EXPLORATION IN SOUTHERN FLORIDA IN 1915

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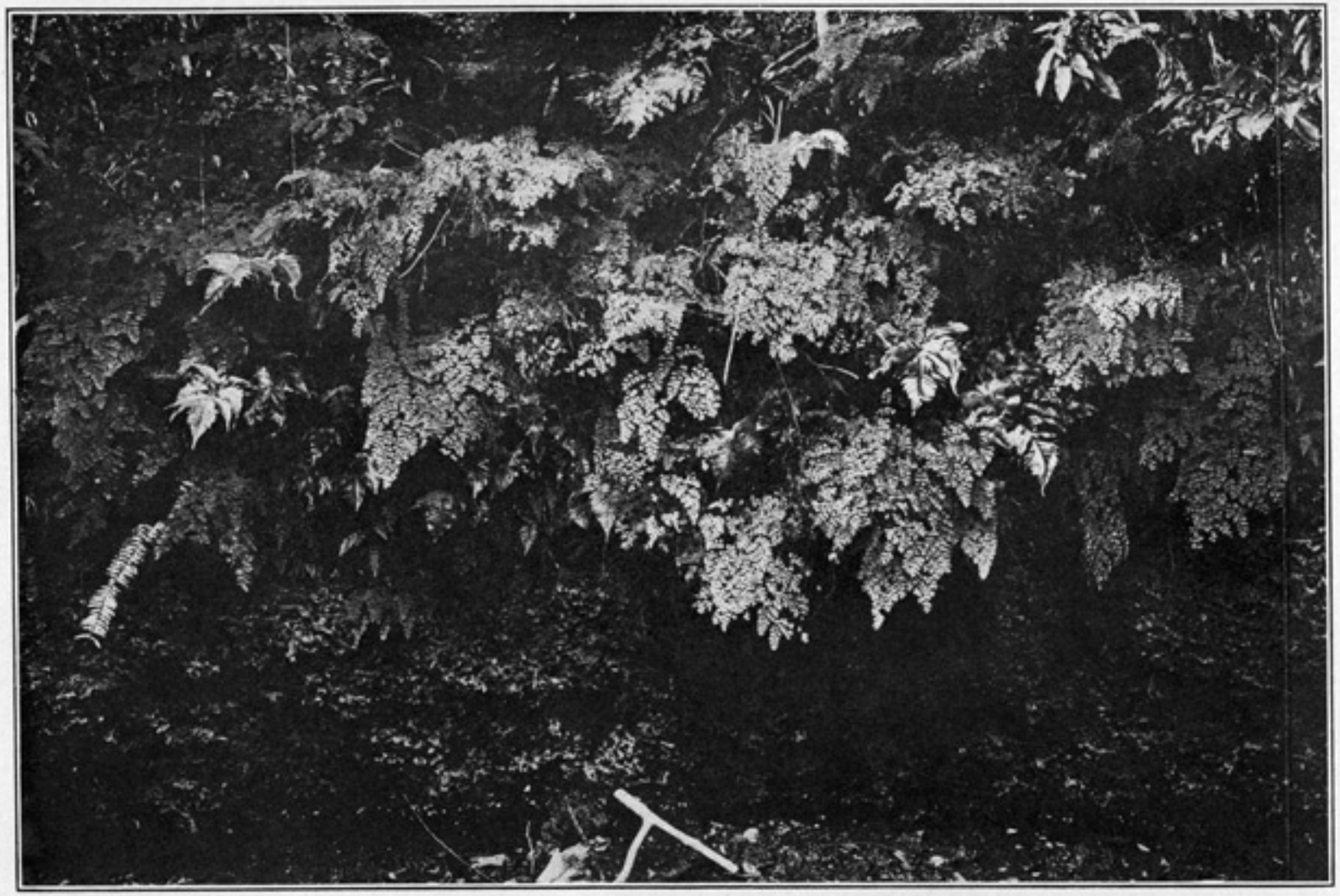

Perpendicular side of large lime-sink or erosion-hole in a pineland hammock. The plant-covering of the wall is mainly of tropical ferns. In this case it is chiefly maidenhair, *Adiantum tenerum*. There are present also, *Tectaria heracleifolia*, *Dryopteris radicans*, and *Nephrolepis exaltata*. Some hammocks have many sinks, others are devoid of them. In some cases the plant covering is entirely of small filmy-ferns.

EXPLORATION IN SOUTHERN FLORIDA IN 1915

(WITH PLATES CLXVI–CLXVIII)

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF,

Sir: Exceedingly far-reaching and conspicuous changes are taking place with the southward advance of civilization in the little-known or until recently unknown parts of southern peninsular Florida and on the Florida Keys. In view of these developments and their consequences a few preliminary remarks in connection with my report of recent field work may be of interest.

Previous to 1903, when we began botanical exploration in southern Florida, the country southwest of Cutler and Perrine, then the frontier settlements on the eastern coast of Florida, was almost a *terra incognita*. At this time a preliminary survey for a projected railroad line from Miami to Cape Sable was in progress, and an exceedingly interesting map of some of that heretofore unknown territory was made by Mr. W. J. Krome, who is now constructing engineer of the Key West Extension of the Florida East Coast Railway Company. This was the first map to locate definitely the dry land in the Everglades between Miami and Cape Sable, which land proved to be a curved chain of limestone islands extending three fourths the distance from about the Miami River to the southwestern extremity of the peninsula.

A wagon road to the south of Miami, or Fort Dallas, as it was at one time called, connected that place with Cocoanut Grove and Cutler and terminated at Perrine, which was an old but scarcely at all developed settlement in the pine forest, situated about three miles west of Cutler and Bay Biscayne. Near Perrine the surveyor's trail entered the pine forest and extended toward the southwest through the unbroken wilderness until it met the open Everglades at a point called Camp Longview. This trail soon served as a means of entering that territory by the few homesteaders who early began to take up claims in the region beyond Perrine.

At that time Miami was the southern terminus of the Florida

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East Coast Railway. After the survey referred to was about completed, it was decided to extend the railroad to Key West instead of to Cape Sable, and as work on the road-bed progressed a rough trail developed parallel to the road-bed chiefly through the transportation of camp and construction supplies. This afforded us another and somewhat different route for penetrating the wilderness. By following this trail which ran into the open Everglades at a point called Camp Jackson, we made many additions to our already large list of discoveries. Shortly after this time many miles of the finest type of roads were built and at present they extend as far as the country has been settled. Furthermore, a highway from Miami to Cape Sable, a distance of about one hundred miles, is now completed at least as far as Royal Palm hammock which lies in the Everglades about half way between the two points just mentioned, and work on the second half is now in progress. The second portion of this highway will make accessible large areas of the southwestern portion of the Florida peninsula which have never been entered by man. A portion of this region was traversed by Mr. Krome in making the survey referred to above, and in a recent letter Mr. Krome says: "I do not know whether you have ever penetrated into the country lying north and east of Cape Sable, but if you have not there are still some treats in store for you, providing you make your investigations during the winter months. I think there are orchids and epiphytes enough in the Coot Bay region alone to keep a botanist busy for the term of his natural life, and mosquitoes sufficient to keep him miserable most of the time."

By means of these fine roads in place of the old surveyor's trails we are now able to accomplish as much exploration and collecting in a day or two as used to require a week's time.

Notwithstanding the inaccessibility of this region during the early period of exploration, we found scores of plants, either new to science or typical West Indian and Central American, not before known to occur naturally in the United States, not even on the tropical Florida Keys, and learned that these islands in the Everglades which we have designated the Everglade Keys are,

so far as their vegetation is concerned, a portion of the West Indies isolated on the Florida peninsula. Although over one hundred miles north of the tropic of Cancer, their flora is tropical.

We were fortunate in getting into this field before or simultaneously with the homesteader, for his axe and firebrand, if not alone sufficient to exterminate hammocks, paved the way for the West Indian hurricanes to work double the usual amount of destruction in the unique pineland hammocks, and already some of the rare plants have apparently disappeared from the region.

Fortunately, however, civilization has not yet claimed all this interesting region, and the virgin field is yet more than equal in extent to that now wholly or partly devastated. The exceptional opportunity afforded both by this new rock highway running through unknown territory to Cape Sable, and the completed and proposed water highways through the Everglades should not be lost. Complete collections of specimens and photographs of this portion of our country so near at hand, and destined at an early day to have its natural features to a large extent, if not wholly, obliterated, will prove both valuable and interesting.

With your permission I spent portions of February and March, and June and July in further exploration of this region. On the first trip, I was accompanied by Mrs. Small, who participated in some of the field-work and who cared for the specimens at headquarters. On the second trip, I was accompanied by my son, George K. Small, who participated in all the field-work. Our collecting headquarters were, as usual, in the laboratory building of the Plant Introduction Garden of the United States Department of Agriculture, at Miami. This we occupied through the kindness of Mr. David G. Fairchild, and Mr. Edward Simmonds, who is in charge of this Garden, did much to further our work.

The unusual success of the field-work was due to the interest and coöperation of Mr. Charles Deering, who placed means of transportation both by land and by water at our disposal. We were able to spend the whole or a part of every day in the field.

Mr. Charles A. Mosier participated in nearly all the field-work and through his activity and his knowledge of the hitherto unexplored hammocks he contributed largely to our success. Our thanks, too, are due Mr. J. T. Gratigny for keeping our transportation facilities in almost constant motion, thus enabling us to cover large areas and long distances in the time spent in the field.

The following table will indicate the geographical extent of our operations and the character of the points visited.

EVERGLADE KEYS

PINELAND HAMMOCKS AND ADJACENT PINELANDS, Miami and southwestward.

Addison
Black Point Creek (twice)
Brickell (twice)
Brogdon
Cocoanut Grove
Costello (thrice)
Cox
Goodburn (twice)
Hattie Bauer (thrice)
Murden
Nelson
Nixon-Lewis (thrice)
Ross (thrice)
Royal Palm (twice)
Shields
Snapper Creek
Sykes (thrice)
Timms (twice)

EVERGLADES

PRAIRIE HAMMOCKS north of Miami.

Old Rhodes' Key
Caesar's Rock
Adams' Key
Freeman (twice)
Merritt's Island
Humbugus (twice)

PRAIRIES north of Miami.

Humbugus (twice)
Little River
Arch Creek

PRAIRIES south of Miami.

Cutler to Black Point
Vic. Long Prairie
Vic. Murden hammock
Vic. Nixon-Lewis hammock
Vic. Timms hammock
Vic. Silver Palm
Vic. Larkins

SAND-DUNES

Near Crocodile Hole
Opp. Lemon City
Opp. Miami (twice)
Key Biscayne

FLORIDA KEYS

Sands' Key
Pumpkin Key
Elliott's Key
Big Pine Key
Key West

These comprise distinct phyteographical areas. They are as follows:

EVERGLADE KEYS—Pineland hammocks and adjacent pinelands.

EVERGLADES—Prairie hammocks and prairies.

COASTAL SAND-DUNES—Hammocks.

FLORIDA KEYS—Hammocks and pinelands.

Pineland with saw-palmetto, shrubs, and herbs in foreground. Sykes hammock, noted for its copious growth of air-plants, in background. In addition to epiphytic ferns and orchids, a dozen kinds of bromeliads, belonging to four genera, grow on the trees.

Large shrub of *Tetrazygia bicolor* in flower in the pinelands. This plant, which is related to the more widely known meadow-beauty (*Rhexia*), blooms profusely in the summer. It occurs on the Everglade Keys from below Peters Prairie to Long Key.

The first collecting trip was made to Royal Palm hammock. One of the most interesting discoveries there was a tropical vine heretofore known from our flora only from Elliott's Key, namely *Hippocratea volubilis*, the "bejuco prieto" of the West Indies. Besides thus discovering the first definite locality for this vine on our mainland, we found quantities of one of our very rare shrubs, the myrtle-of-the-river, or *Calyptranthes Zuzygium*. Royal Palm hammock is an island or key in the Everglades about three miles west of Camp Jackson and six miles southwest of Camp Longview, points already referred to, and which up to the end of 1914 were the limits of transportation, except by man on foot. It is different from all the other Everglade Keys, largely because it has for ages been isolated by two forks of the headwaters of an unmapped river. Referring to Royal Palm hammock and also to the sentimental feeling of one who visited it in former times, I will quote another paragraph from Mr. Krome's letter already referred to: "I recently visited Royal Palm hammock by automobile but cannot say that I enjoyed the trip. I have for so long felt that the hammock and the recesses of the 'Glades' and big mangrove swamp beyond were spots reserved for the pleasure of only those few who were willing and able to surmount the difficulties that encompassed them, that I am selfish enough not to relish their being 'thrown open to the public.'"

A second visit to Royal Palm hammock forcibly exhibited the advance of civilization. Up to this last year the flora of the key was natural and native; but a camp had been maintained there for a short period in connection with road-building and we found among other exotics such plants as millet, oats, timothy, alsike, red-clover, and peanut. The introduction of these plants in an isolated and virginal flora seems sacreligious, not to say criminal. The only interesting point in this connection will be the observations as to how long or how vigorously the species may maintain themselves in perhaps as unnatural an environment as they have ever entered.

Six of the pineland hammocks cited in the preceding list of localities were not visited by botanists before, and they all

yielded new or interesting plants. The most interesting of the new hammocks are Brogdon, Goodburn, Nixon-Lewis, Shields, and Sykes. In this connection I am sorry to report that two, and perhaps three, of the hammocks explored during our first incursion into this region have wholly disappeared. The interesting Caldwell hammock and Long-Prairie hammock no longer exist, and the small but prolific Scott hammock we were not able to locate, although it may still be in existence. The Cox hammock, with its numerous enchanting fern-lined lime-sinks, where a decade ago we discovered trees of the West Indian holly, *Ilex Krugiana*, growing in the United States and first found the wild-coffee, *Colubrina Colubrina*, growing as a tree, is doomed. The owner, not satisfied with the progress of destruction wrought by axe, fire, and hurricane, this year fenced it about and put in a half dozen goats in order to hasten the destruction of what vegetation then remained alive.

Among the recent discoveries are two trees new to our flora, these are *Colubrina cubensis* and a species of *Coccolobis*. The former tree was found growing plentifully in no less than four hammocks. One of the new hammocks yielded the tropical epiphytic orchid *Brassia caudata* and another the rarer *Epicladium Boothianum* known otherwise on our mainland only from the now extinct Long Prairie hammock. In several of the hammocks gigantic trees of the West Indian holly were in full bloom during February and March and the fragrance of their flowers filled the surrounding pine woods.

In the Goodburn hammock we were surprised to meet with the first native plants of the sea-bean, *Mucuna urens*, found in the United States. I had been looking for this plant ever since we began exploration in southern Florida. In this hammock we observed one vine with a very thick trunk-like stem and greatly elongated branches spreading over shrubs and trees to the extent of fully three acres. The vine was covered with both its lemon-yellow flowers and its bright green fruits.

The lime-sinks and rotten logs in the newly visited hammocks maintained the most beautiful and abundant growth of filmy-ferns yet observed in the United States and the crowded masses

Pinelands as they appear on some of the lower Florida Keys, Big Pine and Little Pine Keys, and on No Name Key where the above photograph was taken. There the pine trees are not accompanied by a copious undergrowth of saw-palmetto, *Serenoa serrulata*, as on the Everglade Keys; but by an abundance of both the thatch-palm, *Thrinax microcarpa*, and the silver-palm, *Coccothrinax argentea*.

of our rarer epiphytes, such as *Guzmannia* and *Catopsis*, not to mention many kinds of orchids, were marvelous. These hammocks harbored at least five species heretofore known from the Florida Keys new to the flora of the mainland. Mushrooms, liverworts, and mosses were in good condition in all the hammocks and were collected generously.

The pinelands about the hammocks yielded their share of new and interesting plants. The three most conspicuous in bloom in the summer season were two kinds of West Indian morning-glories discovered there some years ago, the one with numerous purplish flowers and the other with clusters of large crimson fuchsia-like flowers, and most showy of all a white-flowered shrub related to our northern meadow-beauty. This shrub is well worthy of cultivation. Two introductions following the path of civilization from further north in the state were collected, namely the may-pop, a passion-flower, *Passiflora incarnata* and the trumpet-creeper, *Bignonia radicans*.

The Everglades, including the prairies and the prairie hammocks, added much to our previous knowledge of their flora. Many groups of plants were in their best condition owing to recent rains, and our list of the plants hitherto known to grow in the Everglades was materially increased. Among the additions were both native and naturalized plants, the latter class evidently brought in and established there through recent farming activity.

The coastal sand-dunes opposite Miami, near Crocodile Hole, and opposite Lemon City were given some attention. These interesting natural features are suffering the same fate as the hammocks. Large portions of the natural vegetation have already been obliterated. With this destruction of the dunes is disappearing one of our finest species of milkwort, *Polygala Krugii*, which is not now known to occur elsewhere, not even at its original locality, New Providence, Bahamas. These dunes added a Cuban rag-weed to our flora, *Ambrosia Rugelii*.

Eight of the Florida Keys were visited, six of the Upper Keys and two of the lower ones. In an area of original forest on the lower portion of Elliott's Key we found a terrestrial West Indian

orchid, *Ibidium lucayanum*. This plant was first described from specimens collected in the Bahamas. On Key West we found the East Indian vine, *Cryptostegia grandiflora*, a member of the milkweed family, thoroughly naturalized in several places; but the most conspicuous native shrub of the old hammock areas was the little but showy hibiscus, *H. spiralis*, with its myriads of nodding deep-crimson flowers and drooping fruits. A search through the remains of the old hammock for full-grown specimens of an endemic species of cactus, *Cephalocereus keyensis*, revealed only two remaining plants. Several large plants had been cut down some years previous and many of the branches had taken root and were growing about the old stump. We collected many stems of small plants in the winter and in order to save the species from extermination Mr. Deering has had them planted in several hammocks near Miami, and in the spring he had a whole tree transplanted to his grounds near Miami. Big Pine Key as usual disclosed one or two new species, and in a portion of the hammock near the southern end of the island we met with dozens of large trees of the locust-berry, *Byrsonima lucida*, which we first found as a tree in the United States on Long Key in the Everglades. These trees were in full bloom in March and presented a sight not soon to be forgotten.

A brief summary of the more interesting discoveries in the collection of about 11,000 specimens, so far as studied, is as follows: First, over forty species of flowering plants comprising naturalized exotics and heretofore unobserved natives, added to the known flora of the Everglade Keys and vicinity. Second, additions to the known flora of the United States: Mushrooms, two West Indian species and several new endemic species; liverworts, four West Indian species and three new species; mosses, several West Indian species; ferns, a West Indian species; flowering plants, ten West Indian species and several new endemic species.

Respectfully submitted,

J. K. Small