Rio Mamoré, Sept. 15, 1909. Haseman.

In general appearance these specimens resemble those from the Rio San Francisco. One is moderately and evenly pigmented while the other is without pigment.

7223a, C. M., one, 135 mm., San Antonio de Rio Madeira, Nov. 3, 1909. Haseman.

7224a-b, C. M., two, 102-124 mm., Villa Bella, Oct. 5, 1909. Haseman.

### 32. *Pimelodus altipinnis* Steindachner.

7234a, C. M., one, 140 mm., Belem, Jan. 15, 1910. Haseman.

7235a-c, C. M., three, 130-180 mm., Pará, Dec. 24, 1909. Haseman.

7236a-c, C. M., three, 120-135 mm., San Joaquin, Sept. 5, 1909. Haseman.

7237a-j, C. M., ten, 56-101 mm., Santarem, Dec. 11, 1909. Haseman.

### 33. *Pimelodus valenciennis* Kröyer.

7238a-m, C. M., thirteen, 61-148 mm., Uruguayana, Feb. 5 to 7, 1909. Haseman.

7005a, C. M., one, 67 mm., Buenos Aires, Feb. 20, 1909. Haseman.

This species is a true *Pimelodus*, the parietal fontanel being absent, the frontal fontanel ending abruptly opposite the posterior edge of the orbit. This arrangement of fontanel is found in the smallest specimens of the genus, while *Pimelodella* always has a parietal fontanel extending to the base of the occipital process, a bridge being present immediately behind the eye.

34. *Pimelodus fur* (Reinhardt).

6989a, C. M., one, 213 mm., Penedo, March 20, 1908. Haseman.

*Iheringichthys* Eigenmann.

Three species of this genus were examined, *I. megalops* Eigenmann, *I. labrosus* (Lütken), and *I. westermanni* (Lütken). The first species (*megalops*) was taken at Caceres and Corumbá, the second (*labrosus*) at Uruguayana, and the third (*westermanni*) at Penedo and Joazeiro.

*I. megalops* has a narrow band of premaxillary teeth as described by Eigenmann. The teeth in *labrosus* are in a still narrower band and the premaxillary teeth in *westermanni* consist of a single series of very small teeth, which were entirely overlooked by Lütken.

*Bergiaria* and *Bergiella* become synonyms of *Iheringichthys*.

KEY TO THE SPECIES OF *IHERINGICHTHYS*.

- a. Premaxillary with a single series of teeth; snout long, subconical; eye five times in the head, less than the interorbital.....1. *westermanni* (Lütken).
- b. Interorbital concave; width of occipital process at its base equal to its length; eye three and one-half times in the head; upper lip scarcely narrowed in the middle.....2. *megalops* Eigenmann.
- bb. Interorbital flat; occipital process distinctly narrower than long; eye four and one-quarter times in the head; upper lip with deep notch in the middle.  
3. *labrosus* (Kröyer).

35. *Iheringichthys megalops* Eigenmann & Ward.

7241a-b, C. M., two, 172-185 mm., Caceres, May 22, 1909. Haseman.

7242a-b, C. M., two, 129-131 mm., Corumbá, May 9, 1909. Haseman.

36. *Iheringichthys westermanni* (Lütken).

7249a-e, C. M., five, 89-154 mm., Penedo, March 20, 1908. Haseman.

7250a-h, C. M., eight, 46-176 mm., Joazeiro, Nov. 27, 1908. Haseman.

37. *Iheringichthys labrosus* (Kröyer).

7248a-j, C. M., ten, 102-179 mm., Uruguayana, Feb. 6, 1909. Haseman.

38. *Goeldiella eques* (Müller & Troschel).

7041a-b, C. M., two, about 205-300 mm., Manáos, Nov. 27, 1909. Haseman.

39. *Phractocephalus hemiliopterus* (Bloch & Schneider).

7023a, C. M., one, about 410 mm., Maciél, Rio Guaporé, July 9, 1909. Haseman.

40. *Platynematischthys punctulatus* Kner.

7020a, C. M., one, 330 mm., Manáos, Nov. 28, 1909. Haseman.

7021a, C. M., one, about 570 mm., Cachoeira de Giral, Rio Madeira, Oct. 26, 1909. Eigenmann.

7022a, C. M., one, about 477 mm., Cachoeira Theotonio, Rio Madeira, Oct. 30, 1909. Haseman.

41. *Sciades pictus* Müller & Troschel.

7016a, C. M., one, about 570 mm., Manáos, Nov. 28, 1909. Haseman.

42. *Sciades marmoratus* Gill.

7017a, C. M., one, about 560 mm., Manáos, Dec. 2, 1909. Haseman.

43. *Steindachneria parahybæ* (Steindachner).

7035a, C. M., one, 370 mm., Entre Rios, June 3, 1908. Haseman.

44. *Pseudoplatystoma fasciatum?* (Linnæus).

7030a, C. M., one, 310 mm., Puerto Suarez, May 6, 1909. Haseman.

6798a-c, C. M., three, Uruguayana, Feb. 7, 1909. Haseman.

7031a, C. M., one, 305 mm., Manáos, Nov. 16, 1909. Haseman.

6799a, C. M., one, Santarem, Dec. 15, 1909. Haseman.

7032a, C. M., one, 220 mm., Manáos, Nov. 16, 1909. Haseman.

In these specimens the dark lateral bands are represented by short oval spots. Barbels extending beyond tip of dorsal.

45. *Pseudoplatystoma coruscans* (Agassiz).

7028a, C. M., one, about 370 mm., Joazeiro, Rio San Francisco, Nov. 28, 1907. Haseman.

7029a, C. M., one, about 350 mm., locality ? Haseman.

46. *Platystomaticthys sturio* (Kner).

7025a-b, C. M., two, 250 mm. to base of caudal, Pará, Jan. 16, 1910. Haseman.

7122a-c, C. M., three, 165-185 mm., to base of caudal at middle, Pará, Jan. 5 and 18, 1910. Haseman.

47. **Paulicea lütkeni** (Steindachner).

7039*a*, C. M., one, about 350 mm., Manáos, Nov. 28, 1909. Haseman.

48. **Brachyplatystoma rousseauxi** (Castelnau).

7014*a*, C. M., one, 320 mm., Pará, Jan. 18, 1910. Haseman.

49. **Brachyplatystoma vaillanti** (Cuvier & Valenciennes).

7246*a-i*, C. M., nine, 130-220 mm., Pará, Dec. 24, 1909. Haseman.

7247*a-d*, C. M., four, 45-55 mm., Santarem, Dec. 11, 1909. Haseman.

7015*a-b*, C. M., two, 360 and about 470 mm., Manáos, Nov. 16 and 28, 1909. Haseman.

The measurements are without the caudal filament, which in many cases is longer than the rest of the fish.

The specimens from Santarem are small and evidently immature. The teeth are as those from Pará, in which they are typical of the species. The back and sides are thickly covered with brown spots, which is unusual for this species. The dorsal has a black spot near its middle about the size of the eye. The caudal filament, though short, is present in one of the specimens, the caudal of the other being broken.

50. **Tænonema steeri** Eigenmann & Bean.

7051*a*, C. M., one, 260 mm., to end of middle caudal rays. Pará, Jan. 17, 1910. Haseman.

51. **Hemisorubim platyrhynchos** (Cuvier & Valenciennes).

6800*a-d*, C. M., four, 156-215 mm., Santarem, Dec. 8, 9, 15, 1909. Haseman.

7121*a-b*, C. M., two, 115-145 mm., Laguna near Rio Mamoré, Berlin, Bolivia, Sept. 4, 1909. Haseman.

7036*a*, C. M., one about 360 mm., Lagoa de Parnagua, Jan. 16, 1908. Haseman.

7037*a-c*, C. M., three, about 310-380 mm., Caceres, May 24, 1909. Haseman.

In the specimens from Caceres the fins are marbled.

52. **Sorubim lima** (Bloch & Schneider).

6794*a*, C. M., one, 60 mm., Villa Hays, April 11, 1909. Haseman.

6795a-b, C. M., two, 75-95 mm., Rio Mamoré, Sept. 19, 1909. Haseman.

7026a, C. M., one, 410 mm. to end of middle caudal rays, May 6, 1909. Haseman.

6796a-d, C. M., four, 145-155 mm., Uruguayana, Feb. 7, 1909. Haseman.

6797a-d, C. M., four, 120-173 mm., Santarem, Dec. 15, 1909. Haseman.

7308a-d, C. M., four, 190-230 mm., San Joaquin, Sept. 5, 6, 1909. Haseman.

53. *Sorubimichthys planiceps* (Agassiz).

7033a, C. M., one, 370 mm., Rio Machupo, Aug. 28, 1909. Haseman.

7034a, C. M., one, 410 mm., Berlin, Rio Mamoré, Sept. 15, 1909. Haseman.

Subfamily DORADINÆ.

54. *Doras dorsalis* Cuvier & Valenciennes.

7165a-l, C. M., five, 160- about 430 mm., Pará, Dec. 24, 1909 and Jan. 18-22, 1910. Haseman.

55. *Doras granulatus* Valenciennes.

7168a-c, C. M., three, 57-205 mm., Santarem, Dec. 9-15, 1909. Haseman.

7169a, C. M., one, 80 mm., Rio Mamoré, Sept. 19, 1909. Haseman.

56. *Doras cataphractus* (Linnæus).

7166a-d, C. M., four, 48-61 mm., Maciél, Rio Guaporé, Aug. 11, 1909. Haseman.

57. *Doras costatus* (Linnæus).

7177a-f, C. M., six, 68-91 mm., Maciél, Rio Guaporé, Aug. 9-11, 1909. Haseman.

7172a, C. M., one, 65 mm., San Joaquin, Bolivia, Sept. 4, 1909. Haseman.

7173a, C. M., one, 109 mm., Santarem, Dec. 15, 1909. Haseman.

7174a-d, C. M., four, 119-144 mm., Corumbá, April 28, 1909. Haseman.

- 7175a, C. M., one, 135 mm., Puerto Suarez, May 7, 1909. Haseman.  
7176a-b, C. M., two, 69-110 mm., Rio Jaurú, emptying into Rio Paraguay, June 4, 1909. Haseman.

58. **Doras spinosissimus** Eigenmann & Eigenmann.

- 7167a-f, C. M., six, 50-111 mm., Maciél, Rio Guaporé, Aug. 11, 30, 1909. Haseman.

59. **Doras marmoratus** Reinhardt.

- 7170a-b, C. M., two, 200-205 mm., Penedo, March 20-22, 1908. Haseman.  
7171a-e, C. M., five, 110-145 mm., Nov. 22-28, 1909. Haseman.  
7046a, C. M., one, 320 mm., Cidade do Barra, Dec. 27, 1908. Haseman.

60. **Doras asterifrons** Heckel.

- 7162a-k, C. M., eleven, 56-93 mm., Maciél, Rio Guaporé, July 9, Aug. 2, 10, 1909. Haseman.  
7163a-d, C. M., four, 67-89 mm., Santarem, Dec. 6, 1909. Haseman.  
7164a, C. M., one, 37 mm., San Joaquin, Bolivia, Sept. 5, 1909. Haseman.

61. **Doras weddellii** Castelnau.

- 7178a-b, C. M., two, 55-171 mm., Manáos, Nov. 17-29, 1909. Haseman.  
7179a-b, C. M., two, 45-130 mm., Santarem, Dec. 8, 1909. Haseman.  
7180a-b, C. M., two, 26-33 mm., Rio Jaurú, June 3, 1909. Haseman.  
7181a-x, C. M., twenty-six, 21-30 mm., Bastos, Rio Alegre, emptying into Rio Guaporé, June 26, 1909. Haseman.  
7182a-f, C. M., six, 31-40 mm., San Joaquin, Bolivia, Sept. 4, 1909. Haseman.  
7183a-x, C. M., twenty-six, 25-74 mm., Maciél, Rio Guaporé, July 30, Aug. 3-11, 1909. Haseman.

62. **Oxydoras kneri** Bleeker.

- 7045a, C. M., one, 450 mm., Corumbá, April 28, 1909. Haseman.

63. **Oxydoras niger** (Valenciennes).

- 7184a, C. M., one, 192 mm., Santarem, Dec. 9, 1909. Haseman.  
7185a-b, C. M., two, 197-240 mm., Manáos, March 27, 1909. Haseman.



64. **Oxydoras amazonium** Steindachner.

7047a, C. M., one, 375 mm., Amazon between Santarem and Pará, Dec. 21, 1909.

65. **Hemidoras nattereri** Steindachner.

7201a-g, C. M., seventeen, 48-98 mm., San Joaquin, Bolivia, Sept. 1, 4, 5, 6, 1909. Haseman.

7202a-e, C. M., five, 57-107 mm., Santarem, Dec. 9, 11, 1909. Haseman.

7204a-b, C. M., two, 40-80 mm., Rio Mamoré, Sept. 15, 1909. Haseman.

7205a-j, C. M., ten, 19-42 mm., Maciél, Rio Guaporé, July 23, 26, 1909. Haseman.

7203a, C. M., one, 81 mm., Villa Hays, April 13, 1909. Haseman.

66. **Hemidoras brevis** (Kner).

7190a, C. M., one, 114 mm., Santarem, Dec. 15, 1909. Haseman.

7192a, C. M., one, 88 mm., Maciél, Rio Guaporé, Aug. 3, 1909. Haseman.

7193a, C. M., one, 102 mm., San Joaquin, Bolivia, Sept. 5, 1909. Haseman.

7194a-c, C. M., three, 92-110 mm., Rio Jaurú, flowing into Rio Paraguay, June 4, 1909. Haseman.

7191a, C. M., one, 90 mm., Caceres, Rio Paraguay, May 26, 1909. Haseman.

67. **Hemidoras punctatus** (Kner).

7195a-m, C. M., thirteen, 35-43 mm., Rio Jaurú, into Paraguay, June 2, 3, 1909. Haseman.

7196a-e, C. M., five, 47-54 mm., San Joaquin, Bolivia, Sept. 4-6, 1909. Haseman.

7197a-f, C. M., six, 41-68 mm., Maciél, Rio Guaporé, July 9-August 3, 1909. Haseman.

7198a-f, C. M., six, 45-61 mm., Santarem, Dec. 9-15, 1909. Haseman.

68. **Hemidoras lipophthalmus** (Kner).

7200a, C. M., one, 64 mm., Santarem, Dec. 9, 1909. Haseman.

69. *Hemidoras stenopeltis* (Kner).

7186*a-b*, C. M., two, 112-132 mm., Rio Madeira near San Antonio, Nov. 3, 1909. Haseman.

7187*a-f*, C. M., six, 107-156 mm., San Joaquin, Bolivia, Sept. 5, 1909. Haseman.

70. *Hemidoras affinis* (Steindachner).

7189*a-d*, C. M., four, 116-119 mm., San Joaquin, Bolivia, Sept. 5-6, 1909. Haseman.

71. *Hemidoras orestes* (Steindachner).

7199*a-c*, C. M., three, 75-77 mm., Santarem, Dec. 11-15, 1909. Haseman.

72. *Leptodoras acipenserinus* (Günther).

7188*a-c*, C. M., three, 130-140 mm., Maciél, Rio Guaporé. Haseman.

## Subfamily AUCHENIPTERINÆ.

73. *Trachelyopterichthys tæniatus* (Kner).

6996*a-e*, C. M., five, 38-152 mm., Santarem, Dec. 19, 1909. Haseman.

74. *Centromochlus heckeli* (Filippi).

6788*a-x*, C. M., twenty-six, 48 mm., Santarem, Dec. 6-11, 1909. Haseman.

6786*a*, C. M., one, 115 mm., San Joaquin, Bolivia, Sept. 5, 1909. Haseman.

6783*a*, C. M., one 73 mm., Pará, Dec. 24, 1909. Haseman.

6784*a*, C. M., one, 80 mm., Pará, Jan. 15, 1910. Haseman.

6787*a-e*, C. M., five, 83-93 mm., Rio Mamoré, Sept. 19, 1909. Haseman.

6785*a*, C. M., one, 72 mm., Manáos, Nov. 29, 1909. Haseman.

75. *Centromochlus intermedius* Steindachner.

7002*a-c*, C. M., three, largest about 54 mm., Maciél, Rio Guaporé, Aug. 3, 1909. Haseman.

7004*a-b*, C. M., two, 71 mm., Rio Tapajos at Santarem, Dec. 10, 1909. Haseman.

76. *Glanidium albescens* Lütken.

- 6790a-c, C. M., three, largest 60 mm., Joazeiro, Rio São Francisco, Nov. 27, 29, 1907. Haseman.  
 6789a, C. M., one, 86 mm., Rio Ribeira da Iguapé, Dec. 12, 1908. Haseman.  
 6791a, C. M., one, 107 mm., Serraria Minas, Rio Parahybuna, May 22, Haseman.  
 6792a-b, C. M., two, 130-137 mm., Entre Rios, Rio Parahyba, June 2, 1908. Haseman.  
 6793a, C. M., one, 170 mm., Porto Alegre, Jan. 9, 1909. Haseman.

77. *Trachycorystes galeatus* (Linnæus).

- 7153a, C. M., one, 124 mm., Pará, Dec. 24, 1909. Haseman.  
 7156a-b, C. M., two, 158-175 m., Manáos, Nov. 17, 28, 1909. Haseman.  
 7157a-d, C. M., four, 100-155 mm., Santarem, Dec. 9-15, 1909. Haseman.  
 7158a-f, C. M., six, 51-116 mm., Maciél, Rio Guaporé, Aug. 1-11, 1909. Haseman.  
 7148a, C. M., one, 118 mm., Rio San Francisco, Bolivia, June 10, 1909. Haseman.  
 7151a-b, C. M., two, 78-101 mm., San Joaquin, Bolivia, Sept. 4, 1909. Haseman.  
 7145a-b, C. M., two, 149-155 mm., Rio Jaú, into R. Paraguay, June 4, 1909. Haseman.  
 7149a, C. M., one, 146 mm., Puerto Suarez, Rio Paraguay, May 6, 1909. Haseman.  
 7150a, C. M., one, 130 mm., Arequa, Paraguay, April 7, 1909. Haseman.  
 7147a-p, C. M., sixteen, 64-93 mm., Uruguayana, Feb. 7, 1909. Haseman.  
 7160a-d, C. M., four, 128-156 mm., Penedo, March 20, 1908. Haseman.  
 7159a-c, C. M., three, 140-176 mm., Barreiras, Rio São Francisco, Jan. 4, 1908. Haseman.  
 7155a-b, C. M., two, 80-85 mm., Joazeiro, Nov. 27, 29, 1907. Haseman.  
 7001a-b, C. M., two, larger 66 mm., Rio das Velhas, May 11, 1908.

- 7152a, C. M., one, 96 mm., Munez Freire, Rio Itapemerim, June 18, 1909. Haseman.  
7154a, C. M., one, 190 mm., Campos, June 14, 1908. Haseman.  
7146a, C. M., one, 154 mm., Lagoa Feia, June 16, 1908. Haseman.  
7161a-m, C. M., thirteen, 70-160 mm., São João da Barra, June 22, 24, 1908. Haseman.  
6999a-e, C. M., four, largest 62 mm., Rio Itapicurú, Queimadas, March 2, 1908. Haseman.  
7000a-b, C. M., two, larger 78 mm., Rio Itapicurú, Timbo, March 5, 1908.

This species is undoubtedly identical with *T. striatulus* (Steindachner). The specimens from the south are lighter in color and more mottled, those from the north having fewer spots and flecks and being generally darker. A complete intergradation of all the characters used to separate the two species *T. galeatus* (Linn.) and *T. striatulus* (Steindachner) is found, and therefore *striatulus* is placed in the synonymy of *galeatus*.

78. *Auchenipterichthys thoracatus* (Kner).

- 6782a, C. M., one, 175 mm., Manáos, Nov. 29, 1909. Haseman.  
6781a-d, C. M., four, 60-117 mm., Maciél, Rio Guaporé, Aug. 11, 1909. Haseman.  
7003a-f, C. M., six, 73-90 mm., San Joaquin, Sept. 5, 1909. Haseman.  
6998a, C. M., one, 125 mm., Bastos, Rio Alegre, into R. Guaporé, June 26, 1909.

79. *Pseudauchenipterus nodosus* (Bloch).

- 6778a-j, C. M., seven, 122-145 mm., Pará, Dec. 24, Jan. 19-22, 1909. Haseman.  
6780a-c, C. M., three, 80-120 mm., Penedo, March 20, 1908. Haseman.  
6779a, C. M., one, 210 mm., Alcobaça, Jan. 10, 1910. Haseman.  
6997a, C. M., 140 mm., Rio Coité, Jan. 1, 1910. Haseman.

The specimens from Pará have the margin of the caudal dark, the dark widest on the upper lobe; maxillary barbel reaching to the tip of the pectoral or a little shorter. Three of the specimens are males, in these the anterior anal rays are prolonged into a slender lobe extending far beyond the tip of the last rays; the urogenital duct of the male

extends along the anterior face of the anal lobe, is expanded at the tip into a vesicle, and opens near the tip of the ray.

In the specimens from Penedo, the dots of the back are much coarser than in the specimens from Pará; the caudal lobes plain.

80. **Auchenipterus nuchalis** (Spix).

6772a-c, C. M., three, 64-134 mm., Pará, Jan. 5-Feb. 7, 1909. Haseman.

6774a, C. M., one, 208 mm., San Antonio, Rio Madeira, Nov. 3, 1909. Haseman.

7309a-f, C. M., six, 76-157 mm., Lagoa de Parnagua, Jan. 17, 1908. Haseman.

In No. 6774a the dorsal is 1.7; pectoral spine seven times in the length, not equal to its distance from the tip of the snout; outer ventral ray longer than the pectoral; maxillary barbel extends to tip of ventrals; pectorals dusky toward tips; ventrals pale.

In 7309a-f, head 4.75-5.25; depth 4.5-5; D. 1.7; A.  $\frac{41}{1}$ ,  $\frac{43}{2}$ ,  $\frac{44}{3}$  V. 13; maxillary barbel extending nearly or quite to tip of pectorals; ventrals sometimes reaching to the eighth anal ray.

These specimens have uniformly seven dorsal rays. The sides are plain; a dark streak along middle of back. Top of head peppered; occipital dark; fins all pale, except sometimes the caudal, which may be tipped with dark.

Subfamily AGENEIOSINÆ.

81. **Ageneiosus ucayalensis** Castelnau.

7132a-b, C. M., two, 205-about 270 mm., Manáos, Nov. 16, 1909. Haseman.

7133a-g, C. M., seven, 140-174 mm., Pará, Dec. 27, 1909. Jan. 22, 1910. Haseman.

These specimens are like those described by Eigenmann & Eigenmann, *South American Nematognathi*, 1890, p. 306, except for the depth of the band of premaxillary teeth, which is variable. In some specimens the depth of the band is equal to the eye while in others it is scarcely more than one-half the diameter of the eye.

82. **Ageneiosus dentatus** Kner.

7136a, C. M., one, 94 mm., Berlin, Rio Mamoré, Sept. 15, 1909. Haseman.

7137a, C. M., one, 101 mm., San Joaquin, Bolivia, Sept. 5, 1909.  
Haseman.

7138a, C. M., one, 81 mm., Rio Mamoré, Sept. 19, 1909. Haseman.

83. **Ageneiosus valenciennesi** (Cuvier & Valenciennes).

7042a-b, C. M., two, 270-300 mm., Buenos Aires, Feb. 20, 1909.  
Haseman.

84. **Ageneiosus brevifilis** Cuvier & Valenciennes.

7134a, C. M., one, 232 mm., Bastos, Rio Alegre, emptying into Rio  
Guaporé, June 26, 1909. Haseman.

7135a, C. M., one, 191 mm., Rio Jaurú, June 4, 1909. Haseman.

7043a-d, C. M., four almost 290-360 mm., Manáos, Nov. 28, 1909.  
Haseman.

?7044a, C. M., one, almost 440 mm., Buenos Aires, Feb. 20, 1909.

85. **Ageneiosus madeirensis** Fisher. Sp. nov. (Plate XLII.)

7143a, C. M., one, Type, male, 122 mm. 7144a-m, C. M., thirteen,  
Paratypes, 35-115 mm., San Joaquin, Bolivia, Sept. 6, 1909.  
Haseman.

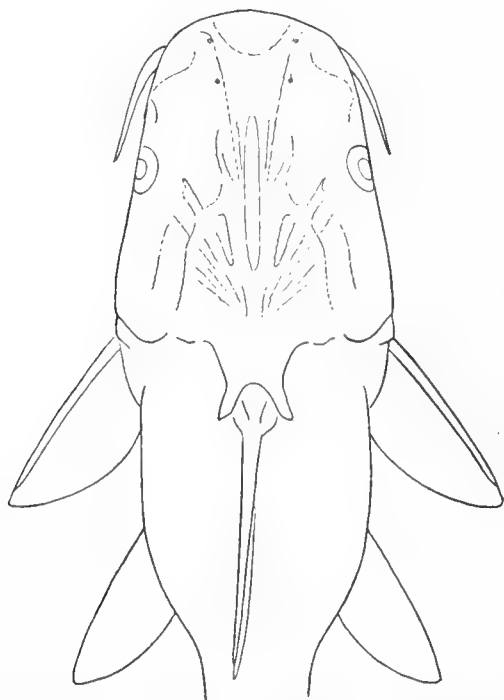
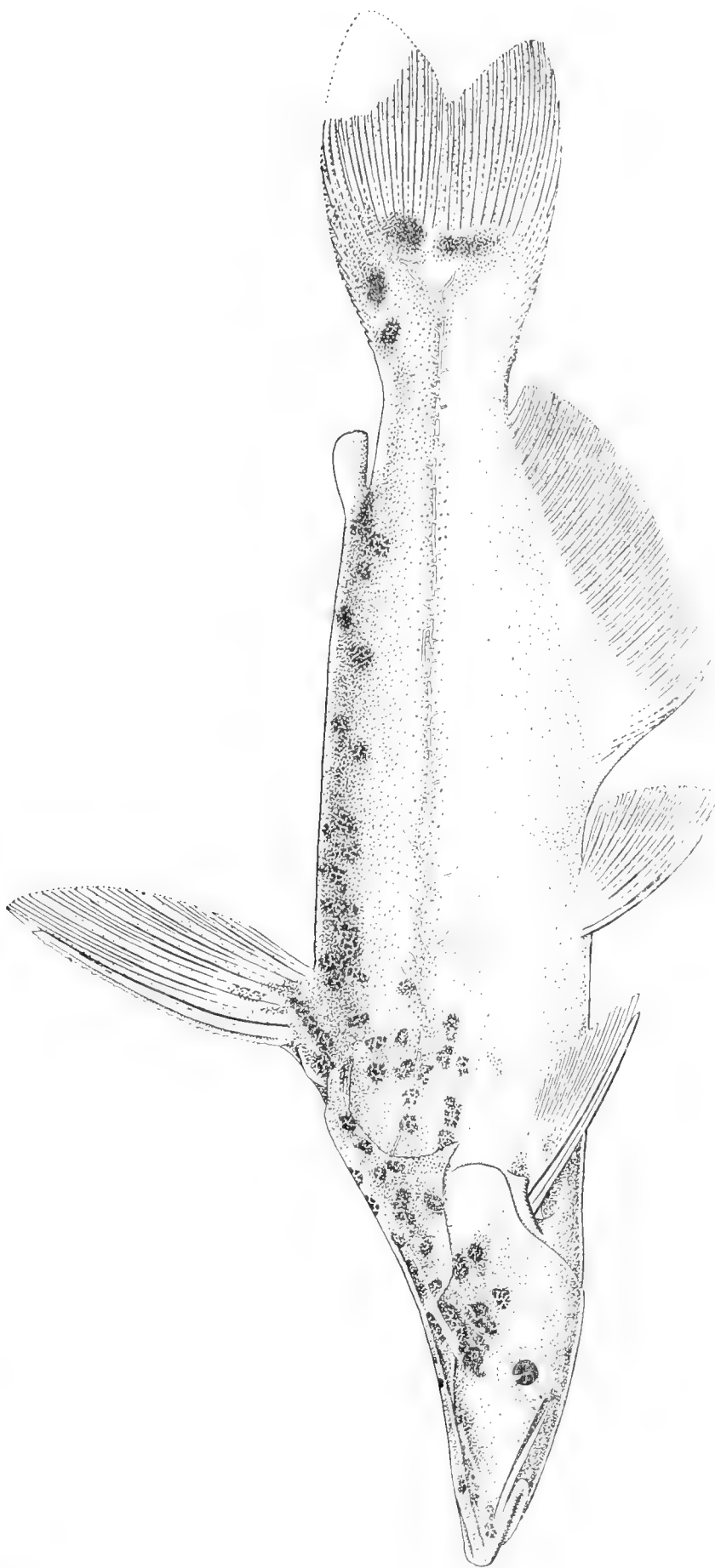


FIG. 4. *Ageneiosus madeirensis* Fisher. Type. C. M. No. 7143a. Nat. size.



*Ageneiosus madeirensis* Fisher. Type. C. M. No 7143. ♂. 122 mm.  $\times 1\frac{1}{2}$ .





D. 1.6; A. 34-37; V. 8; Head 3.25; depth at origin of dorsal 4.75; width below origin of dorsal 5; snout two and one-quarter times in head, one in interorbital.

Body elongate, compressed toward the caudal. Head depressed, covered with skin, snout spatulate, the upper jaw produced one-half the length of the eye. Fontanel narrow, continued as a groove to the base of the occipital process, which is extended to meet the dorsal plate. Bones of the head somewhat striated.

Eye strictly lateral, its margin not free, three times in the snout, about eight times in the head, and three times in the interorbital.

Teeth as in *Ageneiosus ucayalensis*, but the band narrower, the depth of the band less than half the diameter of the eye.

Dorsal high, its height equal to three or more times the length of its base. Dorsal spine pungent, toothed on its anterior margin, its posterior margin smooth. First soft ray of the dorsal as long as, or a little longer than, the spine; the last ray less than one-third the length of the spine; the spine strong, somewhat shorter in the female than in the male. The origin of the dorsal from the snout two and two-fifths times in the length of the fish.

Pectoral spine strong, with moderately recurved teeth on its posterior margin, its dorsal margin slightly roughened; dorsal and ventral surfaces of the spine distinctly striate. The spine sharp; five to five and four-fifths times in the length of the fish. Pectorals not quite reaching the ventrals; the ventrals reaching one-fourth their length past the origin of the anal.

Adipose short, its base equal to the diameter of the eye or shorter; caudal forked. Back marbled with irregular, dark purple spots and blotches, the largest of which are almost equal to the length of the diameter of the pupil of the eye. Dorsal, pectorals, and caudals with a few small purplish spots near their bases. The ventrals and anals plain.

This species is closely related to *Ageneiosus valenciennesi* Bleeker, from which it differs by the longer pectoral spine, the longer head, and the much weaker dentition.



FIG. 5. *A. mendeirensis* Fisher. Right pectoral spine.  $\times 3$ .

## XVI. A SYNOPSIS OF THE SAURIAN GENUS PRIONODACTYLUS.

BY LAWRENCE EDMONDS GRIFFIN.

Since the genus *Prionodactylus* was treated by Boulenger in the Catalogue of Lizards in the British Museum ten more species have been discovered, making a total of fifteen which are assigned to the genus. On account of the trebling of the membership of the genus I hope that the following assemblage of the species in the form of a key will serve a useful purpose.

I. Nostril pierced in the middle of a single or partly divided nasal.

1. Ventrals in four longitudinal rows.

Twenty-seven scales around the middle of the body, thirty scales from occiput to base of tail.....*P. quadrilineatus* (Böttger) 1876.

2. Ventrals in six longitudinal rows.

a. Prefrontals not forming a suture.

Twenty ventral series, twenty-nine scales around the middle of the body, thirty-one scales from occiput to base of tail, two anterior and two posterior pre-anal scales.....*P. argulus* (Peters) 1862.

aa. Prefrontals forming a suture.

b. Posterior chin-shields separated.

c. Two anterior pre-anal scales.

Eighteen to nineteen ventral series, thirty-three to thirty-five scales around the middle of the body, thirty-eight to forty scales from occiput to base of tail, two anterior and two posterior pre-anal scales.....*P. oshaughnessyi* Boulenger, 1885.

Eighteen to nineteen ventral series, forty-three scales around the middle of the body, thirty-five to thirty-eight scales from occiput to base of tail, two anterior and three posterior pre-anal scales.....*P. manicatus* (O'Shaughnessy) 1881.

Eighteen ventral series, twenty-nine scales around the middle of the body, thirty-one scales from the occiput to base of tail, two anterior and four posterior pre-anal scales.

*P. eigenmanni* Griffin 1917.

Seventeen ventral series, twenty-seven scales around the middle of the body, twenty-one scales from occiput to base of tail, two anterior and two posterior pre-anal scales.

*P. albostrigatus* Griffin, 1917.

cc. One anterior pre-anal scale.

Thirty-seven scales from occiput to base of tail, one anterior and three posterior pre-anal scales.. *P. champsonotus* Werner, 1910.

bb. Posterior chin-shields in contact.

Nineteen ventral series, thirty-nine scales around the middle of the body, twenty-six scales from occiput to base of tail, one anterior and three posterior pre-anal scales. . . *P. kocki* Lidth de Jeude, 1904.

3. Ventrals in eight longitudinal rows.

Nineteen ventral series, twenty-six scales around the middle of the body, twenty-nine scales from occiput to base of tail, four pre-anal scales in the form of a cross. . . . . *P. leucostictus* Boulenger, 1900.

Eighteen ventral series, thirty-three scales around the middle of the body, thirty-two scales from occiput to base of tail, two anterior and four posterior pre-anal scales. . . . . *P. bolivianus* Werner, 1899.

4. Ventrals in twelve longitudinal rows.

Nineteen to twenty-one ventral series, thirty-eight to forty-five scales around the middle of the body, thirty-nine to forty-six scales from occiput to base of tail, two anterior and four to six posterior pre-anal scales.

*P. spinalis* Boulenger, 1911.

II. Nostril pierced in the suture between two plates, scales of outer and middle rows of ventral scales smaller than the others.

1. Ventrals in six longitudinal rows.

Twenty ventral series, thirty-seven scales around the middle of the body, thirty scales from occiput to base of tail.

*P. vertebralis* (O'Shaughnessy) 1879.

Twenty ventral series, fifty scales around the middle of the body, thirty-one scales from occiput to base of tail. . . . *P. palmeri* Boulenger, 1908.

2. Ventrals in eight longitudinal rows.

Eighteen to twenty ventral series, thirty-six to thirty-eight scales around the middle of the body, thirty-five to thirty-eight scales from occiput to base of tail, three or four pre-anal scales in a single row.

*P. ockendeni* Boulenger, 1907.

8. Ventrals in ten longitudinal rows.

Twenty-seven ventral series, thirty-seven scales around the middle of the body. . . . . *P. ocellifer* Werner, 1901.

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XVII. NOTES ON A COLLECTION OF FISHES FROM  
CEYLON WITH DESCRIPTIONS OF NEW SPECIES.

BY DAVID STARR JORDAN AND EDWIN CHAPIN STARKS.

PLATES XLIII-XLV.)

In January, 1914, the senior author spent a week at Colombo and Kandy in Ceylon, making collections of fishes. The present paper contains notes on these species, with descriptions of three thought to be new to science. Besides the species here named, numerous sharks, rays, and other large fishes were seen, but the collector was not prepared to retain large specimens. At Colombo the shore is sandy, slowly sloping into deep water, a sluggish stream flowing in from the uplands behind; no corals, no rocks. At Mount Lavinia, eight miles to the westward, are small headlands of rock with rock-pools. From these several small species were taken. Near Kandy, in the mountains, are the headwaters of the Mahaweli River, a clear stream with some rocky places and occasional deep pools flowing northeastward to Trincomali. From these pools five species were taken with a cast-net by my colleague, Professor Walter Kenrick Fisher. A few fresh-water fishes were taken in the small river which flows through Colombo. The collection is in the Carnegie Museum at Pittsburgh, Pennsylvania, a series of duplicates being retained at Stanford University, California.

Family GALEIDÆ.

GENUS CHARCHARINUS Blainville.

1. *Charcharinus acutus* (Rüppell).

No. 8020a, C. M. A single small specimen with the umbilical mark still present.

Family DASYBATIDÆ.

GENUS PTEROPLATÆA Müller & Henle.

2. *Pteroplatæa micrura* (Bloch & Schneider).

No. 8021a, C. M. A solitary specimen.

## Family CHIROCENTRIDÆ.

## Genus CHIROCENTRUS Cuvier.

3. *Chirocentrus dorab* (Forskål).

No. 8022a, C. M. One small specimen.

## Family CLUPEIDÆ.

## Genus HARENGULA Cuvier &amp; Valenciennes.

We adopt the name *Harengula* for the small herrings of the tropics, mostly with large, firm scales, which have been placed in the groups called *Kowala*, *Clupeonia*, *Paralosa*, etc. This is the adjustment correctly made by Jordan & Seale, *Fishes of Samoa*, p. 186.

According to Mr. Regan *Sardinella aurita* Cuvier & Valenciennes from France is the European analog of the West Indian Sardine, called *Sardinia pseudohispanica* by Poey. This being the case, the name *Sardinella* Cuvier & Valenciennes should replace *Amblygaster* Bleeker and *Sardinia* Poey, as the generic designation of the pilchards and sardines. The name *Sardinia* is used by Regan for the pilchard of Europe (*Sardinella pilchardus*) he regarding it as generically distinct from *Sardinella*. But we cannot perceive any differences which would seem to justify the generic separation of the pilchard from the West Indian Sardine.

4. *Harengula kanagurta* (Bleeker).

Three specimens were collected. Only one of them shows the spots supposed to mark this species. There are no teeth in the mouth.

5. *Harengula lile* (Cuvier & Valenciennes).

No. 8024a-c, C. M. Four specimens taken. There are no teeth on jaws, vomer, or palatines; they are present on pterygoids and tongue only.

6. *Harengula toli* (Cuvier & Valenciennes).

No. 8025a-n, C. M. Several small specimens. No teeth anywhere in the mouth.

7. *Harengula venenosa* (Cuvier & Valenciennes).

No. 8026a, C. M. Two specimens. Teeth on tongue and lower jaw only.

8. *Harengula klunzei* (Bleeker).

No. 8027a, C. M. Two specimens. Teeth on lower jaw, tongue, pterygoids, and palatines.

Genus *ILISHA* Richardson.

(*Pellona* Cuvier & Valenciennes.)

9. *Ilisha indica* (Swainson).

No. 8028a-b, C. M. Three specimens.

Genus *OPISTHOPTERUS* Gill.

10. *Opisthopterus tartoor* (Cuvier).

No. 8029a, C. M. Three small specimens of this well-marked form.

Genus *DUSSUMIERIA* Cuvier & Valenciennes.

11. *Dussumieria hasselti* Bleeker.

No. 8030a, C. M. Two specimens were taken.

Family *DOROSOMATIDÆ*.

Genus *CLUPANODON* Lacépède.

The genus *Clupanodon* was proposed by Lacépède for various species of herrings without teeth. Rafinesque in 1815 substituted for it the name *Thrissa*, taken from the name of the first species named under *Clupanodon* (*Clupea thrissa* Osbeck and of Linnæus) which is a species of *Konosirus* Jordan & Snyder. Although Lacépède confused this Chinese species with the American *Opisthonema oglinum*, the generic name should apparently go with the original Chinese *Clupea thrissa*. Different views have been taken of this case by ourselves and others, and it is arguable that *Clupanodon* should replace *Opisthonema*. In our present view *Clupanodon* should stand with *thrissa*, the type of *Konosirus*.

12. *Clupanodon thrissa* (Osbeck). (*Clupea nasus* Bloch).

No. 8031a, C. M. One large specimen.

Family *ENGRAULIDÆ*.

Genus *ANCHOVIELLA* Fowler.

This genus is distinguished from the other anchovies by the prolongation of the maxillary, which in the typical species reaches as far as the vent.

The name *Anchovia* Jordan & Evermann was proposed for a single peculiar American species of anchovy, *Engraulis macrolepidotus*

Kner & Steindachner. The great body of tropical anchovies, distinguished from *Engraulis* by their fewer and stronger vertebræ, have lately been placed in *Anchovia*. But these are not congeneric with the type of *Anchovia*, having a more elongate form and a very much smaller number of gill-rakers.

The generic name *Stolephorus* Lacépède was based on two species, *Atherina japonica* Houttuyn and *Stolephorus commersonianus* Lacépède. The latter species belongs to the genus which includes the ordinary tropical anchovies. Bleeker calls these two species *Stolephorus*, as he supposed them to be congeneric. This use of the name *Stolephorus* was continued by Jordan & Evermann, who employed the name in the same way, mentioning *Atherina japonica* as type. But investigation shows that *Atherina japonica* is not an anchovy at all, but a species of Bleeker's genus *Spratelloides*. Jordan, Tanaka, & Snyder in their recent "Catalogue of the Fishes of Japan" definitely specify *Atherina indica* Houttuyn as the type of *Stolephorus*, making the genus equivalent to *Spratelloides* Bleeker, one of the "round herrings," and not an anchovy. Bleeker supposed that *Atherina japonica* and *Stolephorus commersonianus* were both anchovies and therefore congeneric. As Lacépède drew his knowledge of "*Stolephorus*" from the account given by Commerson of *Stolephorus commersonianus* and not from the trivial notice of *Atherina japonica* furnished by Houttuyn it is not strange that Bleeker followed him in thinking the two species congeneric. In adopting the name *Stolephorus* for the whole body of tropical anchovies Bleeker followed the rule taking the first species named as the type. His type of *Stolephorus*, however, should have been *Atherina indica*. Later this species was formally indicated as type by Jordan and his colleagues. This species is a "round herring," not an anchovy, and it belongs to Bleeker's genus "*Spratelloides*."

The genus *Anchoviella* Fowler (*Proc. Acad. Nat. Sci. Philadelphia*, 1911, p. 211) type *Engraulis per fasciatus* Poey, is based on a species of the same group, and would be tenable for this genus, if *Stolephorus* and *Eucrasicolus* are ineligible. According to Fowler the type of *Anchovia* Jordan & Evermann (*A. macrolepidota*) has from one hundred and six to one hundred and thirty-five gill-rakers, while in *Anchoviella* (*Eucrasicolus*) there are only from thirty-five to fifty gill-rakers, a generic character of undoubted value.

It is possible that *Thryssa* may be found inseparable from *Eucrasicolus*, as the produced maxillary has all degrees of extension. We

are in doubt as to the tenability of the name *Thryssa* and also as to the validity of the genus itself as distinct from *Eucrasicolus* or *Anchoviella*.

Bleeker retains the name *Engraulis* for the genus here spoken of as *Thryssa*, but the original type of the European *Engraulis* (*Engraulis eucrasicolus* Linnæus) is a very different fish, with soft flesh and bones, and an increased number of vertebræ.

13. **Anchoviella indica** Hasselt.

Five specimens.

14. **Anchoviella malabarica** (Bloch).

No. 8032a, C. M. Two specimens.

15. **Anchoviella mystax** (Bloch).

No. 8033a, C. M. Two specimens.

16. **Anchoviella hamiltoni** (Gray).

No. 8034a-b, C. M. Three large specimens similar to those from Manila.

17. **Anchoviella setirostris** (Broussonet).

No. 8035a-c, C. M. Several specimens.

This species is remarkable for the extraordinary extension of the maxillaries, reaching about to the front of the anal fins. As Valenciennes observed, this character is subject to many gradations in the different species. In some, as *A. (Thryssa) malabarica* it is scarcely longer than in typical *Eucrasicolus*, with which *Thryssa* is perhaps to be merged, as already indicated, by Valenciennes.

Family SILURIDÆ.

Genus OMPOK Lacépède.

The generic name *Ompok* Lacépède has priority over *Callichrous* Hamilton-Buchanan.

18. **Ompok bimaculatus** (Bloch).

No. 8036a-e, C. M. Two large specimens from the Mahaweli River at Kandy, and several smaller ones from the stream at Colombo.

Genus CLARIAS Gronow.

19. **Clarias magur** (Hamilton-Buchanan).

No. 8037a, C. M. Two specimens from the river at Colombo.



## Genus SACCOBRANCHUS Cuvier &amp; Valenciennes.

20. **Saccobranthus fossilis** (Bloch).

No. 8038a-h, C. M. Several specimens, five to eight inches long, from the river at Colombo. The notch between the anal and the caudal is variable; in some of the smaller ones it is but little developed.

## Genus BATRACHOCEPHALUS Bleeker.

21. **Batrachcephalus mino** (Hamilton-Buchanan).

No. 8039a, C. M. A single specimen from the river at Colombo. It has the eye somewhat smaller than described by Day, it being contained five times in the head, rather than four times. Bleeker's plate shows it to be four and one-half times in the head. The ridges which run from the eye form an even concave curve, not a double curve, as shown in Bleeker's plate.

## Genus OSTEOGENEOSUS Bleeker.

22. **Osteogeneiosus militaris** (Linnæus).

No. 8040a, C. M. A specimen from the river at Colombo agrees very well with Day's description (*Fishes of India*, p. 469) though the eye is a little smaller (eight times in length of head, four and a half times in the interorbital width); the gape a little narrower (two and a half times in the head).

23. **Osteogeneiosus stenocephalus** Day.

No. 8041a, C. M. A single specimen from the river at Colombo. It differs from *O. militaris* in having a larger eye, a slenderer and slightly smaller head, a narrower mouth, and higher fins; the ridges on top of the head not so high and less conspicuous; the top of the head above the opercle less rough; and the sides of the body below the occipital process more steeply sloping.

## Genus ARIODES Bleeker.

24. **Ariodes dussumieri** (Cuvier & Valenciennes).

No. 8042a, C. M. One large specimen from the sea at Colombo.

## Genus MACRONES Duméril.

25. **Macrones vittatus** (Bloch).

No. 8043a-b, C. M. Three small specimens from the river at Colombo.

## Family CYPRINIDÆ.

## Genus LABEO Cuvier.

26. *Labeo fisheri* Jordan & Starks, sp. nov. (Plate XLIII.)

No. 8044a, C. M. Type.

Dorsal II, 11; anal II, 5; scales 40; pharyngeal teeth 5-4-2+2-4-5. Head three and one-half to three and two-thirds times in body; depth three and one-quarter times in the length.

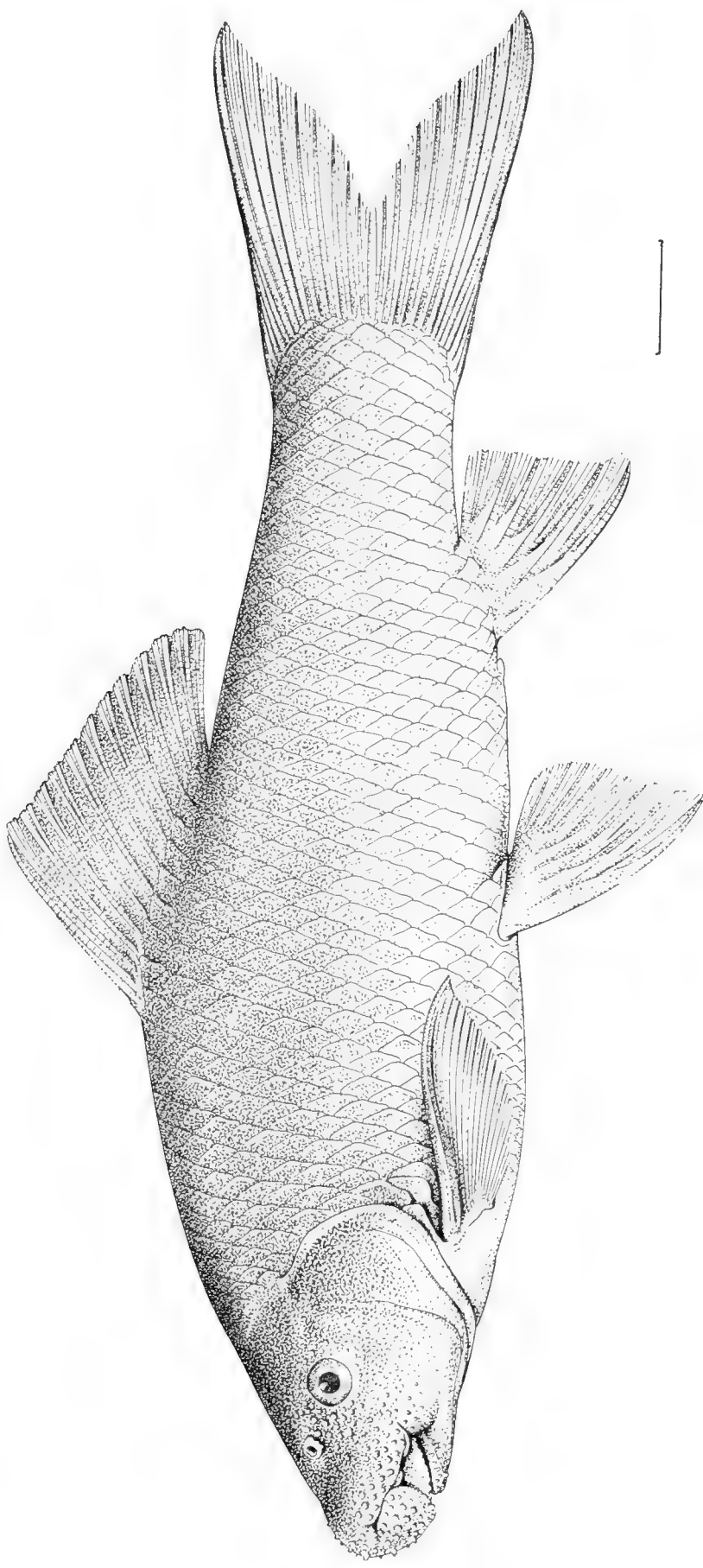
Head as wide as high; its height one and one-half times in its length. Eye small, less than height of scales, seven times in head; front of pupil at middle of head. Snout much swollen, overhanging the mouth. A deep oblique groove running from maxillary groove upward and forward, separating off a lateral lobe on each side of snout. Barbel single on each side, its length less than that of eye (the ventral barbels lost with age?). A thin, soft flap from snout projecting in front of upper lip, its edge irregularly and firmly dentate. Mouth wide and broadly curved; upper lip smooth and swollen; lower lip irregularly scalloped behind, with a few irregular, fine cirrhi on its edge and a few elongate papillæ on its surface. Just inside of lips are flat roughened projections arranged in irregular rows. Cutting ridge inside of lips thin, continuous and movable. Conspicuous rough pores covering top of head, cheeks, and opercles, while larger pores are just in front of eye, and still larger ones on snout and lateral lobe, each with a rough, bony papilla. Pharyngeal teeth forming a nearly continuous oblique grinding surface, each tooth sharp on its outer edge.

Dorsal outline straight across ends of rays, though first branched ray is slightly produced, giving a very slight concave outline at front of fin. First branched ray equal to length of snout and eye. Anterior third of dorsal in front of origin of ventrals. Pectoral not nearly reaching to ventral, nor ventral to anal. Anal sharp in front, its posterior outline sub-vertical. Caudal deeply forked; its longest rays as long as head, or longer.

Scales in series running obliquely downward and forward from front of dorsal to lateral line, seven and one-half; obliquely upward and backward from front of ventral, five and one-half.

Color in alcohol uniform slaty on back, growing lighter below; scales slightly darker at base; under parts with red tinges; fins unmarked by lines or spots; pectoral and ventral growing dusky towards end of rays.

This species is represented by two specimens, fourteen and one-half



*Labeo fisheri* Jordan & Starks. Type. C. M. Catalog Fishes, No. 8044a.



inches long, taken with a casting-net in the Mahaweli River at Kandy by Professor Fisher. The type is in the collection of the Carnegie Museum and the paratype in Stanford University.

*L. fisheri* is nearest the species called *Diplocheilus erythropterus* by Bleeker, but differs in having a larger head, the lower lip not delicately fringed (as shown in Bleeker's plate) and the outline of the dorsal fin not broadly concave.

27. **Labeo dussumieri** (Cuvier & Valenciennes).

No. 8045a, C. M. Two small specimens from the river at Colombo. The silvery streak along each series of scales is conspicuous. A blotch on each side of the caudal peduncle, which is black in one specimen and only faintly dusky in the other. Cuvier's plate does not indicate the blotch.

28. **Labeo dorsalis** (Jerdon).

No. 8046a-f, C. M. Several specimens taken in the river at Colombo. They do not show the small blackish spot on the dorsal base as described by Günther, but they agree in this respect as well as others with the picture published by Day (Fishes of India, Plate CXLII, fig. 2).

Genus LABEOBARBUS Rüppell.

29. **Labeobarbus tor** (Hamilton-Buchanan).

No. 8047a, C. M. Two large specimens were collected in the Mahaweli river at Kandy. The largest, thirteen and one-half inches long, has the third osseous dorsal ray very much less than the length of the head. In the smaller one, which is ten and one-half inches long, the entire length of the ray, including the soft portion, is as long as the head. Günther describes the stiff portion as being as long as the head, and Bleeker's plate (in which the soft portion does not show) has the entire ray longer than the head.

Genus CYCLOCHEILICHTHYS Bleeker.

30. **Cyclocheilichthys pinnauratus** (Day).

No. 8048a-c, C. M. A few specimens collected in the river at Colombo.

The large dark spot on the caudal peduncle seems to be variable. In some examples it is black and rather sharply defined; on others it is dusky and diffused.

## Genus RASBORA Bleeker.

31. *Rasbora daniconia* (Hamilton-Buchanan).

No. 8049a-f, C. M. A few specimens from the river near Colombo.

## Genus AMBLYPHARYNGODON Bleeker.

32. *Amblypharyngodon grandisquamis* Jordan & Starks, sp. nov.  
(Plate XLIV.)

No. 8050a, C. M., type; 8051a-c, paratypes.

Dorsal rays 9 (counting first short ray); anal rays 7; scales 45; head somewhat more than three to three and one-half times in body; depth three to three and one-third times in the length. Body deep, sometimes elevated at dorsal base, slightly gibbous at nape. Eye equal to length of snout, four times in head; jaws equal, the lower very slightly protruding. Lower jaw with a thin sharp edge, produced in a blunt scallop at the symphysis, which fits into a concavity in the edge of the upper jaw.

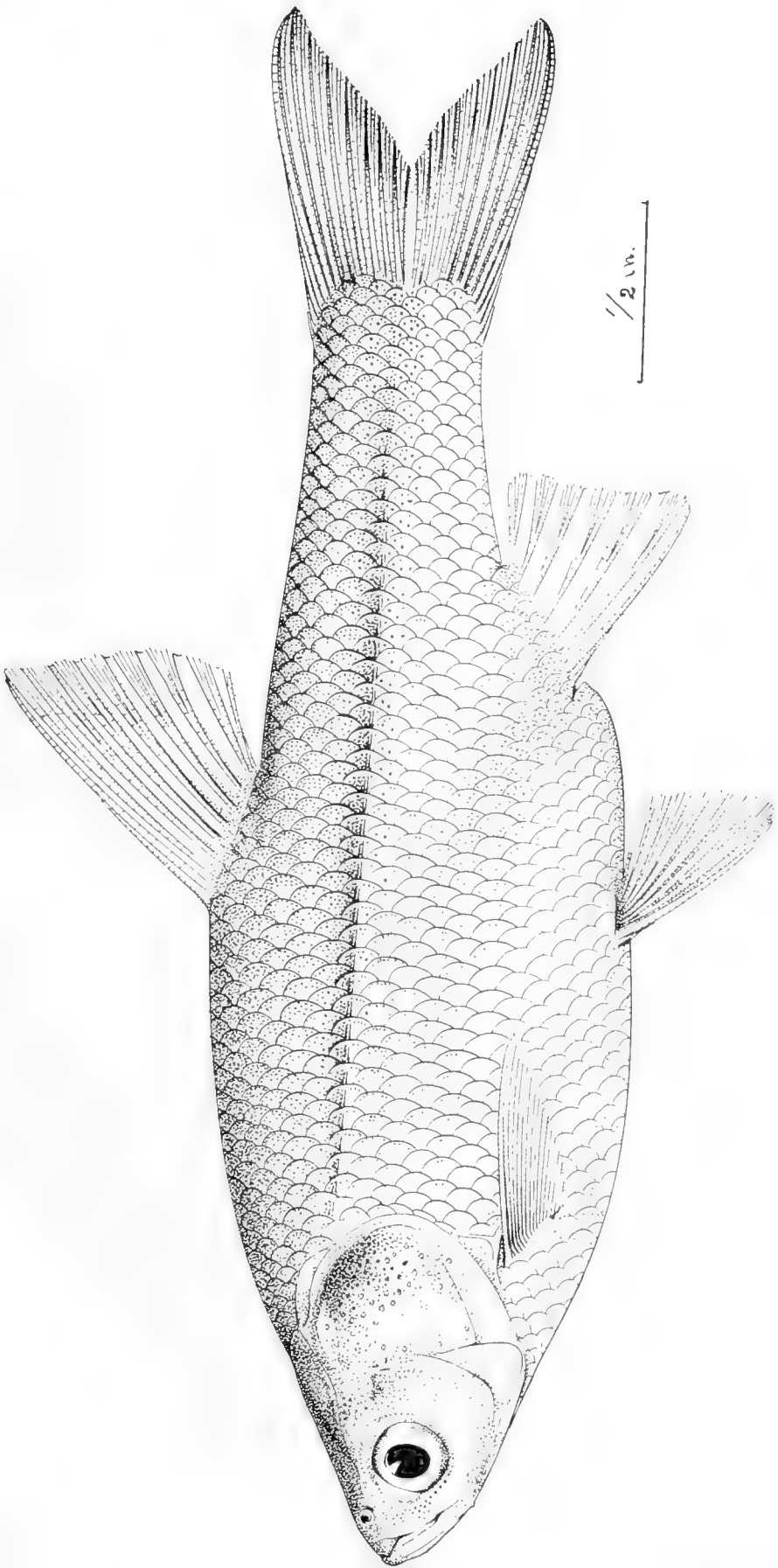
Pharyngeal teeth 5-3-1+1-3-5; the outer series small and the two end ones smallest and pointed; the middle series much larger, the inner largest of all. The length of the grinding surface equal to twice that of a tooth of the outer series and once and one-half that of the middle series. All but the two end teeth of the outer series have an elliptical grinding surface with four cross-ridges.

Front of dorsal opposite base of ventral, or very slightly behind, considerably nearer snout than base of caudal. Length of pectoral equal to length of head without snout, or varying to length of head from middle of eye. Pectoral not nearly reaching to ventral base; ventral reaching barely to vent. Caudal deeply forked; longest rays as long as head. Lateral line present on seven or eight anterior scales only.

Color in alcohol silvery, dusky above, growing lighter below; dusky streak from middle of caudal base to upper end of gill-opening, growing smaller and less distinct anteriorly; below it traces of a silver streak; fins all colorless.

The type and largest specimen is four inches in length, and was collected in the river at Colombo. It is in the Carnegie Museum at Pittsburgh. Several slightly smaller paratypes were collected.

This species is closest to *Amblypharyngodon melettinus*, but is deeper and has much larger scales.



*Amblypharyngodon grandisquamis* Jordan & Starks. C. M. Catalog Fishes, No. 8050a.





## Family BELONIDÆ.

## Genus TYLOSURUS Rafinesque.

33. *Tylosurus vancila* (Hamilton-Buchanan).

No. 8052a, C. M. Two small specimens. No spot on caudal; dorsal rays fourteen; anal rays sixteen; no gill-rakers.

## Family ATHERINIDÆ.

## Genus ATHERINA Linnæus.

34. *Atherina forskali* Rüppell.

No. 8007a-c, C. M. Several specimens.

## Family SPHYRÆNIDÆ.

## Genus SPHYRÆNA Bloch.

35. *Sphyræna langsar* (Bleeker).

No. 8053a, C. M. One specimen nine inches long. The first dorsal is a trifle behind the base of the ventrals and over the posterior fifth of the pectoral.

36. *Sphyræna jello* Cuvier & Valenciennes.

A large specimen seen at Colombo, but not taken.

## Family MUGILIDÆ.

## Genus LIZA Jordan &amp; Swain.

37. *Liza troscheli* (Bleeker).

No. 8054a, C. M. Two specimens were collected, which agree very well with current descriptions.

The generic name *Chelon* Röse, in Walbaum's *Artedi Piscium*, p. 1792, is based on two species not given technical names, but apparently corresponding to *Mugil labeo* and *Mugil chelo* Cuvier & Valenciennes. Apparently these species belong to *Chænomugil* Gill. If so, *Chelon* should replace *Chænomugil*, as designating a genus differing from *Liza* in the thickened, very protractile lips, with enlarged teeth.

## Family MASTACEMBELIDÆ.

## Genus MASTACEMBELUS Gronow.

38. *Mastacembelus armatus* (Lacépède).

No. 8055a, C. M. One large specimen from the Mahaweli River at Kandy.

## Genus RHYNCHOBDELLA Schneider.

39. *Rhynchobdella aculeata* (Bloch).

No. 8050a, C. M. A small specimen, six inches in length, taken at Kandy.

## Family OPHIOCEPHALIDÆ.

## Genus OPHIOCEPHALUS Bloch.

40. *Ophiocephalus striatus* Bloch.

No. 8057a-c, C. M. Five specimens from the Mahaweli River at Kandy.

41. *Ophiocephalus punctatus* Bloch.

No. 8058a-f, C. M. Several small specimens from Kandy.

## Family ANABANTIDÆ.

## Genus ANABAS Cuvier.

42. *Anabas scandens* (Daldorff).

Several specimens of this "climbing perch" were collected in the river at Colombo. They show considerable variation in the height of the body, and particularly in the extent to which the spines of the subopercle are produced backwards.

## Family TRICHIURIDÆ.

## Genus TRICHIURUS Linnæus.

43. *Trichiurus haumela* (Forskål).

Two specimens were taken at Colombo.

## Family SCOMBRIDÆ.

## Genus SCOMBER Linnæus.

44. *Scomber japonicus* Houttuyn.

Seen in Colombo, but not taken.

## Genus RASTRELLIGER Jordan &amp; Starks.

45. *Rastrelliger kanagurta* (Cuvier).

No. 8060a-b, C. M. Three specimens identical with those described from Fiji by Jordan & Dickerson (*Proc. U. S. Nat. Mus.* XXXIV, 1908, p. 609) as *Rastrelliger brachysomus*. Specimens from the Philip-

pinus called *R. microlepidotus* (Rüppell) seem to be the same, except that they show several faint, blackish stripes along the back, as described in *R. chrysozonus* (Rüppell). A specimen before us from the Red Sea is also *R. kanagurta*.

The back in *R. kanagurta* is lustrous green with a row of large rounded spots obscured by the silvery luster of the small but very distinct scales. Traces of a row of fainter and smaller spots occur on the base of the spinous dorsal; soft dorsal edged with black.

*Rastrelliger loo* (Cuvier & Valenciennes) from Samoa is a different species with a more pointed snout and rather slenderer body. On the back are three or four rather irregular rows of very distinct black spots. *Rastrelliger moluccensis* (Bleeker) seems to be the same as *R. loo*. It is not certain that there are any valid species of *Rastrelliger* except *R. loo* and *R. kanagurta* = *R. brachysomus*.

#### Genus AUXIS Cuvier.

##### 46. *Auxis thazard* Lacépède.

Seen in the market at Colombo, but not taken.

#### Genus ACANTHOCYBIUM Gill.

##### 47. *Acanthocybium sara* (Lay & Bennett).

Large examples seen in the market at Colombo, but not taken. Teeth 20/20–20/20. We regard the specimens seen as probably identical with *Acanthocybium sara* from Tahiti and Hawaii. *A. solandri* (Cuvier & Valenciennes) with double the number of teeth is a very distinct species. *A. petus* Poey of the West Indies with the teeth about 23/23 is doubtless different from either.

#### Family CARANGIDÆ.

#### Genus SCOMBEROIDES Lacépède.

##### 48. *Scomberoides tala* (Cuvier & Valenciennes).

No. 8061a, C. M. One specimen seven and one-half inches long.

The teeth of this species distinguish it from its relatives, but they have not been adequately described.

Teeth in the mandible in two rows. The outer row consisting of small, sharp, close-set, slightly irregular teeth, with a short thick conical casing extending obliquely forward and outward at each side

of the symphysis. The inner row is composed of larger, sharp teeth, rather more regularly and more widely spaced and having a slenderer canine just back of the anterior ones near the symphysis, which is directed slightly backwards.

In the upper jaw is a very irregular outer row of enlarged teeth, consisting of some thick conical teeth inclined outwards, and slenderer ones inclined downward. At the front of the jaw are a couple of larger conical teeth. The vomer and palatines bear villiform teeth; those on the vomer in a semi-round patch and those on the palatines in an elongate patch, wide and round in front and tapering to a thin point behind.

Genus *TRICROPTERUS* Rafinesque.

49. *Tricropterus forsteri* (Cuvier & Valenciennes).

No. 8062a, C. M. One large specimen.

The specimen compares very well with specimens from Japan and with Day's description of the species wrongly called *Caranx hippos*. The breast is covered with scales, while in the true *Scomber hippos* Linnæus and its Asiatic analog, *Scomber ignobilis* Forskål, there is a patch of scales in the center of the breast surrounded by a naked area.

We adopt the specific name *forsteri* for this wide-spread species, the analog of *latus* of the Atlantic (*fallax* Cuvier & Valenciennes) although much of the synonymy is doubtful.

Under the current rules of nomenclature we find ourselves obliged to regard *Scomber speciosus* Linnæus as the type of the genus *Caranx* (Commerson) Lacépède, and as equivalent therefore to *Gnathanodon* Bleeker, as Gill has already shown. This leaves the name *Tricropterus* Rafinesque (*Caratteri*, 1810) as the oldest available for the type of *Caranx carangus* Lacépède, the genus *Carangus* of Girard. Both *Tricropterus* and *Carangus* are based on *Caranx carangus*. The name *Tricropterus*, shortened from *Triacropterus*, refers to the three free spines supposed to intervene between the dorsal fins, a non-existent character.

50. *Tricropterus jarra* (Cuvier & Valenciennes).

No. 8069a, C. M. One specimen.

The example agrees very well with Day's description. The breast in front of the ventral fins is naked; the outer row of maxillary teeth, as well as the small canines in front of the mandible, are similar to those of *Tricropterus forsteri*.

## Genus SELAR Bleeker.

51. *Selar calla* (Cuvier & Valenciennes).

The name *Selar* Bleeker may perhaps be retained for the species of this type with oblong body and even teeth. *Tricropterus* has the teeth uneven, and *Carangoides* Bleeker, with even teeth, has the back elevated. *Caranx*, deep-bodied, has no teeth at all. *Citula* has some of the dorsal spines produced into filaments.

No. 8065a, C. M. One specimen which compares well with Day's figure and description as well as with a specimen from Hong Kong. The opercular spot at the beginning of the lateral line is very conspicuous.

52. *Selar ire* (Cuvier & Valenciennes).

No. 8064a, C. M. One specimen, which agrees perfectly with Day's description except that it has a very small patch of scales (less than diameter of pupil in extent) directly in front of the base of the ventral fins.

53. *Selar affinis* (Rüppell).

No. 8064a, C. M. One specimen. We can appreciate no difference between this and examples from Honolulu. The last ray of the dorsal and anal are so modified as almost to appear to be separate finlets; they are, however, connected by membrane to the rest of the fins.

## Genus CITULA Quoy &amp; Gaimard.

54. *Citula atropus* (Bloch & Schneider).

No. 8066a, C. M. A small specimen, four inches long, showing the characteristic cross-bands of the young.

55. *Citula armata* (Forskål).

No. 8067a, C. M. One specimen agreeing well with Day's description and figure, though the first dorsal rays are a little shorter.

## Genus TRACHINOTUS Lacépède.

56. *Trachinotus bailleni* (Lacépède).

No. 8068a, C. M. One specimen six and one-half inches in length.

## Family CORYPHÆNIDÆ.

Genus CORYPHÆNA Linnæus.

57. *Coryphæna hippurus* Linnæus.

Seen in the market at Colombo, but not taken.

## Family MENIDÆ.

Genus MENE Lacépède.

58. *Mene maculata* (Bloch & Schneider).

Seen in Colombo market, but not taken.

## Family LEIOGNATHIDÆ.

Genus LEIOGNATHUS Lacépède.

59. *Leiognathus equula* (Forskål).

No. 8070a-c, C. M. Four specimens collected. These compare very well with Day's description and picture given under *Equula edentulus*, and also with a specimen from Cavite, P. I.

*Scomber edentulus* Bloch seems to be the same species.

60. *Leiognathus daura* (Cuvier).

No. 8071a-d, C. M. Six specimens were collected. The smallest, nearly three inches long, shows a distinct black stripe running from the upper part of the opercle to the caudal peduncle. The largest, four and one-half inches in length, also shows this stripe on the anterior half of the body on one side only. The upper half of the spinous dorsal has a jet-black, sharply cut blotch, which does not involve the tips of the first two spines.

61. *Leiognathus insidiatrix* (Bloch).

No. 8072a, C. M. One small specimen with the dark spots on the back, which form broken bars, very conspicuous.

Genus GAZZA Cuvier &amp; Valenciennes.

62. *Gazza minuta* (Bloch).

No. 8073a-d, C. M. Several specimens collected. They vary in length from four and one-half to nearly six inches. Head three to three and one-half times in length without the caudal; depth two and one-third to two and one-half times in the length; dorsal VIII, 16; anal III, 14; gill-rakers 14 on lower limb of arch.

Anterior profile of head straight from occiput to tip of rather sharp snout; that of mandible straight to symphysis, steeper than dorsal profile of head. Eye large, three times in head, with a narrow membranous eyelid. Maxillary reaching to below front of pupil, its exposed part equal in length to the diameter of the eye. Posterior point of mandible a trifle behind maxillary. Ascending limb of premaxillary reaching to above posterior edge of eye. Width of maxillary a little greater than narrowest part of pre-orbital, equal to space from eye to pre-opercular ridge. Depth of cheek below eye equal to diameter of eye, a little greater than length of snout. Longest gill-rakers a trifle more than half diameter of pupil. Two small spines over front of eye, the supra-orbital ridge finely serrated behind them. Lower limb of pre-opercle more coarsely serrated. Two canines at symphysis of premaxillary, one on either side of them, these very much smaller, but a little larger than the single row of even sharp teeth posterior to them. In the mandible a single row of teeth, beginning with a very small canine at each side of the symphysis, then a couple of large canines, the posterior teeth growing smaller, but still larger than the teeth at side of premaxillary. The upper teeth at symphysis fit into a notch left between lower teeth. Dr. Day attributes villiform teeth to the lower jaw inside of the canines. In one specimen the skin of the mouth comes directly to the base of the canines. When, however, the skin is removed, the bone of the lower jaw feels (with a needle point) slightly rough. Two small, slender processes on shoulder-girdle, extending forward over gill-fringes.

Dorsal spines slender and flexible, the second equal in length to the length of the head behind the front of the pupil, or to the length of the pectoral. Second anal spine a little stouter and equal in length to the snout from the middle of the eye. Ventral fins reaching two-thirds of the distance to anal; their length equal to that of the second anal spine.

Fine scales cover the body, except on a triangular space, the apex of which is in front of the pectoral and the base from the front of the anal forward. Head entirely naked, the naked area including the backward extending occipital spine.

Color dusky above, silvery on sides and below, sometimes covered with fine dark points. In one specimen irregular blotches form wavy lines above the lateral line. Axil black, the color more or less continuous with a dusky or black blotch on shoulder-girdle just under opercle. Membrane of dorsal slightly dusky towards tips of spines and rays; other fins without color.

This species seems to be the original *Scomber minutus* as figured by Bloch. *Gazza equulæformis* of Rüppell seems to be the same, and there is nothing in the description of *Gazza argentaria* (Forster) or *Gazza dentex* Cuvier & Valenciennes to indicate specific difference. The measurements of *Gazza equulæformis* fit our specimens best.

63. ***Gazza achlamys*<sup>1</sup>** Jordan & Starks, sp. nov. (Plate XLV.)

No. 8074a, C. M. Type; Nos. 8075a-b, C. M., Paratypes.

Head two and four-fifths times to two and seven-eighths times in body without caudal; depth one and four-fifths times in length; dorsal VIII, 16; anal III, 13 or 14; gill-rakers fourteen on lower limb of arch.

Anterior profile of top of head and mandible slightly concave. Eye slightly larger than in *Gazza minuta*, two to two and one-half times in head. Maxillary reaching to under front of pupil, its exposed part equal in length to two-thirds the diameter of the eye. Ascending limb of premaxillary scarcely reaching to above the posterior margin of the eye. Width of maxillary as in *G. minuta*. Depth of cheek below eye a little greater than in *G. minuta*, equal to length of snout from front of pupil.

Spines and serrations of supra-orbital ridge about as in *G. minuta*, but the serrations on lower limb of pre-opercle very much coarser. Teeth similar to those of *G. minuta*, but only about one-third as large, and there is less discrepancy in size between the anterior mandibular teeth and those behind them. Two small processes on shoulder-girdle as in *G. minuta*.

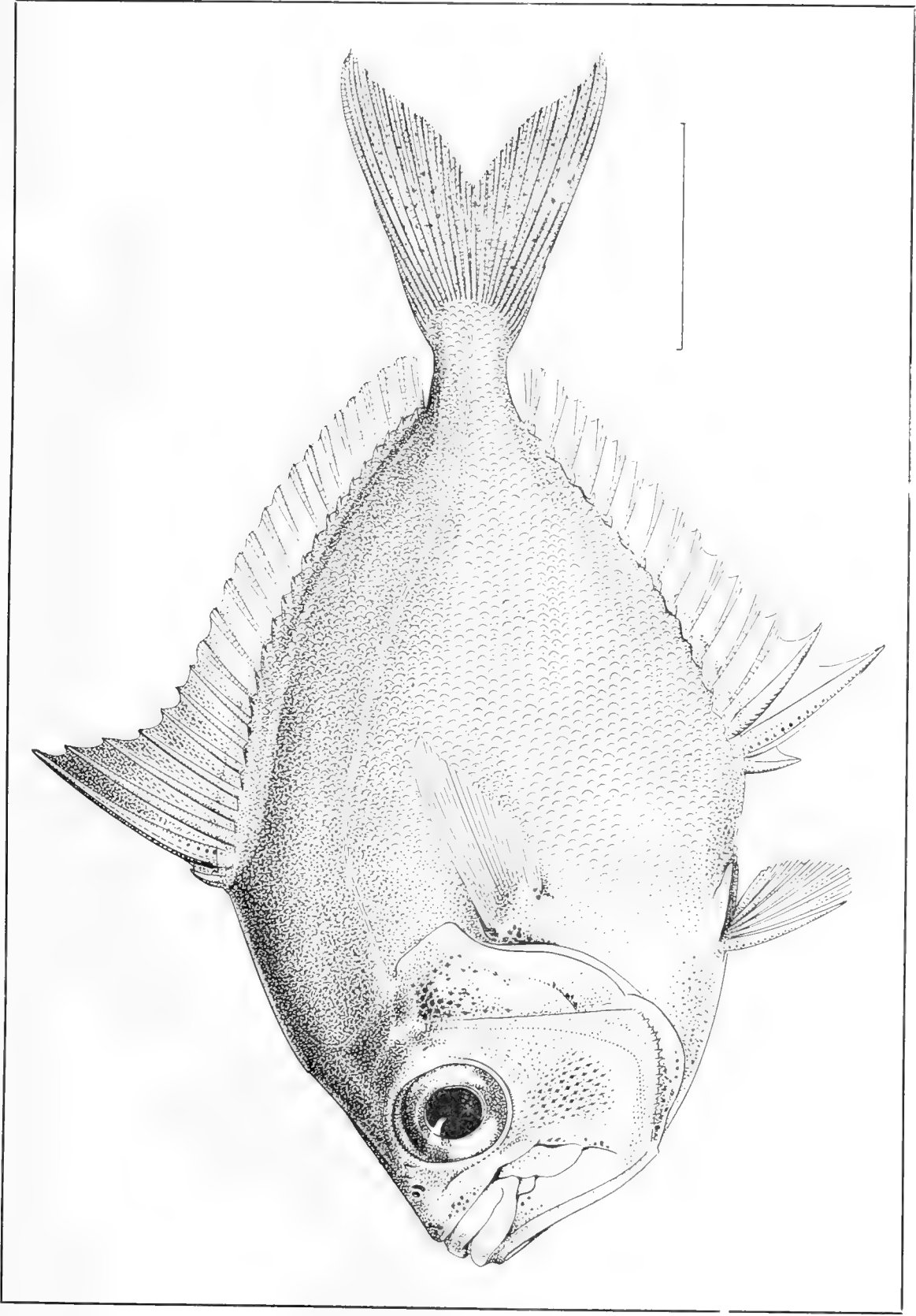
Dorsal spines rather stiff, much stouter than in *G. minuta*, the second equal in length to the head behind the middle of the eye, and a little shorter than the length of the pectoral. Anal spines of about the same length, but very thick as in *G. minuta*. Ventral fins reach three-fourths to four-fifths the distance from their base to front of anal.

Body naked anteriorly to a line running from the front of the soft dorsal obliquely downward to behind the pectoral base and thence downward and backward to the front of the anal. The scales have not been lost, as with a lens one may appreciate that they are smaller and unimbricated where they begin gradually to develop. The lateral line runs to the base of the caudal.

Color dusky above, silvery on sides and lower parts, no wavy lines on back, except in specimens from the Philippine Islands, where indis-

<sup>1</sup> ἀχλάμυς = *without a cloak*, referring to the scaleless back.





*Gazza achlamys* Jordan & Starks. Type. C. M. Catalog Fishes, No. 8074a.



tinct wavy lines are appreciable above the lateral line. Axil dusky or black. Dusky color sometimes present on shoulder-girdle beneath opercle. A dusky blotch on upper part of opercle may be present or entirely absent. A very slight dusky shade towards tips of dorsal spines; fins otherwise colorless.

This species differs from *Gazza minuta* among the other above described characters, particularly in having the anterior part of the body naked, especially along the back; in having the teeth much smaller and the fin-spines much stouter; and in the deeper body.

The type, No. 8074a, C. M., from Colombo, is five and one-half inches long. Four paratypes, from three to four inches long, were collected at the same place, two of which have been retained in Stanford University. Two paratypes of similar size are in the collection of Stanford University having been collected in Mindanao, P. I., by Mr. Alvin Seale.

#### Family LACTARIIDÆ.

##### Genus LACTARIUS Cuvier & Valenciennes.

#### 64. *Lactarius lactarius* (Bloch).

No. 8076a-b, C. M. Three specimens from Colombo.

#### Family HOLOCENTRIDÆ.

##### Genus MYRIPRISTIS Cuvier.

#### 65. *Myripristis murdjan* (Forskål).

No. 8077a, C. M. One specimen with the typical black opercle flap and axillary flap. The first soft dorsal and rays are black towards the tips. *M. intermedius* (Günther) is said only to differ from this species in having black spots on the anal *and* dorsal. Day says the spots may be absent or present. It is probably identical with *M. murdjan*.

##### Genus HOLOCENTRUS Bloch.

#### 66. *Holocentrus caudimaculatus* (Rüppell).

No. 8078a, C. M. Two specimens, showing longitudinal streaks and a large white spot on the upper part of the caudal peduncle.

#### 67. *Holocentrus ruber* (Forskål).

No. 8079a, C. M. One large specimen. It has the longest dorsal spine about equal in length to the longest soft rays, as shown in Day's

plate, not shorter than the soft portion as described. Our specimen has a small black blotch on the scales at the base of the anal, and a similar, but less evident blotch at the base of the soft dorsal.

Family CHEILODIPTERIDÆ.

Genus AMIA Gronow.

68. **Amia novemfasciata** (Cuvier & Valenciennes).

No. 8080a, C. M. A single small specimen one and three-eighths of an inch long; collected in a rock-pool at Mount Lavinia.

A medium band from occiput, dividing at dorsal, and running along base of fins to caudal peduncle, on top of which it again is united. A second band converging with its fellow at tip of snout and running along back to upper caudal lobe. A third through eye to middle of caudal base, where it slightly expands. Below it a silvery band on head across opercle. A fourth band from maxillary running below eye to base of pectoral and continued behind to base of caudal rays. A short streak just above anal. First dorsal dark. A band across base of second dorsal. *Amia fasciata*, from Australia, a species with which this and the next have been confounded, is quite distinct.

69. **Amia endekataenia** (Bleeker).

No. 8081a-h, C. M. Several small specimens, three-quarters of an inch long, seem to be referable to this species.

The upper longitudinal bands are as described above in *Amia novemfasciata*, but the band below the eye to the pectoral base runs downward to the anal, instead of reaching the caudal.

Family SERRANIDÆ.

Genus DIPLOPRION Cuvier.

70. **Diploprion bifasciatus** (Kuhl & Van Hasselt).

No. 8082a, C. M. One specimen.

Genus EPINEPHELUS<sup>2</sup> Bloch.

71. **Epinephelus merra** Bloch.

No. 8083a-b, C. M. Three specimens were taken. The spots are farther apart than shown in Day's plate, so that the network of light

<sup>2</sup> A specimen of *Epinephelus boenack* Bloch collected by Dr. Jordan in Ceylon was received by the Museum, but is not referred to in his manuscript. The Catalog Number 8210 has been assigned to it in the Carnegie Museum. (C. H. Eigenmann, Curator.)

lines is not evident. They agree very well with Boulenger's description (*Cat. Fishes Brit. Mus.*, 2d edit., Vol. I, 1895, p. 241) and with specimens from Australia, though the spots on the fins are somewhat smaller in the latter.

**72. *Epinephelus fasciatus* (Forskål).**

No. 8084a, C. M. One specimen. No color remains except a dark brown shade around the eye and above the maxillary, jet-black spots at the edge of the membrane between the dorsal spines, and fine dark points dusted over the top of the head and back. We have compared it with specimens from Japan.

**73. *Epinephelus sonnerati* (Cuvier & Valenciennes).**

No. 8085a-c, C. M. Four specimens. A net-work of fine dark lines on the snout and other parts of the top of the head form small light spots.

Family LUTIANIDÆ.

Genus LUTIANUS Bloch.

**74. *Lutianus fulviflamma* (Forskål).**

No. 8086a, C. M. Two specimens from Colombo, identical with others from the Philippines.

**75. *Lutianus gibbus* (Forskål).**

No. 8087a-b, C. M. Two specimens from Colombo, showing the characteristic deep notch in the pre-opercle; the dark caudal fin and the dark-edged dorsal with a narrow white margin.

**76. *Lutianus vitta* (Quoy & Gaimard).**

No. 8088a, C. M. Two specimens with dark lateral band apparent, but not conspicuous.

**77. *Lutianus madras* (Cuvier & Valenciennes).**

No. 8089a-b, C. M. Three specimens collected.

**78. *Lutianus lineolatus* (Rüppell).**

No. 8090a, C. M. Two specimens.

**79. *Lutianus quinquelinearis* (Bloch).**

No. 8091a-e, C. M. Several specimens from Colombo, identical with others from the Philippines.

## Genus APRION Cuvier.

80. **Aprion virescens** (Cuvier & Valenciennes).

Seen at Colombo, but not taken.

## Genus APSILUS Cuvier &amp; Valenciennes.

81. **Apsilus fuscus** Cuvier & Valenciennes.

Seen in the market at Colombo, but not taken.

## Genus APHAREUS Cuvier &amp; Valenciennes.

82. **Aphareus furcatus** (Lacépède).

No. 8092a, C. M. A specimen twelve inches long was collected. Unlike a specimen twice as long from Japan it has the jaws well supplied with villiform teeth.

## Family HÆMULIDÆ.

## Genus THERAPON Cuvier.

83. **Therapon jarbua** (Forskål).

No. 8093a, C. M. Two specimens.

84. **Therapon puta** Cuvier & Valenciennes.

No. 8094a-c, C. M. Four specimens collected.

85. **Therapon quadrilineatus** (Bloch).

No. 8095a, C. M. A single specimen. We have compared it with specimens from Formosa, the Philippine Islands, and Queensland.

## Genus POMADASIS Lacépède.

86. **Pomadasis argyreus** (Cuvier & Valenciennes) (*Pristipoma guoraka* Day, *non* Bleeker).

No. 8097a-b, C. M. Three specimens collected.

87. **Pomadasis maculatus** (Bloch).

No. 8096a, C. M. One specimen collected. A specimen from Aden, Arabia, has the body a trifle deeper and the eye larger. The difference is probably not specific. Our specimen agrees better with examples from the Philippine Islands.

88. **Pomadasis hasta** (Bloch).

Seen in the Colombo market.

## Genus EUELATICHTHYS Fowler.

89. **Euelatichtys crassispinus** (Rüppell).

Seen in Colombo, but not taken.

## Genus SCOLOPSIS Cuvier &amp; Valenciennes.

90. **Scolopsis bimaculatus** (Rüppell).

No. 8098*a-b*, C. M. Four specimens collected. These have the two spots on the back run together, as described by Day ("or the two may be conjoined") and as shown by Rüppell's plate.

91. **Scolopsis eriomma** Jordan & Richardson.

No. 8099*a*, C. M. Two specimens taken, which we have compared with the paratypes from Takao, Formosa.

92. **Scolopsis vosmeri** (Bloch).

No. 8100*a*, C. M. Two specimens, six inches long, showing the vertical light bar, bordered with dark behind, on the opercle, but not the longitudinal bar on the body. Length of head four times in total length (with caudal); depth two and two-thirds to two and four-fifths times in length; eye two and three-quarters times in length of head. Bleeker (according to Day) gives the following measurements for the two species mentioned: *S. torquatus*: Head 4 to 4.5; depth 2.66 to 3; eye 2 to 2.5. *S. vosmeri*: Head 4.33 to 4.66; depth 2.75 to 3; eye 2.66 to 3.

## Family SPARIDÆ.

## Genus LETHRINUS Cuvier.

93. **Lethrinus variegatus** Ehrenberg.

No. 8101*a*, C. M. One specimen. It is not so slender as described by Günther under the name of *L. latifrons*. It agrees very well with Bleeker's figures.

94. **Lethrinus ramak** (Forskål).

No. 8102*a*, C. M. Two specimens collected.

## Genus SPARUS Linnæus.

95. **Sparus sarba** Forskal. (?*Sparus aries* (Temminck & Schlegel)).

No. 8103*a*, C. M. One specimen. Specimens from China and Queensland are identical with this specimen from Ceylon. It is

probable that *Sparus aries* from Japan is the same as *Sparus sarba*, originally described from the Red Sea.

Family KYPHOSIDÆ.

Genus KYPHOSUS Lacépède.

96. **Kyphosus fuscus** (Lacépède).

Seen at Colombo, but not taken.

97. **Kyphosus cinerascens** (Forskål).

Seen at Colombo, not taken.

Family SCIÆNIDÆ.

Genus OTOLITHES (Cuvier) Oken.

98. **Otolithes ruber** (Bloch & Schneider).

No. 8104a, C. M. One specimen. The species is common in the markets.

99. **Otolithes argenteus** (Kuhl & Van Hasselt).

No. 8015a, C. M. One specimen.

Genus BOLA Hamilton-Buchanan.

We retain this generic name for the Asiatic species related to *Sciæna*, but in which the inner teeth of the lower jaw are enlarged. It may perhaps include the Europeo-African genus *Argyrosomus* of de la Pylaie (1835) = *Pseudosciæna* Bleeker. Its type is *Bola coitor* Hamilton-Buchanan. *Johnius* with the lower teeth in a uniform band is still near to *Sciæna* Linnæus = *Corvina* Cuvier (see Jordan & Thompson, *Proc. U. S. Nat. Mus.*, Vol. XXXIX, 1911, p. 245.)

100. **Bola axillaris** (Cuvier & Valenciennes).

No. 8106a-d, C. M. Five specimens were collected. The black axillary spot, extending considerably above the base of the pectoral, is conspicuous. Inner mandibular teeth somewhat enlarged. Edge of pre-opercle nearly entire on its vertical limb, strongly toothed at its angle and its lower limb. Base of soft dorsal densely scaled, and thin inconspicuous scales cover all but the distal fourth of the fin. The latter are only appreciated by the aid of a lens. Scales below lateral line in horizontal series parallel to straight portion of line, but at an angle with the curved portion. Above the line they are parallel



to the straight portion, but run obliquely upward above the curved portion. No median pore at symphysis, but two on each side, as in *Bola ossea*.

101. ***Bola ossea*** (Day).

No. 8107a, C. M. Two small specimens seem to be referable to this species. No median pore at symphysis of mandible; two pores on each side. The inner row of mandibular teeth are enlarged (Day places the species in "*Johnius*" a group without enlarged teeth; his specimen was, however, very much larger than ours). Edge of pre-opercle crenulated, somewhat spiny at the angle. The scales run slightly obliquely both above and below the lateral line. Apparently scales covered at least the basal half of the soft dorsal membrane, though in the specimens at hand they only remain on a few places.

Genus *JOHNIUS* Bloch.

We accept the generic name *Johnius* for those species of this complicated group, in which the teeth of the mandible are even and the second anal spine moderate. *Sciæna* (*Corvina*) has the lower teeth uniform and the second anal spine very large.

104. ***Johnius carutta*** Bloch.

No. 8108a-b, C. M. Three specimens with the lateral line following a light streak, and otherwise agreeing well with Day's description. The inner mandibular teeth are not enlarged. In specimens six inches long the edge of the pre-opercle is strongly crenulated. In a specimen nine inches long it is scarcely crenulated, but without long teeth. The membrane of the soft dorsal is inconspicuously scaled nearly or quite to its outer edge. The series of scales run rather obliquely upward both above and below the lateral line.

103. ***Johnius maculatus*** (Bloch & Schneider).

No. 8109a, C. M. One specimen of this well-marked species. Pre-opercle rather strongly denticulated at its angle. Mandible with a band of villiform teeth, uniform in size. Soft dorsal entirely naked. Series of scales running obliquely upward both above and below the lateral line, though at the lateral line where they cross it their continuity is somewhat broken. Posteriorly, where the lateral line becomes straight, the lines of scales also become straight and parallel to it, rather than crossing it.

## Genus UMBRINA Cuvier.

104. **Umbrina macroptera** (Bleeker).

No. 8110a, C. M. One small specimen, four inches long. The barbel is small, less than one-fourth the diameter of the eye. Preopercle crenulated. Outer premaxillary teeth somewhat enlarged. Fine scales extend upward over approximately the basal half of the soft dorsal membrane. The only other species described, which has so short a barbel, is *U. sinuata*, a conspicuously banded species.

## Family MULLIDÆ.

## Genus UPENEUS Cuvier.

105. **Upeneus macronemus** (Lacépède).

No. 8111a, C. M. One specimen of this well-defined species, showing all the typical markings.

106. **Upeneus dispilurus** (Playfair).

No. 8112a, C. M. Two specimens.

## Genus UPENEOIDES Bleeker.

107. **Upeneoides vittatus** (Forskål).

No. 8146a, C. M. Several specimens with the oblique caudal bars more or less evident. Teeth on jaws, vomer, and palatines.

## Family POLYNEMIDÆ.

## Genus TRICHIDION Klein.

(*Polydactylus* Lacépède.)

If the genera of Klein, revived by Müller and others in "Der Neue Schauplatz," 1777, are eligible, as claimed by Garman, *Trichidion* must displace *Polydactylus*.

108. **Trichidion plebeium** (Broussonet).

No. 8113a, C. M. A single large specimen taken. It has been compared with a specimen from Samoa (type-locality Tahiti) and no specific difference could be appreciated. In the Samoan specimen the stripes are more pronounced, though the same in number and position; the color of the fins a little darker; the snout somewhat sharper. All of these differences were slight.

109. **Trichidion sectarium** (Bloch).

No. 8114a, C. M. One small specimen.

110. **Trichidion heptadactylum** (Cuvier & Valenciennes).

No. 8115a-b, C. M. Three specimens.

## Family SILLAGINIDÆ.

## Genus SILLAGO Cuvier.

111. **Sillago sihama** (Forskål).

No. 8116a, C. M. A single specimen. It has been compared directly with examples from Takao, Formosa, and Cavite, P. I., and no difference has been detected.

Family XYSTÆMATIDÆ.<sup>3</sup>

## Genus XYSTÆMA Jordan &amp; Evermann.

112. **Xystæma punctatum** Cuvier & Valenciennes.

(*Gerres filamentosus* Cuvier & Valenciennes).

No. 8117a-b, C. M. Four specimens were collected.

113. **Xystæma lucidum** (Cuvier & Valenciennes).

No. 8118a, C. M. Two small specimens.

## Family CICHLIDÆ.

## Genus ETROPLUS Cuvier &amp; Valenciennes.

114. **Etroplus maculatus** (Bloch).

No. 8119a-u, C. M. This species is represented by several specimens from Colombo. They agree very well with the description and plate published by Day in his "Fishes of India."

115. **Etroplus suratensis** (Bloch).

No. 8120a-h, C. M. Several specimens from the river at Colombo. The larger examples (from five and one-half to six and one-half inches in length) have large black spots irregularly scattered over the lower part of the sides, obscuring the cross-bands.

<sup>3</sup> There is a family *Gerridæ* among insects, and we therefore follow Cockerell in calling this group *Xystæmatidæ*.

## Family POMACENTRIDÆ.

## Genus ABUDEFDUF Forskål.

116. **Abudefduf sex-fasciatus** (Lacépède).

(*Glyphidodon caelestinus* Cuvier & Valenciennes).

No. 8121*a-j*, C. M. Several young as well as adult specimens taken in the rock-pools at Mt. Victoria near Colombo.

117. **Abudefduf septem-fasciatus** Cuvier & Valenciennes.

No. 8122, *a-z*, C. M. (55 specimens). A large number of young specimens taken from the same rock-pools in which the examples of the preceding species were collected.

118. **Abudefduf lacrymatus** (Quoy & Gaimard).

No. 8123*a*, C. M. Two specimens. Compared directly with examples from Samoa no differences can be detected.

## Genus POMACENTRUS Lacépède.

119. **Pomacentrus cyanomus** Bleeker.

No. 8124*a*, C. M. Two specimens were taken in the rock-pools at Mount Lavinia. They agree very well with the description given by Günther.

## Family LABRIDÆ.

## Genus CHÆRODON Bleeker.

(*Chærops* Rüppell)

120. **Chærodon anchorago** (Bloch).

No. 8125*a*, C. M. A single large specimen, showing little color, except a blotch above pectoral. It has twelve instead of thirteen spines in the dorsal.

## Genus LEPIDAPLOIS Gill.

121. **Lepidaplois axillaris** (Bennett).

No. 8127*a*, C. M. Two specimens were collected.

122. **Lepidaplois diana** (Lacépède).

No. 8126*a*, C. M. The single specimen taken is rather slenderer than described by Day, although evidently referable to this species. The white spots above the lateral line are rather obscure, but evident.

## Genus HALICHÆRES Rüppell.

123. **Halichæres notopsis** (Kuhl & Van Hasselt).

No. 8128a-x, C. M. A large number of very small specimens were taken from rock-pools at Colombo. Four or five longitudinal stripes are very conspicuous. The tail is abruptly white. The largest specimen, two inches long, shows only faint traces of the stripes, except on the head, where they are still evident.

## Genus THALASSOMA Swainson.

124. **Thalassoma lunare** (Linnæus).

No. 8129a, C. M. Two small specimens were collected.

125. **Thalassoma hebraicum** (Lacépède).

No. 8130a, C. M. One small specimen.

## Family SCORPIDÆ.

## Genus MONODACTYLUS Lacépède.

126. **Monodactylus argenteus** (Linnæus).

No. 8131a, C. M. Two specimens three and one-half inches long. They differ from Day's picture in showing only a trace of the second black bar which passes the base of the pectoral, the first bar scarcely shows below the eye, and the dorsal and anal lobes shade into jet-black. They are, however, identical with specimens of similar and larger size from the Philippine Islands, from New South Wales, and from the Samoan Islands. The latter have the first bar obscure.

## Family EPHIPPIDÆ.

## Genus DREPANE Cuvier &amp; Valenciennes.

127. **Drepane punctata** (Gmelin).

No. 8132a, C. M. One specimen.

## Family CHÆTODONTIDÆ.

## Genus CHÆTODON Linnæus.

128. **Chætodon vagabundus** Linnæus.

One specimen. It differs from the figure given by Day (*Fishes of India*, Pl. XXVII, fig. 1) in having the dorsal solid black (not with a basal black bar and the fin edged with black) and in having the anal

black with a narrow white edge and a white streak curving from first spine back and up to posterior margin of fin.

129. **Chætodon pictus** Forskål.

No. 8133a, C. M. One adult specimen. It has twelve fine dark lines obliquely crossing the body below and six above, with the addition of a short one running from the base of the pectoral. This agrees with Forskål's original description, with the exception of the short line. It also agrees in this respect with the figures given by Russell and by Bennett under the name of *Chætodon vagabundus*. Bennett's picture is the best in general color-markings, that by Russell having the dark color of the anal and dorsal too sharp on the anterior edges where it should be blended with the body-color. Day publishes a picture which represents either a different color-phase (perhaps of the young) or a different species. The lines are much coarser and more numerous, and the basal caudal bar is more crescent-shaped.

Genus HENIOCHUS Cuvier.

130. **Heniochus macrolepidotus** (Linnæus).

(*Chaetodon acuminatus* Linnæus, with page-priority).

No. 8134a, C. M. One large specimen.

Genus HOLOCANTHUS Lacépède.

131. **Holocanthus nicobariensis** (Bloch).

No. 8135a, C. M. Two small specimens collected from rock-pools at Mount Lavinia. One of them, seven-eighths of an inch long, has a semicircular stripe across the snout, one behind the eye, one opposite the middle of the pectoral, one at the caudal base, and one between these two last. A little larger specimen has intermediate narrower stripes and is nearly identical in markings with a specimen an inch and one-half long of *H. bishopi* Seale from Okinawa. The last, however, has a black caudal stripe, while the Ceylon specimens have the caudal entirely colorless.

Family HEPATIDÆ.

Genus HEPATUS Gronow.

132. **Hepatus triostegus** (Linnæus).

No. 8136a, C. M. Two small specimens taken in a tide-pool.

**133. *Hepatus mata* Cuvier & Valenciennes.**

No. 8137*a*, C. M. Two small specimens. Dark brown, the fins black.

## Family PLATYCEPHALIDÆ.

## Genus INSIDIATOR Jordan &amp; Snyder.

**134. *Insidiator scaber* (Linnæus).**

No. 8138*a*, C. M. One specimen, which compares very well with others from Sumatra.

## Family PTEROSPARIDÆ.

## Genus PARAPERCIS Steindachner.

**135. *Parapercis punctata* (Cuvier & Valenciennes).**

No. 8139*a*, C. M. One specimen.

## Family GOBIIDÆ.

## Genus GOBIUS Linnæus.

**136. *Gobius ornatus* Rüppell.**

No. 8140*a*, C. M. One specimen, which agrees very well with the description and figure given by Day.

**137. *Gobius elegans* (Kuhl & Van Hasselt).**

No. 8141*a-b*, C. M. Three specimens from the tide-pools.

## Genus GLOSSOGOBIUS Gill.

**138. *Glossogobius giuris* (Hamilton-Buchanan).**

No. 8142*a-b*, C. M. Three specimens were collected. These agree very well with examples from Mindora, P. I., with which they were directly compared.

## Family PLEURONECTIDÆ.

## Genus PSEUDORHOMBUS Bleeker.

**139. *Pseudorhombus triocellatus* (Bloch & Schneider).**

No. 8143*a*, C. M. We collected two specimens of this flounder, showing the three typical dark spots on the sides.

## Family BLENNIIDÆ.

## Genus SALARIAS Cuvier.

140. *Salarias rivulatus* Rüppell.

No. 8144*a*, C. M. A single specimen from the tide-pools. It does not differ from specimens from the Philippine Islands and Samoa.

141. *Salarias frenatus* Cuvier & Valenciennes.

No. 8145*a*, C. M. Two small specimens were taken in the rock-pools at Mount Lavinia. They agree very well with Day's description and figure.



# XVIII. NOTES ON A COLLECTION OF FISHES FROM PORT SAID, EGYPT.

BY DAVID STARR JORDAN AND CARL L. HUBBS.

(PLATES XLVI AND XLVII.)

In February, 1914, Dr. Jordan spent a day at Port Said at the northern end of the Suez Canal, making a collection of fishes. The sea is very shallow at this point, with sandy bottom, and the species taken were those characteristic of such places in the eastern Mediterranean. Series of the specimens obtained are in the Carnegie Museum in Pittsburgh and in Stanford University. The numbers given under the species refer to the specimens in the Carnegie Museum.

## Family CLUPEIDÆ.

Genus HARENGULA Cuvier & Valenciennes.

### 1. *Harengula maderensis* (Lowe).

No. 8001a-c, C. M.

D. 18 or 19; A. 20; scales 43. Head three and nine-tenths times in length; depth three and a third times in length. Scales striate, finely laciniate. A diffuse blackish spot at base of dorsal in front; a dusky shade on shoulder. This species has not before been received from the Mediterranean. *Harengula latula* from France is very close, but seems to have entire scales.

## Family ENGRAULIDÆ.

Genus ENGRAULIS Cuvier.

### 2. *Engraulis encrasicolus* (Linnæus).

No. 8002a-h, C. M.

Appears to be very abundant at Port Said.

## Family CYPRINODONTIDÆ.

Genus APHANIVS Nardo.

### 3. *Aphanius calaritanus* (Bonelli).

No. 8003a-c, C. M.

Ventral rays six or seven.

## Family HEMIRHAMPHIDÆ.

## Genus HYPORHAMPHUS Gill.

4. *Hyporhamphus picarti* (Cuvier & Valenciennes).

No. 8004a-b, C. M.

D. 14; A. 15; scales 50. Depth seven and one-half to eight times in length from tip of upper jaw. Head with mandible two and three-fifths times in length from snout to base of caudal. Head without mandible four and one-third times in length. Eye four and one-third to four and one-half times in head. Ventrals midway between base of pectoral and base of caudal; dorsal and anal scaleless or nearly so. Silvery band distinct, much broadened behind. Jaws black; the tip of lower jaw red; upper jaw pale, bordered with black; caudal and dorsal dusky.

This species has been recorded from Cadiz and Algiers, but never fully described. It is allied to the American *H. roberti*, but distinct. Several specimens taken.

## Family SYNGNATHIDÆ.

## Genus SYNGNATHUS Linnæus.

5. *Syngnathus agassizi* Michahelles.

No. 8005a, C. M.

Rings 17-35; D. 26. Brown, marbled with blackish; pale spots between rings below. A rare species, the range of which is little known.

## Genus HIPPOCAMPUS Rafinesque.

6. *Hippocampus hippocampus* (Linnæus).

No. 8006a-b, C. M.

## Family MUGILLIDÆ.

## Genus MUGIL Linnæus.

7. *Mugil cephalus* Linnæus.

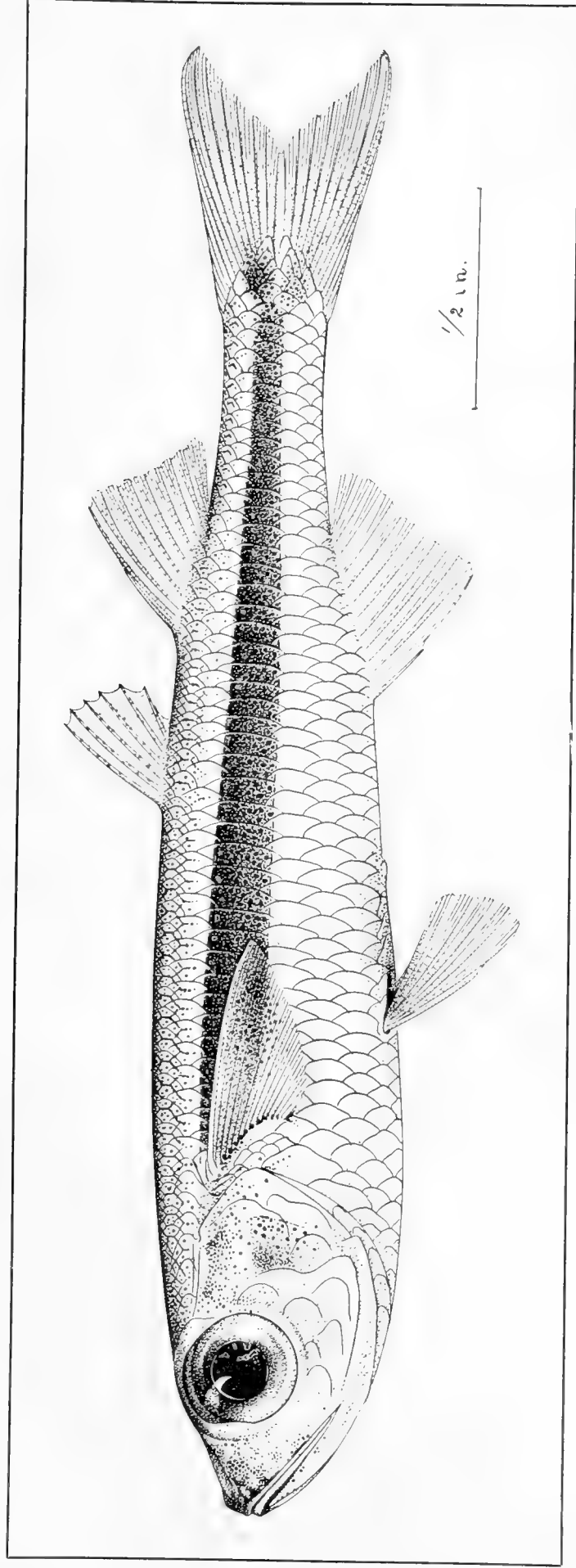
No. 8008a, C. M. Apparently common.

## Family ATHERINIDÆ.

## Genus ATHERINA Linnæus.

8. *Atherina forskali* Rüppell. (Plate XLVI.)

No. 8209a-c, C. M.



*Atherina forskali* Rüppell. C. M. Catalog Fishes 8209a.



This species appears to be common at Port Said. We present a figure of one of the several specimens obtained. The presence in the Mediterranean of this Red Sea species is probably due to its passage through the Suez Canal, an explanation strongly supported by the strictly littoral habits of *Atherina*.

Family TRICHIURIDÆ.

Genus TRICHIURUS Linnæus.

9. *Trichiurus lepturus* Linnæus.

No. 8009a-c, C. M. A common species.

Family CARANGIDÆ.

Genus GLAUCUS Klein. (In "Neuer Schauplatz" circa 1776.)

10. *Glaucus glaucus* (Linnæus).

No. 8010a-c, C. M.

This species may be taken as the type of the genus *Glaucus* Klein (1775) which demands restoration. It prevents the necessity of adopting the name *Hypodis* Rafinesque, 1810, also based on *Scomber glaucus* Linnæus. Mr. Regan has shown that *glaucus* cannot remain in the genus *Lichia* and has transferred it to the genus *Trachinotus*. It is in fact midway between *Lichia* and *Trachinotus* and cannot be placed in either. It is generically identical with the group called *Cæsiomorus* by Lacépède. The genus *Glaucus*, older than either *Lichia*, *Trachinotus*, or *Cæsiomorus*, may be regarded as well established, the name replacing *Cæsiomorus*.

Family POMATOMIDÆ.

Genus POMATOMUS Lacépède.

11. *Pomatomus lophar* (Forskål).

(*Gonenion serra* Rafinesque).

No. 8011a, C. M.

Abundant. This species, the representative of the common Bluefish of the Atlantic coast of America, is characteristic of the eastern Mediterranean, the Adriatic, and the Ægean Sea, but has not been recorded from the coast of France. Forskål records it as *Perca lophar* from Constantinople, and Eichwald as *Sypterus* from the Caucasus. Guichenot records it from Algiers. Rafinesque describes it as *Gone-*

*nion serra* from Palermo; Jordan & Hoffman from Athens (*Proc. Ac. Nat. Sci. Philadelphia*, 1892, p. 258); and Faber from the coast of Dalmatia. It has not been taken in France nor in the eastern Atlantic, except in the Canaries and in Senegambia. This, or some closely related form, is found in Australia. Our single specimen from Port Said has but twenty-three soft rays in the dorsal and twenty-five in the anal. American specimens of *Pomatomus saltatrix* Linnæus have twenty-five or twenty-six in the dorsal and twenty-six to twenty-eight in the anal. If this difference persists, the Mediterranean form may stand as *Pomatomus lophar* (Forskål). Seven specimens from Australia, which have been examined, agree with the specimens from Port Said in the scarcity of their fin-rays.

Family STROMATEIDÆ.

Genus STROMATEUS Linnæus.

12. *Stromateus fiatola* Linnæus.

No. 8012a, C. M. One specimen taken.

Family SERRANIDÆ.

Genus LABRAX Klein (1775).

13. *Labrax labrax* Linnæus.

Seen, but not taken.

Genus PAREPINEPHELUS Bleeker.

14. *Parepinephelus ruber* (Bloch).

Seen, but not taken. This genus is distinguished from *Mycteroperca* by the slender and numerous gill-rakers.

Family SPARIDÆ.

Genus PAGRUS Cuvier.

15. *Pagrus pagrus* (Linnæus).

No. 8013a, C. M. One specimen collected.

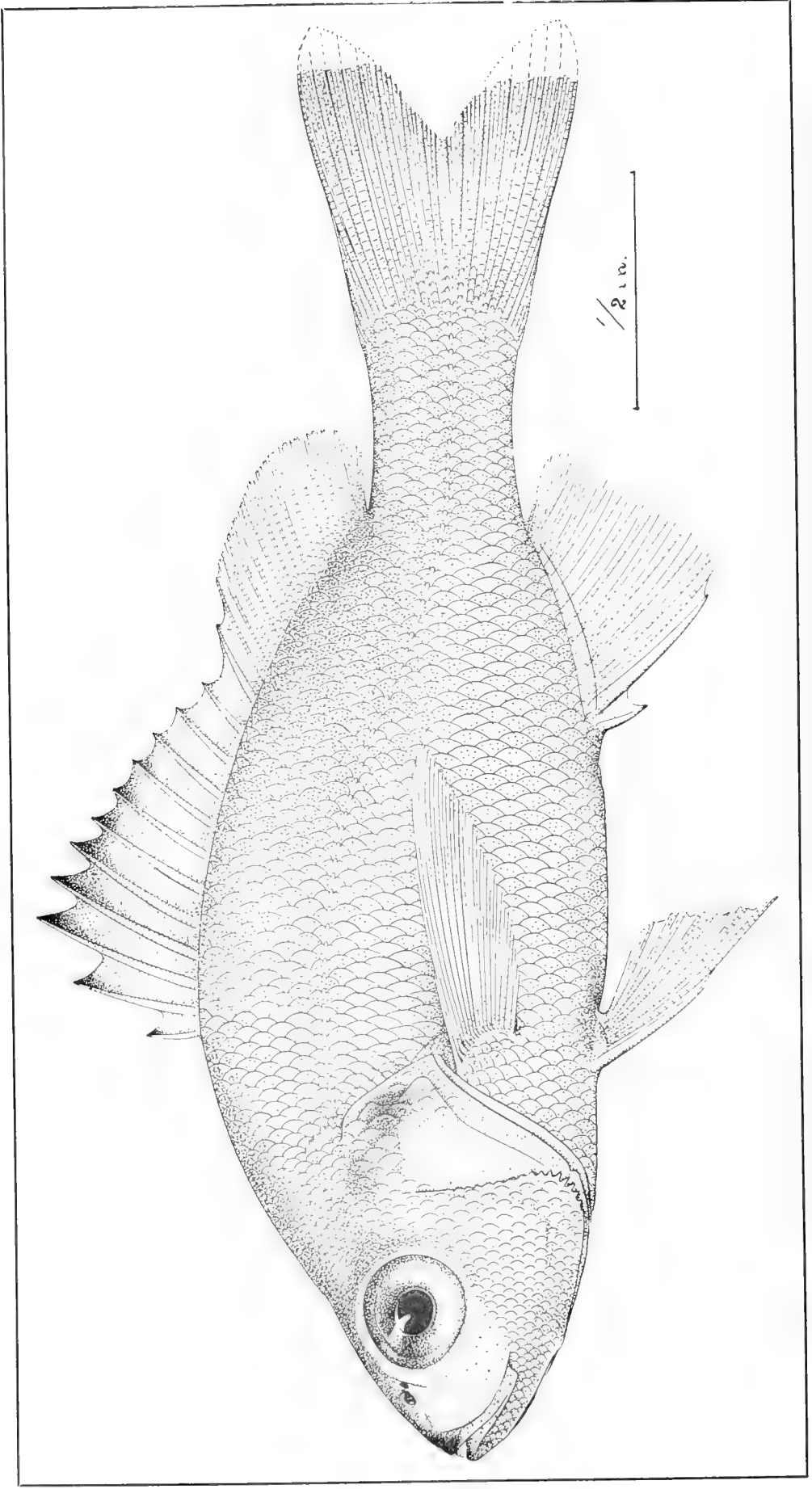
Family HÆMULIDÆ.

Genus DACYMB<sup>1</sup> Jordan & Hubbs, gen. nov.

Allied to *Orthopristis*, but with the mucous structure of the lower part of the head highly developed, much as in *Stellifer* and *Ericymba*.

<sup>1</sup> δά, an intensive particle; κλύβη, ἡ = a cavity, equivalent to *Ericymba*.







Pre-opercle strongly serrate; anal fin long, its spines rather weak; dorsal fin deeply notched, its spines weak; pre-orbital narrow; scales moderate, without smaller ones at base; the series above parallel with the lateral line; dorsal and anal scaleless; back moderately elevated; gill-rakers moderate; lower jaw with a large pore at tip. Type *Pristipoma bennetti* Lowe.

16. *Dacymba bennetti* (Lowe). (Plate XLVII.)

No. 8014a, C. M.

Head two and four-fifths times in length; depth three times in length; eye three and two-fifths times in head; fourth dorsal spine two and one-half times in length of head; gill-rakers 6 + 15, the longest three times in eye. D. XI, I, 16; A. III, 11. Scales with pores fifty-two; pre-orbital narrow, six and one-half times in head. Lower side of head with highly developed muciferous channels, especially on lower jaw, where they are separated by cross-ridges. Maxillary extending to just beyond front of eye. Anterior teeth in upper jaw

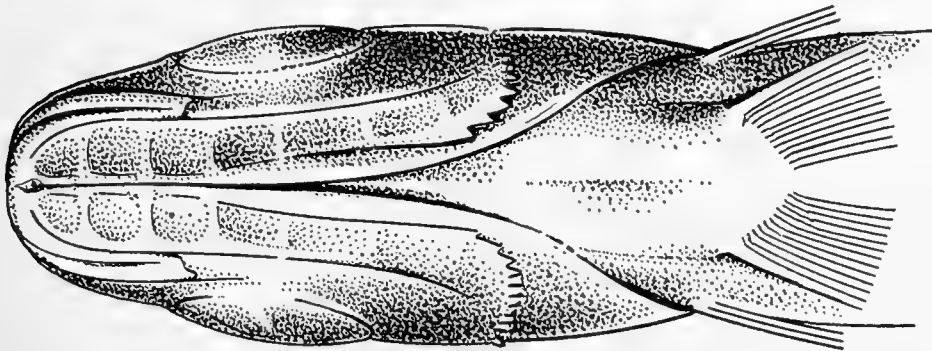


FIG. 1. *Dacymba bennetti* (Lowe). Lower side of head. Nat. size. C. M.  
Catalog Fishes, No. 8014a.

moderately enlarged. Pre-opercle strongly serrate. Pectoral long, one and one-third times in head. Scales above lateral line in series parallel with the lateral line. Tip of lower jaw with three pores, the middle one largest. Dorsal and anal fins low, long, scaleless, running in a scaly groove. Dorsal fin deeply divided, the spines slender; second anal spine two and two-third times in head, the third spine absent in our specimen, probably due to abnormal variation, as all the rest of this family have three anal spines. Color brownish, speckled; a large black spot at angle of opercle, probably disappearing with age. One young specimen, about 60 mm. long to caudal base,

from Port Said. Originally described from Madeira, it has been rarely recorded; and only once before from the Mediterranean by Guichenot at Algiers.

Family MULLIDÆ.

Genus MULLUS Linnæus.

17. *Mullus barbatus* Linnæus.

Seen, but no specimens were taken.

Family SCIÆNIDÆ.

Genus ARGYROSOMUS De la Pylaie (*Pseudosciæna* Bleeker).

18. *Argyrosomus aquila* (Cuvier).

No. 8015a-d, C. M. Common.

Genus UMBRINA Cuvier.

19. *Umbrina cirrhosa* (Linnæus).

No. 8016a, C. M. Only one specimen taken.

Family GOBIIDÆ.

Genus GOBIUS Linnæus.

20. *Gobius niger* Linnæus.

No. 8017, C. M. Not received (*C. H. Eigenmann*).

Light to dark brown, marbled with darker; lighter than a series from Naples. Our identification is made in accordance with a recent study of European gobies by Louis Fage.<sup>2</sup>

21. *Gobius paganellus* Gmelin.

No. 8018a, C. M.

D. VI + I, 12; A. I, 10; scales 54. Male nearly black; the low first dorsal tipped with orange-white, the spines even. Our single specimen agrees with descriptions of this species, and with our specimens from Italy. All of these differ from the figure given by Holt and Byrne<sup>3</sup> in the extension of the pectoral beyond the ventrals. Louis Fage (*l. c.*) also describes the pectorals as longer than the ventrals in *G. paganellus*.

<sup>2</sup> Arch. Zoöl. Exp., I, 55, No. 2, Oct., 1915.

<sup>3</sup> *The British and Irish Gobies*, App. III to Pt. II of *Report on the Sea and Island Fisheries of Ireland for 1901*, Pl. I, figs. 1, 2.

## Family PLEURONECTIDÆ.

## Genus ARNOGLOSSUS Bleeker.

This genus, although including species of widely different types, does not appear to be divisible into smaller groups, owing to the existence of species with characters intermediate between the extremes. The scales vary from large to fine, and the interior dorsal rays may or may not be prolonged. *A. japonicus*<sup>4</sup> stands intermediate in both these characters. The interorbital varies from a sharp naked ridge in *A. japonicus* and *A. laterna* through a narrow concave space, as in *A. grohmanni*, to a rather wide region, as in *A. malhensis*.<sup>5</sup> These same characters are valuable in defining related genera.

22. *Arnoglossus laterna* Walbaum.

No. 8019a-c, C. M.

Six specimens, of which the largest is 77 mm. long without the caudal, were secured at Port Said. Dorsal rays 84 to 90; anal rays 63 to 68; agreeing exactly in fin formula with specimens from Venice and Palermo. From the Italian material and from the descriptions of the species, the Port Said specimens differ in having a shorter, blunter head, the length of which is contained from 3.9 to 4.2 times in the length without the caudal, equal to the depth of the head at vertical through rear border of eyes, and equal to the depth of the body below the lateral line. The least depth of the caudal peduncle is contained from 2.0 to 2.2 times in the length of the head; 2.4 in 3 specimens from Venice; 2.7 or 2.8 in 2 specimens from Palermo. It may well be that two species or subspecies of this type inhabit the Mediterranean, but we refrain from separating them on our insufficient material, as further differences are not apparent.

## Family SOLEIDÆ.

## Genus SOLEA Klein.

23. *Solea solea* (L.).

Seen, not taken.

## NOTE ON GENERA RELATED TO ARNOGLOSSUS.

*Arnoglossus* is typical of a group of flounders which are distinguished from others by the following set of characters: ventral fins unsymmetri-

<sup>4</sup> Hubbs, *Proc. U. S. N. M.*, Vol. XLVIII, 1915, p. 454, Pl. 25, fig. 2.

<sup>5</sup> Regan, *Trans. Linn. Soc. London*, Ser. 2, Vol. XII, Pt. 3, 1908, p. 235, Pl. 26, fig. 2.

cal, free from the anal; both pectorals present; vomer toothless; lateral line with an anterior arch. These genera may be classified as follows:

- a*<sup>1</sup>. Interorbital alike in the two sexes, usually a narrow ridge, but in some species of moderate width and concave; spines of head present in both sexes, or absent.
  - b*<sup>1</sup>. Right ventral not elongate.
    - c*<sup>1</sup>. Teeth developed on both sides of jaws; gill-rakers developed.
      - d*<sup>1</sup>. Rostral spines absent.
        - e*<sup>1</sup>. Scales cycloid, or nearly so, very thin and deciduous; mouth large ..... *Arnoglossus*.
        - e*<sup>2</sup>. Scales ctenoid, firmer; mouth very small; no anterior dorsal crest ..... *Psettina*.
      - d*<sup>2</sup>. Rostral spines present; anterior dorsal rays produced into a high crest; scales fine, ctenoid ..... *Lophonectes*.
    - c*<sup>2</sup>. Teeth on blind side of jaws only; gill-rakers obsolete, interorbital with a retrorse spine ..... *Engyophrys*.
  - b*<sup>2</sup>. Right ventral elongate; no spines on head ..... *Trichopsetta*.
- a*<sup>2</sup>. Secondary sexual differences great; the interorbital region greatly widened in the males; rostral and ocular spines developed only in the males; pectoral fin of eyed side elongate in males; scales ctenoid.
  - f*<sup>1</sup>. Dorsal fin not produced anteriorly.
    - g*<sup>1</sup>. Scales fine ..... *Platophrys*.
  - f*<sup>2</sup>. Dorsal fin produced anteriorly; scales moderate ..... *Perissias*.
    - g*<sup>2</sup>. Scales coarse ..... *Engyprosopon*.

The species of the preceding genera are distributed as follows: *Arnoglossus*, of eastern Atlantic, Indo-Asiatic and Australian faunas; *Psettina*, which originally based on one Japanese species,<sup>6</sup> probably includes also a Black Sea species, recently described by Schmidt<sup>7</sup> as *Arnoglossus kessleri*, as that species also has ctenoid scales and a very small mouth; *Lophonectes*, with one Australian species; *Engyophrys*, with one species belonging to the fauna of Panama; *Trichopsetta*, with one species of the western Atlantic; *Platophrys*, containing many species found in all the tropical seas; *Engyprosopon*, of the Indo-Asiatic faunæ; and *Perissias*, with a single species from the coasts of Lower California.

<sup>6</sup> Hubbs, l. c., p. 456.

<sup>7</sup> Schmidt, *Ann. Mag. Nat. Hist.*, Vol. 16, 1915, p. 108.



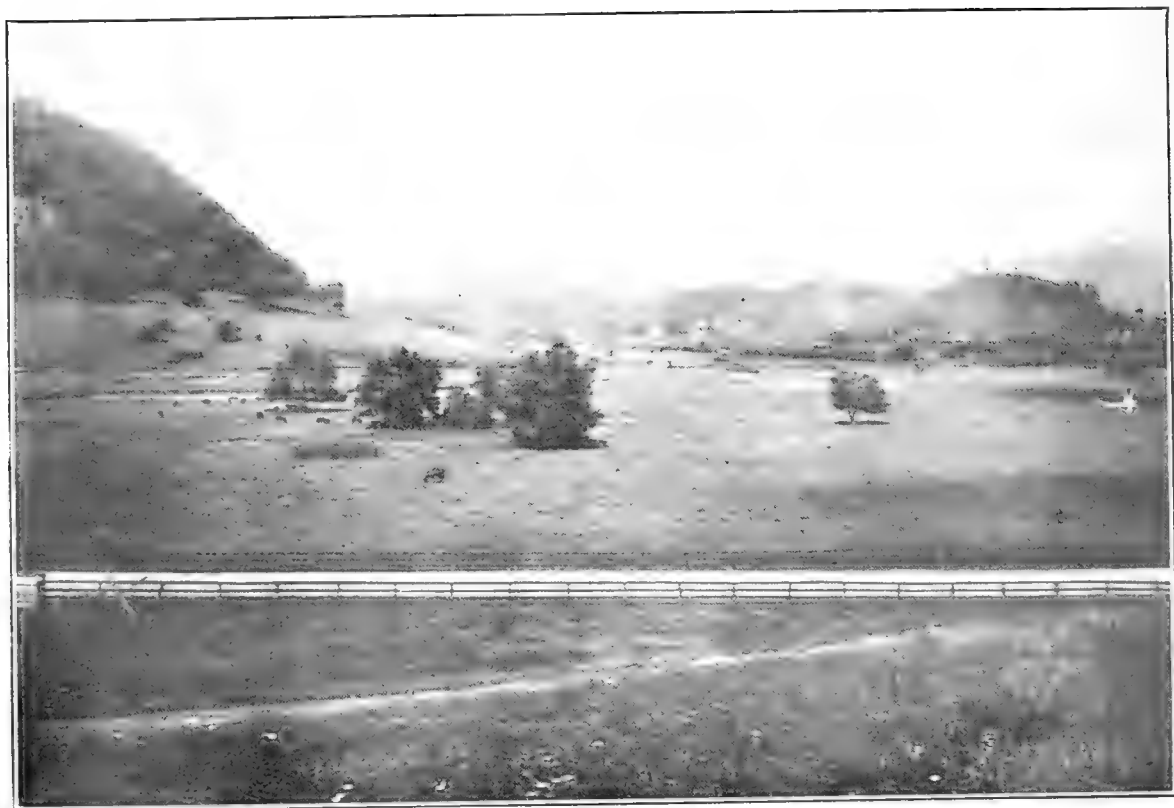


FIG. 1. Saltville Valley. The pools in the middle distance represent old sink-holes. The recent cave-in is designated by the white cross at the right.



FIG. 2. Near view of cave-in at "Well No. 69," Mathieson Alkali Works, Saltville, Virginia.

XIX. A FOSSIL-BEARING ALLUVIAL DEPOSIT IN SALT-  
VILLE VALLEY, VIRGINIA.

BY O. A. PETERSON.

(PLATE XLVIII.)

In the month of June, 1917, there was brought to the Carnegie Museum for identification a small collection of fossils from Saltville, Smyth County, Virginia. This material suggested a preliminary investigation of the locality, whence it came. The writer was therefore sent to the spot to examine the deposit. By the kind permission of Mr. W. D. Mount, the General Manager of the Mathieson Alkali Works, on the property of which the deposit is located, I was able to commence an investigation on June 23.

Saltville Valley is drained by a tributary of the North Holston River, and lies between a series of high and rounded hills in the early Paleozoic. (See Plate XLVIII.) A great deal of the valley was formerly covered by water during certain portions of the year, but is now drained by a series of canals and ditches. The approximate width of the valley is from one and one-quarter to one and one-half miles at its widest part. The surface is covered by rich black alluvium and clay which rests on a yellowish brown layer of clay heavily charged with gypsum.

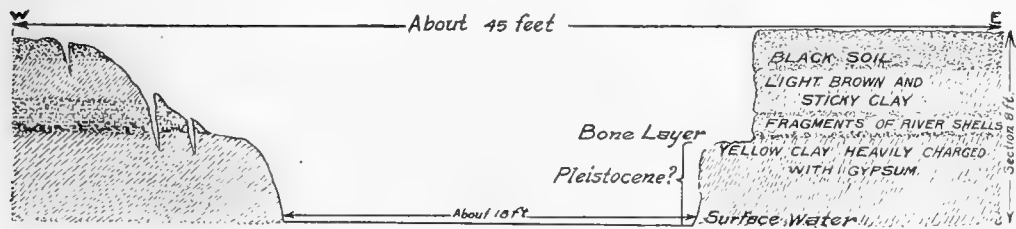


FIG. 1. Diagram showing deposits at point where the bones were discovered.

This stratum of yellow clay is probably of Pleistocene origin. Its thickness has not been accurately determined. Water is struck everywhere in the valley at a depth of about eight feet below the surface, and this may account for the fact that the depth of the formation alluded to is not more certainly known. In the deeper strata, to a depth of about one thousand feet, are various layers of salt, which are

being worked by wells sunk by the Mathieson Alkali Company. Their works are located on the Holston River approximately three-quarters of a mile from the wells. After these wells have been pumped for a longer or shorter time, there generally occur in close proximity to the well one or more sink-holes, the surface caving in, and causing much inconvenience to the company. At "Well No. 69" a cave-in



FIG. 2. Near view of the cave-in at "Well No. 69."

recently occurred, and along its banks, some five or six feet below the surface, a number of bones of *Mastodon* were found by different parties in the employment of the company. A few of these, as has already been stated, found their way to the Carnegie Museum.

Some of these fossil bones are much worn by water, while the fractures and angles of others are quite sharp, having received little or no wear. From the fact that some of the specimens submitted for examination had received little or apparently no abrasion, it was thought that they might have been originally imbedded at the spot where found, and that the deposit might possess interest from a paleontological standpoint.

The layer in which the remains occur is a pavement of coarse gravel,



pebbles, and cobble-stones, some of considerable size, indicating the conditions usually found in the beds of streams. The writer is of the opinion that during the close of the Pleistocene, or later, there flowed through this valley a water-course of considerable size, which excavated Pleistocene remains from places where they had been originally imbedded, probably not far distant, and redeposited them in the spot where they are now found.

Fragments of large shells were found immediately overlying the stratum containing the bones of vertebrates. Dr. A. E. Ortmann after examination decides them to be fragments of fluviatile mollusks. The finding of the tooth of a large crocodilian, described in this paper, furnishes further confirmation of the view that a stream of considerable size, perhaps of greater volume than the Holston River at present, once flowed here.

The remains found in the opening at the edge of the sink-hole at "Well No. 69" are herewith listed, so far as it has been possible to determine, at least approximately, what they are.

### Class **REPTILIA**

#### Order *CROCODILIA*.

#### Genus *CROCODILUS* Laurill. (?) sp. ind.

A tooth (No. 3953, C. M. Cat. Vert. Foss.), which is shown in half the natural size in Fig. 3, was discovered among the scattered remains recovered at "Well No. 69." It is 100 mm. in length, 30 mm. in antero-posterior diameter at crown, and 24 mm. in transverse diameter at same point. The enamel has been more or less abraded, but nevertheless the tooth does not appear to have been transported very far, or much subjected to the action of running water. The apex of the crown, which is somewhat broken, terminates in a blunt rounded point; the shaft is a little curved. (*Note.* The tooth undoubtedly represents a very large Crocodilian, but to which of the various extinct genera it is to be referred cannot now be definitely decided. Recently one of his correspondents has informed the writer of this parenthetic note that discovery has been made by him of Crocodilian

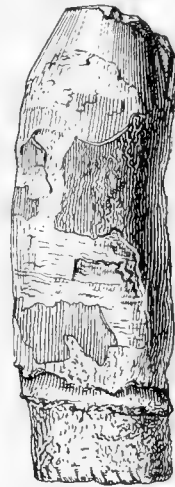


FIG. 3. Crocodilian tooth.  $\frac{1}{2}$  nat. size.

remains in North Carolina, which appear to be identical with the material from Montana described under the generic name *Deinosuchus*. (See ANN. CARNEGIE MUSEUM, Vol. VI, pp. 28-294.) It is barely possible that this great tooth, recovered at Saltville, may belong to this or an allied genus, which survived to a quite recent geologic period. At all events the tooth represents an animal much larger than any living species of the order now existing, at least in the New World. *W. J. Holland.*

Class **MAMMALIA.**

Order *EDENTATA.*

Family MEGALONYCHIDÆ.

Genus MEGALONYX.

**Megalonyx dissimilis** Leidy (?). *Cf.* Leidy, Proc. Acad. Nat. Sci. Philadelphia, Vol. VI, 1852, p. 117.

The symphyseal portion of a pair of lower jaws (No. 3952 C. M. Cat. Foss. Vert.) found at "Well No. 69" is provisionally referred to *M. dissimilis* Leidy. The teeth of this specimen remaining in position are slightly larger, but have the same laterally compressed appearance and outline in cross-section, as given in Fig. 8 of Plate XVI of Leidy's "Extinct Sloth Tribe of North America," *Smithsonian Contributions to Knowledge*, June, 1855. While the teeth of the present specimen appear to be as large as those of *Megalonyx jeffersonii* described in the same publication, the symphysis clearly has a smaller transverse

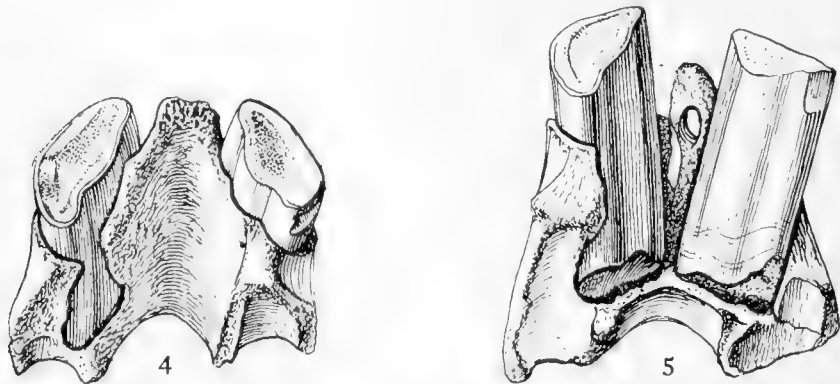


FIG. 4. *Megalonyx* sp. Symphyseal portion of lower jaw, viewed from above and behind.  $\times \frac{1}{2}$ .

FIG. 5. The same, with the back portion of jaw removed, showing the proximity of the roots of the teeth.  $\times \frac{1}{2}$ .

diameter than is shown in the ramus delineated on Plate V of Leidy's paper, and is also too narrow to correspond with the upper jaw illustrated on Plate III of the same paper. Furthermore the alveolus of the second tooth in the present specimen is further forward and the ramus of this region is shallower than represented in Prof. Leidy's illustrations of *Megalonyx jeffersonii*. The transverse diameter of the symphysis and the distance between the canine molar and the succeeding tooth of No. 3952 agree better with *Megalonyx leidyi* found in McPherson County, Kansas, and described by Dr. Josua Lindahl.<sup>1</sup> The specimen recently obtained by the Carnegie Museum may possibly belong to an unpublished species, but, as the specimen is rather inadequate as a type, I refrain from adding another species to those already proposed. The number of species of this genus of North American Ground Sloths, based upon somewhat limited material, indicates either that there were many species, or that there was a wide range of individual variation.

### Order ARTIODACTYLA.

#### Family CERVIDÆ.

#### Genus CERVALCES Scott. (?)

(Proc. Acad. Nat. Sci. Philadelphia, Sept. 1, 1885, pp. 181-202.)

The first upper premolar and the greater portion of the pedicel of an antler were found by different parties in the bank of the cave-in at Saltville. These specimens are now the property of the Saltville High School. Mr. H. L. Crowgey, in charge of the school, kindly submitted the specimens to the writer for study.

The portion of antler, which I take to be the pedicel, has very nearly the size of that of a fully adult moose, but is longer. The long pedicel,

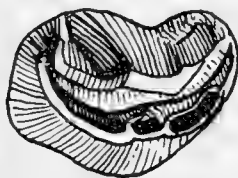
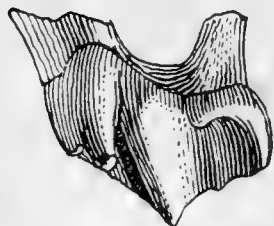


FIG. 6. First upper premolar of *Cervalces* (?) found at Saltville. Natural size.

FIG. 7. Astragalus of Cervid.  $\frac{1}{2}$  nat. size.

<sup>1</sup> *Trans. Amer. Philos. Soc.*, Vol. XVII, 1892, pp. 1-10, Pls. I-V.

which is one of Professor Scott's generic characters of *Cervalces* (*l. c.*, p. 183) is my chief reason for referring the specimen to that genus. The premolar here referred to is larger than that of *C. vapiti*, but proportionally narrower. It is, however, considerably smaller than that of *Alces*, and furthermore differs from the latter by having a relatively smaller transverse diameter, and deeper concavities of the outer face of the ectoloph.

**Cervid. sp. ind.**

An astragalus (No. 3951, C. M. Cat. Foss. Vert.) was found by the writer in the same place in which the remains just described were collected. This bone agrees closely with the same bone in *Oidocoileus virginianus*, but is too large for that species, and much too small to represent a moose.

**Order PERISSODACTYLA.**

**Subfamily EQUINÆ.**

**Gen. EQUUS sp. ind.**

An upper molar of the left side was found in the opening at Saltville and presented to the high school of the place by Mr. George Lipperd. The tooth represents a fully adult animal, but is too much mutilated to permit correct identification.

**Order PROBOSCIDEA.**

**Subfamily MASTODONTINÆ.**

**Genus MASTODON.**

**Mastodon americanus Kerr.**

Remains of mastodons are by far the most common in the Saltville deposit. Isolated teeth, fragments of jaws, portions of vertebræ, ribs, limb-bones, and foot-bones of both adult and young individuals are frequently found while working in this locality. Not only at the opening at "Well No. 69" but at different other places throughout the valley remains of mastodons have been picked up from time to time for a number of years past and are now located in different institutions. A few fragments of teeth and other bones were collected for the Carnegie Museum. While fragments of ribs were plentiful, no complete rib was found.

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