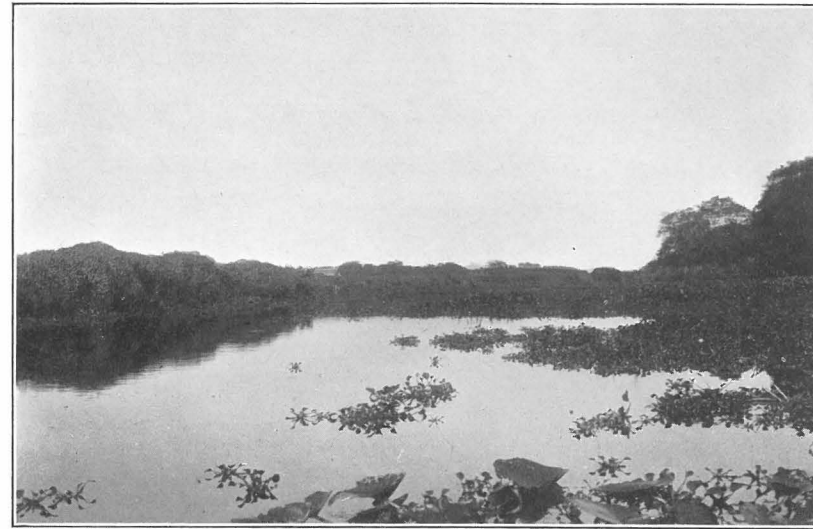


EXPLORATION IN THE EVERGLADES
AND ON THE FLORIDA KEYS

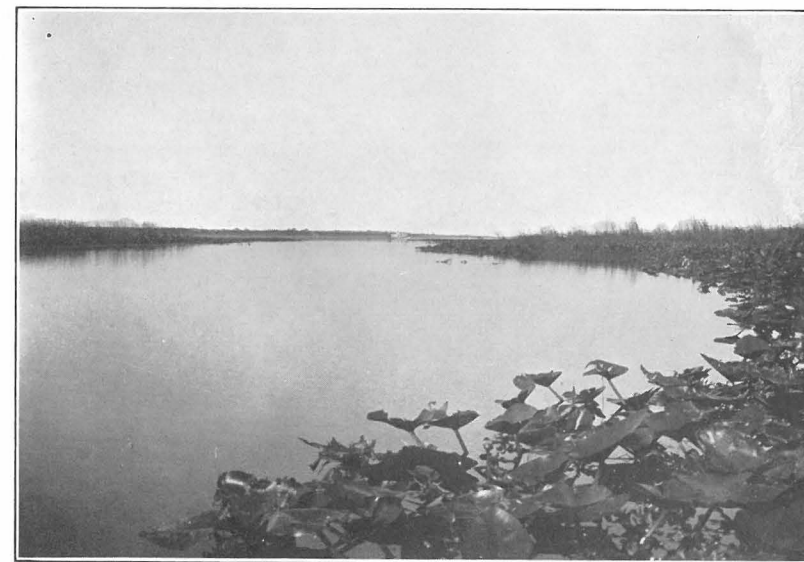
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J. K. SMALL

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Creek at the southeastern end of Lake Okeechobee. Water-plants in the foreground. Pond-apple or custard-apple hammocks on the banks.



Bay at the southeastern end of Lake Okeechobee. Spatter-dock or yellow pond-lily and other water-plants in the foreground. Everglades in the distance.

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EXPLORATION IN THE EVERGLADES AND ON THE FLORIDA KEYS

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

Sir: The active work which has been in progress for several years, preliminary to draining the Everglades, suggested to the writer the desirability of observing the natural flora and of getting together a representative collection of the vegetation of that isolated plant-region in advance of the inevitable colonization and cultivation of its lands, and the consequent modification and perhaps the ultimate destruction of the original plant-covering. In the early part of the last decade a similar idea prompted us to undertake the exploration of the Miami Limestone Region or the Everglade Keys. Most of this relatively small area was then difficult of access, but the wisdom of exploring it was evident long before we had covered half the ground, and as exploration advanced it was astonishing to note the many kinds of plants it yielded either new to science or new to the flora of the United States.

Heretofore, much information about the southern portion of the Everglades, particularly that adjacent to the Miami Limestone Region, was obtained during the progress of the exploration just referred to, but much remains to be ascertained in what is perhaps the most interesting section lying between the larger islands of the Everglade Keys near the eastern coast and

and the Ten Thousand Islands on the western coast of southern peninsular Florida.

With your permission I left New York on the first day of November of last year equipped for exploration in the Everglades and contiguous territory. I was accompanied by my family who as a whole or in part participated in all the work, both in the field and at headquarters, and they added materially to the results. We proceeded direct to Miami, and there upon the invitation of Mr. Edward Simmonds established our exploration headquarters in the laboratory building at the Plant Introduction Garden of the United States Department of Agriculture. All phases of our undertaking were furthered by the interest and the generosity of Mr. C. F. Sulzner and family. While at Miami we made our headquarters at the residence of Mr. Sulzner, and his manifold facilities were generously placed at our disposal. The cruiser "Lida" owned by Mr. Sulzner, was kindly put into commission as a house-boat for our proposed expedition through the Everglades and Lake Okeechobee, and later Mr. Sulzner fitted out his small motor-boat "Scooter," for local work about Bay Biscayne and in the Everglades about the head of the Miami River. I also wish to thank Mr. E. H. Lyon for the use of his small motor-boat of shallow draught. This craft was of much use in exploring certain portions of the shores of Bay Biscayne.

For a period of nearly two weeks only sporadic field work could be accomplished on account of an unseasonable spell of very rainy weather. However, the time not spent in the field was put to good advantage in fitting out and provisioning the "Lida" for our proposed Everglade expedition. By removing the engine from the "Lida" we gained a commodious work-room in the stern of the boat which could not have been more suited to the waters of the region we traversed and to the character of our work. In addition to the converted engine-room, she had a galley, a saloon, and a spacious pilot-house. After securing the services of Captain Ball with his motor-boat "Highball" to tow the "Lida," we awaited a favorable change in the weather. With the advent of the first clear day we started down the Miami

River bound for Fort Lauderdale, which course we were forced to take both on account of an impassable point in the Miami Branch canal just beyond the source of the Miami River and some shallows in the South New River canal near Lake Okeechobee. Our party made an admirable crew for the "Lida," and all members had plenty of work to do from start to finish. After some delays on sand-bars and oyster-banks in Bay Biscayne, we entered the Coastwise Canal at the head of the bay, and passing through Dumbfoundling Bay, New River Sound, and Lake Mable, we entered the mouth of the New River just after dark, and proceeded slowly up the channel to Fort Lauderdale where we tied up at the public dock for the night. As at this point all traces of civilization would be left behind, we spent the evening partaking of the kinds of civilization especially appreciated by the younger members of the party, particularly ice-cream and moving-picture shows, both of which were of a primitive type, nevertheless they were appreciated. Early the next morning, after making repairs to the engine of the "Highball" in the hope of increasing her speed, we started up New River for the Everglades. In saying up, I merely mean against the current for the New River passes through a tortuous channel which covers all points of the compass within short distances. Its banks are lined with a succession of pinelands, hammocks, and wierd cypress-swamps.

That the Everglades are considerably above the level of the sea is at once realized by the rapidity of the current that flows through each canal. The outlook on the Everglades cannot be called picturesque, except in the vicinity of Lake Okeechobee. The view, however, is impressive, but only so by the extreme simplicity of the contours and the monotony of the plant-formation. In the outer portion the landscape consists of water, saw-grass, and low, mostly scattered, usually remote, hammock islands. The inner part consists of a monotonous expanse of water and saw-grass extending to the horizon in all directions; in dry seasons the visible water is more or less eliminated, except in depressions; then nothing is in sight but saw-grass.

Two days' travelling against a strong current, with occasional

stops for collecting along the way, brought us at sundown to the most southern portion of Lake Okeechobee, called South bay. As we approached the lake a gradual elevation of the land was noticeable. This higher land supported dense hammocks, consisting chiefly of pond-apple or custard-apple (*Anona glabra*), while the most conspicuous and everblooming shrub there is the southern-elder (*Sambucus intermedia*). However, by far the commonest plant of all is a high-climbing vine, known in cultivation as the moon-flower (*Calonyction aculeatum*). There it is ubiquitous, and in many hammocks it covers everything and every place. This vine runs over the herbaceous vegetation and shrubs and climbs to the tops of the highest trees, and where there is no vegetation it covers the ground. We were favored by bright moonlight during most of the nights spent on the lake and in the Everglades. The sight of acres, if not of miles, of moon-vine with its deep-green leaves and thousands of large white flowers throughout the night and in the early morning was more beautiful than words can describe. At day-break on the morning following our arrival at South bay we made our way through a channel between the patches of pondweed (*Potamogeton*) to Torry island which is the southernmost and largest of the four islands of the lake. The morning was devoted to exploring Torry island and making collections of the plants observed there. Access to the hammocks of this island is often difficult chiefly on account of mud-flats which extend far from the shore. These expanses consist of the most non-resistant liquid mud I ever experienced. They support a growth of maiden-cane (*Panicum hemitomon*), bulrushes (*Scirpus validus*), water-hyacinth (*Piaropus crassipes*), water-lettuce (*Pistia Stratiotes*) and pennywort (*Hydrocotyle umbellata*), but any one who sets foot thereon sinks in the mud to an indefinite depth about as readily as in pure water. Behind these mud flats one meets with a very dense line of pond-apple or custard-apple trees with curiously buttressed or branched trunks. These trees often form hammocks acres in extent to the exclusion of all other kinds. In these groves, other vegetation is scant. Various vines struggle to the tops of the trees for sunlight, those more conspicuous are,



Cruiser "Lida" at anchor off the eastern shore of Lake Okeechobee. Sand-ridge covered with a dense hammock made up mostly of bald-cypress and cabbage-palm or palmetto trees in the background. Behind the ridge and hammock lies a cypress swamp.



Eastern shore of Lake Okeechobee. Beach of white sand in the foreground. Ridge with hammock behind. The trees along the shore-line are accustomed to thrive both in and out of the water. At the high-water mark the larger tree trunks usually support an assemblage of plants not usually epiphytic, such as the Carolina-aster, a tropical climbing-hempweed, and other herbaceous plants, and vines.

a kind of gourd, and still more surprising, a high-climbing dew-flower (*Commelina*). This plant with its stout fleshy stems and branches climbs all over the limbs of the pond-apple trees, often reaching to the highest branches. Air-plants were represented by both orchids and bromeliads.

About noon we passed between Torry and Kreamer islands and went into Pelican harbor where we dropped anchor. As soon as the "Lida" was made secure we boarded the "Highball" and hurried over to the northern end of Kreamer island several miles to the westward and spent the afternoon in making a large collection in the hammocks. The vegetation for the most part was similar to that of Torry island but apparently rather more varied. Returning to the "Lida" we weighed anchor and moved up into the sound which connects Pelican harbor with Pelican Lake, just as the sun was going down. The scenery there was enchanting, and the birds of various kinds were congregating in their respective rookeries which were the largest and most fantastic I have seen in southern Florida. As the moon was rising we anchored in this sound surrounded by floating islands of water-hyacinth and water-lettuce. These floating islands, varying in size from a few rods to acres in extent, are at times blown about by the wind with almost incredible swiftness. Sometimes the outlook would be perfectly clear, then in a few moments our boats would be surrounded by masses of these plants. How this South American plant got into Lake Okeechobee I do not know, nor how long it has been there will probably never be known. It may have been brought by birds coming from the south or it may have floated down the Kissimmee River, for the distance of several hundred miles after it was introduced into northern Florida. The lake and some of its branches have proved very congenial to the water-hyacinth and I doubt if it grows more luxuriantly in its native countries. Curiously enough it does not prove much of an impediment to navigation. We successfully made our way through formidable looking masses acres in extent almost at full speed; but not so in the case of the inconspicuous pondweed. Progress through a growth of this plant is well nigh impossible, except with a weedless propeller.

With the ordinary style of propeller, a few rods' progress through a patch of the "weeds" is sufficient to stop the engine.

Soon after daybreak next morning we pushed up into Pelican Lake and collected along its wooded shores. We found a creek on the western side of the lake through which we were able to pole our rowboat nearly into Lake Okeechobee. A slight extension of this channel, and it may exist at times of high water, would add a fifth island to the group now in the lake.

After devoting as much time to Pelican Lake as our schedule allowed, we returned to Pelican harbor and passed outside, where we began our course northward along the eastern shore of Lake Okeechobee. Landings were made from time to time as inviting localities appeared along the shore. Just above Pelican harbor and northward from it both the land and the vegetation undergoes an abrupt and a conspicuous change. A ridge of fine white siliceous sand runs parallel with the shore of the lake. This ridge is several feet high and varies, as far as we observed, from about twenty-five feet to two hundred feet in width. Behind this ridge lies a dense cypress swamp. Along the lake-side the shore is open and of clean sand, and not of mud as it is a little further south. There the water-hyacinth and water-lettuce so common and luxuriant a few miles south cannot gain a foothold, and exist, if they are to be found at all, as stunted and insignificant plants hardly noticeable after an experience about Pelican Lake. Consequently the shore-line is devoid of vegetation, except for some small grasses and sedges. Thus a complete change of scenery takes place. The low muddy and irregular shore with its dense growth of pond-apple gives place to a ridge clothed for the most part with a remarkable growth of bald-cypress (*Taxodium distichum*) and palmetto (*Sabal Palmetto*). In appearance this ridge seems to be a series of ancient sand-dunes and the discovery there of several coastwise plants seems to indicate that it was once a sea-coast. These sand-dunes support a very dense growth of the two above-mentioned trees. The growth is almost impenetrable in many places. Scattered with the cypress and palmetto are trees of the red-maple (*Acer carolinianum*), holly (*Ilex Cassine*), ash (*Fraxinus caroliniana*),

also many shrubs and herbaceous plants. In the swamp behind the ridge we found black muck instead of sand. Here in most places the cypress grows to the exclusion of other trees, and ferns of various kinds cover the swampy ground.

Passing northward we found this ridge continuous nearly up to the head of the lake, except where several small creeks connect the lake with the cypress-swamp. We finally reached the northern end of the lake, and anchored off the mouth of Taylor Creek. Here we left the "Lida" at anchor, and going aboard the "Highball," found a channel through the bar at the mouth of the creek and proceeded up the very tortuous channel to a settlement called Tantie. This creek is favorable to the growth of water-hyacinth, and it is often completely choked from shore to shore. Time and again we had to plough our way through hundreds of feet of a dense growth of the plants. The banks of the creek, after passing the line of cypress near the mouth, are clothed with hammocks of shrubs and trees different from the kinds growing at the southern end of the lake. These hammocks resemble more closely those of peninsular Florida farther north. Four miles up the creek we emerged into the pinelands at a point where it is planned to build Okeechobee City. We had now reached the northern extremity of the lake and of the Everglades, and our next move was down the western side of the lake a few miles to Eagle bay, and after collections were made on its shores, the next stage in our journey brought us to the mouth of the Kissimmee River. Further progress along the western shore of the lake was impossible not only on account of the naturally shallow waters of the western side of the lake, but also on account of a remarkably low level of the water brought about by a long drought prevalent in the peninsula north of the lake.

The mouth of the Kissimmee as it exists is very different from that shown on maps. Instead of a bay, it is a delta, and the main channel of the river is very obscure, and evidently very tortuous further up, as a fisherman we met in the delta told us that if we attempted to ascend the river with a boat over twelve feet in length, the boat would have to be hinged in the middle so as to be able to get around the bends in the river.

We now began to retrace our course, and after making several landings on the sand-ridge south of Chancey bay we headed straight for the southern end of the lake and made our first stop for collecting at Observation island.

From the time we left Pelican Lake until we got back into the South New River canal we did not seek the shelter of a harbor but anchored from sunset to sunrise on the open lake. We could not have been favored with better weather for our undertaking.

Observation island is quite flat, and aside from some sandy beaches, at least at periods of low-water, it consists mostly of pond-apple hammocks. The following day found us off the mouth of the South New River canal. There we again left the "Lida" and in the "Highball" made a collecting trip some miles southward into the Everglades.

After leaving the South New River canal we crossed to Rita island, the fourth island of the lake, and the one remaining to be explored. Rita is the smallest of the islands, and apparently has less variety of vegetation than the other three.

The surface of the lake is uninterrupted except by the four islands already mentioned. Several limestone rocks have been reported between Rita and Observation islands. We kept a lookout for these obstructions, and although the water was unusually low, we did not observe them. After leaving Rita island we sailed direct for the mouth of the North New River canal and anchored along the channel where we entered the lake about ten days previous. There we explored a creek lying between the mouths of the North New River canal and the Hillsborough canal. This creek with its growth of water-lettuce, water-hyacinth, pond-lilies, and yellow and white water-lilies on the one hand and the large pond-apple and wild-rubber trees on the other presented one series of pictures after another of indescribable beauty.

Lake Okeechobee may be described as an irregular body of water nearly forty miles in diameter. Its broad expanse is broken only by the four islands near the southern end. Summing up what has been said, the eastern side consists of deep water bordered by a sand ridge with a remarkable growth of bald-cypress



Motor-boat "Highball" towing the "Lida" through Pelican sound. Floating islands of water-hyacinth and water-lettuce in the foreground. Pond-apple hammocks on the shores. Entrance to Pelican Lake in the distance.



Shore of Pelican Lake. Luxuriant growth of water-hyacinth in the foreground. Dense pond-apple hammock in the background. On the muddy shore alligators are plentiful. The hammock is the home of the otter and the racoon, and other mammals. The pond-apple trees furnish rookeries for various kinds of birds.

and palmetto. This ridge gradually passes into the deltas of several creeks and into that of the Kissimmee River at the north. The western side of the lake is shallow and mostly filled with pondweed. Its border consists of Everglade formation. The southern shore is a high ridge of peat or peaty soil which supports a dense hammock and gradually tapers off into the Everglades. South bay is also pretty well filled with pondweed and lined with muddy shores which support exceedingly luxuriant vegetation and remarkable pond-apple hammocks.

To the animal life of the Everglades we paid little attention, except such as was forced upon us. We noticed many kinds of birds. These because of protection throughout the state of Florida have become remarkably numerous and tame. Mammals were represented most conspicuously by otters and racoons. Of course, bear, deer, and wild-cats are plentiful, but they keep themselves out of sight. Reptiles were well represented by alligators, crocodiles, water-moccasins, and rattlesnakes. However, all these animals seemed insignificant after we reached the home of the mosquito and the blind-mosquito. The mosquito did not trouble us at all in the Everglades proper, but when we entered Pelican sound, we found the mosquito and the mosquito found us; but the greatest surprise awaited us as we started up the eastern shore of the lake. There we made the acquaintance of the blind-mosquito. These animals are about the size of the common mosquitoes, but they do not bite. However, their attack which is vicious, persistent, and irritating, is pure bluff, and their numbers are incredible. They live on the vegetation along the shore, and at night they are attracted to a light-colored object or to the lights of a boat. They were so numerous that they actually buried the lantern on the upper deck of our boat and accumulated in a mass to the depth of a foot on the lower deck. The only way in which we could escape the plague was to shut up the cabin at sunset, put out all lights and go to bed, but in spite of all we could do, thousands would find their way inside.

Having put in all the time at our disposal on the lake we started for Fort Lauderdale by the same course as we came to the

lake. However, upon reaching the junction of the two forks of the New River, we went up the South fork and through the South New River canal into the Everglades. After the desired observations and collections were made there, we proceeded back to Fort Lauderdale. There we replenished the supply of gasoline which the almost constant use of the engine had exhausted and the supply of food which ravenous appetites had reduced to the quantity of about a meal, and then made our way to the mouth of the New River, and through Lake Mable to New River Sound. We cast anchor in the southern part of the sound and spent the day on the sand-dunes between the ocean and the sound where there is always much of botanical interest to occupy one. The brilliant coloring of the vegetation, particularly the many shades of green exhibited by the trees and shrubs surrounding the sound is remarkable. Early the next morning we weighed anchor and started on the last stage of our lake trip, and reached Miami late in the afternoon.

After our return to Miami collecting was continued in the Everglades about the head of the Miami River and further up along the Miami Branch canal. Also while caring for the specimens, incidental exploration was carried on along the shore of Bay Biscayne, on the sand-dunes opposite Miami, and in the large hammocks south of Miami.

Several days in the first and third weeks of December were spent in making collections on Key West, Boca Chica Key, and Big Pine Key. The first visit to Key West was made primarily to explore Rock Key, which is said to lie to the westward of Key West, and where Dr. Blodgett collected a very rare plant many years ago. The only Rock Key on the charts, and also the only one known to the inhabitants of Key West, was washed away during recent storms, and thus if the Rock Key referred to above be the same one that Dr. Blodgett collected on, the plants that grew there are exterminated, providing they do not exist on other keys.

After locating the former position of this Rock Key by means of its remains now completely submerged, we turned our attention to Boca Chica Key and Key West. The latter named key

was searched for its botanical treasures, particularly for plants found there early in the last century and not recently collected, nor rediscovered there. A shrub and several kinds of trees still remain to be rediscovered, and unless they are found at an early date, they will never be found, for they will have gone forever together with the little that remains of the original hammock where they evidently once grew. In fact, it will not be very long until the only vegetation of Key West will consist of wayside and backyard weeds. The native vegetation of many other of the Florida Keys is also doomed. The hammocks of Big Pine Key will not survive very long. We devoted as much time as possible to these, and walked the whole length of the key in search of two shrubs or trees collected there many years ago by Dr. Blodgett. Our search for these was unsuccessful, but much else of botanical interest was secured. This key and all the others supporting pinelands in addition to hammocks, should be explored almost every month of the year, if we expect to get a complete collection of their interesting vegetation.

Our party returned to New York without an accident and with a collection of museum specimens and about 6,000 herbarium specimens of flowering plants.

Respectfully submitted,

J. K. SMALL,

Head Curator of the Museums and Herbarium.