

# Narrative of a Cruise to Lake Okeechobee

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ON THE BORDER OF THE EVERGLADES; PELICAN LAKE FIVE YEARS AGO

Against the sky line a solitary cypress spread its branches above the dense growth of pond apple trees (*Annona*), which were overgrown with moon vine (*Caloscytus*), its multitude of blossoms showing as white dots in the picture. Near the shore grew bulrushes (*Scirpus*) and maiden cane (*Panicum*) and, at the water's edge, upright ranks of arrowhead leaves (*Sagittaria*) above a zone of pale green water lettuce (*Pistia*). Water hyacinth (*Pteropus*) also grew luxuriantly here, both along the shore and in floating islands in deeper water. The photograph shows the leaves with their oddly inflated stalks reflected in the lake's surface.

When cruising in Pelican Lake in 1913, both in sunshine and by moonlight, we found it one of the most beautiful spots we had ever seen. Also the forests of the hammocks were immense heron rookeries, and the waters abounded in alligators. Today the whole region is a waste, showing miles of bare lake bottom and acres of coarse weeds.

For many miles around Lake Okechobee there is neither ordinary soil nor rock. Vegetation grows directly from a floor of "peat" or humus formed through the gradual decomposition of vegetable matter. Whether the area be the bottom of the drained lake or the dry land of a cleared hammock, it is everywhere only "peat." Near Moorehaven this peat formation resembles a gigantic sponge, trembling under foot with each step, yet the dwellings and concrete walks of the town are built upon it.

## Narrative of a Cruise to Lake Okeechobee

DESCRIPTION OF A LAND OF "PEAT," WHERE THERE IS NEITHER SOIL NOR ROCK, EVEN TOWNS BEING BUILT ON THE TREMBLING SPONGE OF VEGETATION.—NEED FOR GOVERNMENT PROTECTION OF SELECTED AREAS BEFORE THE FLORA OF THIS REGION, NOWHERE DUPLICATED IN OUR COUNTRY, CEASES TO EXIST

By JOHN KUNKEL SMALL

Head Curator of the Museums and Herbarium of the New York Botanical Garden

THE words "Everglades!" "Okeechobee!" "Big Cypress!" carry great fascination, particularly to the naturalist. Until recent years the regions represented by these names held many mysteries in their unexplored depths. Some of the mysteries have yielded, while others remain to be solved.

In continuation of a botanical exploration of southern Florida, I set out May 5, 1917, on a collecting trip to the Lake Okeechobee region in the Everglades. Wonderful changes have taken place in southern Florida within the last decade or two. Previous to that time anything in the way of modern transportation was wanting. What was then a matter of weeks is now a matter of hours. I had returned to Miami May 4 from a collecting trip to Big Pine Key and Key West, a distance in latitude of nearly one hundred miles, and the night of May 5 found me in the Everglades nearly one hundred miles farther north. Our party left Buena Vista early in the forenoon, on board the "Barbee," generously fitted out by Mr. Charles Deering. Aboard were Paul Matthaus, captain; Victor Soar, horticulturist; Charles T. Simpson, conchologist; Leban Bethel, crew and cook; and the writer. This classification, however, did not hold good at all times. It was a very democratic party: sometimes all members were officers, at other times they were all crew.

We were forced to go to Lake Okeechobee by way of Fort Lauderdale, as the Miami Canal was still securely blocked by politics and finance. (See map, page 686.) All went well until we entered New River Sound, a very beautiful spot in the inland waterway—but also a place where the unexpected always seems to happen. As we were about to pass from the sound into Lake Mabel, a severe electric storm accompanied by drenching rain and high wind suddenly broke upon us. We groped about until the close proximity of a bolt of lightning and an overpowering quantity of ozone brought us to our senses and we decided to throw over an anchor and wait.

After the storm passed, we proceeded into Lake Mabel, passed Fort Lauderdale, and went up to the source of New River at the rim of the Everglades and entered the North New River Canal. The water in the canal was exceptionally low owing to the prolonged drought. While entering the first lock the keel of the "Barbee" caught on the concrete sill amidships and there we hung, so nicely balanced that we were unable to move the boat forward or backward. We had to wait until the water rose sufficiently to float us,—perchance some boat ahead of us had gone through a lock many miles nearer the lake, or the tide may have risen.

Our real troubles, however, were only beginning. Again the low water and an imperfectly dredged channel delayed us. Before proceeding far we

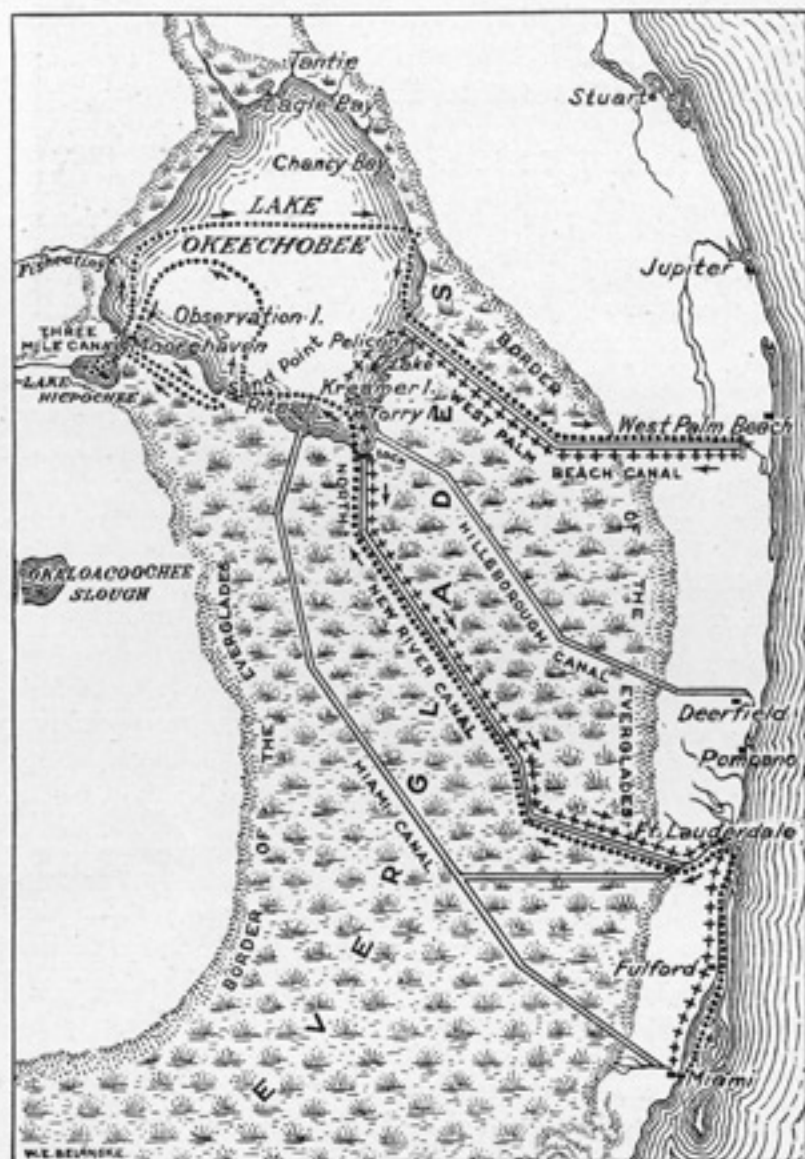
were compelled to reduce our speed to a minimum, for the stout bronze shoe on the keel of the "Barbee" began to touch projecting rocks along the bottom of the canal, and for a distance of

about forty miles we scraped rock after rock, causing as much friction on our nerves as on the shoe.

Had it not been for the ingenuity of our captain we should have had to abandon the cruise. He

created a ballast by pulling our row-boat aboard, setting it across the bows of the "Barbee," and filling it with water. This weighed down the bows, and thus elevated the stern with the propeller high enough to allow the boat to float safely above the rocky bottom. In order to counterbalance the delays and the loss of time caused by the reduced speed, we ran well into the night. Of course, plant collecting suffered neglect, but, fortunately, I had collected rather thoroughly along the banks of this canal in the fall of 1913.

After passing through the second lock, the sailing was smoother—at least



The southern part of peninsular Florida, showing about 120 miles of Atlantic coast, the narrow strip of high land adjacent to this coast, the area of the "Big Cypress" on the west, and the "Everglades" and Lake Okeechobee between.—The Everglades represent a wet prairie, partly dry in winter, submerged in summer, treeless except for the higher hammocks, like islands, along or near the borders, and the dense hammock surrounding Okeechobee (25 ft. above sea level). The region is impenetrable to travel, with no natural channels for navigation; hence the canals, four water highways from the coast across to Lake Okeechobee. When the channel is opened westward from Three Mile Canal and Lake Hippochee, the last link will be completed in a water route across this part of Florida.

The expedition went to Lake Okeechobee from Miami by way of Fort Lauderdale, as the Miami Canal is not completed; but it found that North New River Canal needs to be deepened. The expedition's boat was able to keep its propeller from scraping the rocky bottom only by means of a ballast on the bow. Return was attempted unsuccessfully by way of the West Palm Beach Canal.

At least parts of the Everglade and Lake Okeechobee regions should be made state or federal reservations for the benefit of future generations of Americans. Florida is behind other states of the Union in not having reserved any of its forests or other natural features (except Royal Palm Hammock, together with some of the adjacent Everglades, called "Royal Palm State Park")

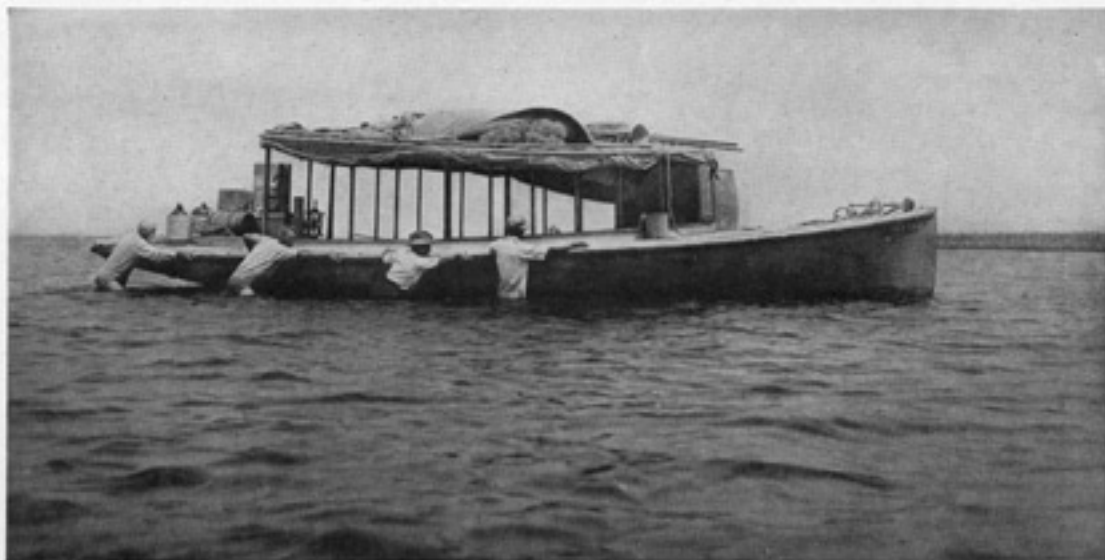


Looking into Lake Okeechobee from West Palm Beach Canal (see map, page 686), which has been dredged through a heavy sand ridge thrown up along this shore by westerly winds. Pond apple trees may be seen at the sides of the canal, and the tops of the cypress trees facing the lake are visible, rising above the pond apples

as far as the bottom of the canal was concerned. This lock is not a real one, but an improvised and homemade affair, and really a wonder! Each gate consisted of a score of separate pieces of planking which had to be handled piece by piece when the gates were opened and closed. But, fortunately, it dammed up enough water to float a

boat of three or four feet draft and thus keep it from striking on the bottom of the canal. The lock at the edge of the lake is in the same condition as in 1913—that is, the place where it is to be is marked out on the canal banks.

Upon entering the lake we were lost. The water level was from five to seven feet lower than it formerly had been,



Defying alligators and giant catfish in the dark waters, we gradually maneuvered the boat into a deeper channel a quarter of a mile to the northward. The expedition's party on the "Barbee" was democratic, sometimes all were officers—and sometimes all were crew, as when the boat struck this bank of putty-like mud near Kreamer Island. The "Barbee" was generously outfitted for the expedition by Mr. Charles Deering, of Miami. Besides the captain and a man who acted as crew and cook, there were three scientists aboard, namely, a conchologist, a horticulturist, and a botanist



Pond apple trees, and water hyacinths set with their beautiful spikes of blue flowers, clothed the margin of Pelican Lake for a distance of many miles in 1913. Water hyacinth attained here a most extraordinary growth, sometimes three or four feet in height, a size greater than ever recorded elsewhere. Whether the species is native in Lake Okeechobee or an introduction from South America, can probably never be decided.



Cypress trees (*Taxodium*) that fringe the hammock, their gray trunks and light green foliage outlined against a background of various broad-leaved trees. This is on the crest of the sand ridge just above the wide beach of the eastern shore. Land and vegetation are quite different here from farther south. Only a few small grasses and sedges grow on the sandy shore. Indeed, from certain plants found, it is thought that this was once a seacoast.

and instead of an uninterrupted expanse of water, great areas of lake bottom extended as far as the eye could see, with uncertain channels running here and there between them. We finally found our way into the lake between Kreamer Island and the southern shore and headed for Rita Island. On account of the low state of the water we passed the northern side of the latter island, and headed for Sand Point. Thence we attempted to pass between Observation Island and the mainland, but were confronted by a barrier in the form of a reef<sup>1</sup> of jagged rock extending from the island to the southern shore of the lake. It proved to be a ridge of rock placed nearly north and south at the southwestern corner of the lake, with Observation Island built up on the higher part. As the water stood at that time, the reef extended just under the surface for about nine miles north of Observation Island.

Darkness fell as we arrived abreast of Observation Island. We were bent on reaching the newly established settlement of Moorehaven, which is situated at the mouth of Three Mile Canal, a dredged channel connecting Lake Okeechobee with Lake Hicpochee. On the eastern side of Observation Island we were about twelve miles, in a direct line, from Moorehaven; but in order to reach it we had to sail many miles to the north to get around the end of the reef already described. Several times we imagined we saw the lights of the settlement in the distance, and subsequently learned that our observations were correct. Having been informed that there was a beacon at the northern end of the reef, we proceeded northward in the darkness, keeping along the edge of the reef by continual soundings. The beacon was supposed to be lighted at night, but after proceeding northward for a distance of nine miles or

more no beacon light hove in sight, and the night was too dark to see the beacon itself unless we had happened to run quite close to it. Just how many times we saw the light of that beacon in imagination it would not be safe to record. When we thought we were fully twelve miles north of Observation Island, the lights of Moorehaven were very evident in the distance, and we could distinguish the outline of the western shore of the lake above Fisheating Creek. Assuming that we had in some way succeeded in rounding the end of the reef, or at least that we were far enough to the northward to round it, we decided to run on a southwesterly course, which would take us to the mouth of a canal recently dredged in the lake for the distance of about eight miles northward of the mouth of the old Three Mile Canal. Successive attempts were made but each resulted only in finding shoal water. Finally we seemed to get into deeper water. We increased our speed, when, to our surprise, the stout keel of the "Barbee" struck a rock. The boat jumped the rock and came down twice on other rocks. We all watched to see the water come in through a hole somewhere in the hull; but none appeared. This incident, however, determined us to spend the rest of the night at anchor.

In the morning we found the much sought for beacon in the distance. After we rounded it, we reached the northern end of the canal without incident, except for an hour's delay on some mud banks during the regular morning squall and rainstorm. At the entrance to the canal our real troubles in navigation began again. Up to within several hundred feet of the canal was deep water and within the canal was deep water, but the bar of hard sand at the entrance was covered with only one or two feet of water.

An old boatman within the canal was watching for the stern-wheeled steamer "Osceola," which was three days over-

<sup>1</sup> This reef is the one I was on the lookout for in 1913, at which time we evidently sailed over it twice without observing it. *Journal of the New York Botanical Garden*, 15: 76. 1914.

due on a thirty mile run across the northern part of the lake. As we lay piled up on the sand bar the boatman told us that it was possible to get a boat across the bar by means of the proper combination of time and labor. So we began our task. First we resorted to our water ballast again, placed the rowboat across the bows and filled it with water. Then the engine was set going at full speed and all hands jumped overboard. By pushing and pulling and lifting, the "Barbee" was moved inch by inch, and after an hour or two of this violent exercise on our part she glided into the canal. Everybody clambered aboard, and we were off on the final tangent of our course to Moorehaven.

We had finally reached an extraordinary portion of the earth's surface. There was present neither soil nor rock! All the dry land was built up of pure humus. We were in a land of "peat." For many miles in all directions there was nothing but vegetable matter in all degrees of decomposition, derived from both herbaceous and woody plants. This accumulation of "peat" extends around Lake Okecho-bee. It is interrupted and partly obscured just back of the eastern shore by a sand ridge which represents the one-time bottom of the lake, blown out and piled up by strong westerly winds. At the southern and southwestern side the accumulation of peat is more massive than elsewhere, varying from three to fifteen feet in depth—or even more. Although this form of decayed vegetable matter is spoken of as "peat," the basis of true peat, sphagnum and the usual associated plants, does not enter into its composition. Furthermore, it is evidently not as acid as sphagnum peat, for all or nearly all cultivated crops may be grown on it in its virgin condition. No preliminary preparation is necessary, except the loosening up of the surface so that seeds may be planted.

The natural plant covering is the hardwood growth known in the southern United States as "hammock." The trees consist principally of cypress (*Taxodium*), strangling-fig (*Ficus*), pond apple (*Annona*), pop ash (*Fraxinus*), and elder (*Sambucus*). The growth is impenetrable except with the aid of a machete.

From the vicinity of Moorehaven around the southern side of the lake, the "peat" formation is remarkable. It resembles a gigantic sponge and walking on it is extremely tiresome. The mass trembles under foot with each step; yet, the concrete sidewalks, the houses, and other structures in Moorehaven are built directly on it.

We tied up to the bank of the Three Mile Canal in town for a time, then proceeded slowly down to Lake Hicpochee, where the canal terminates. This lake is a beautiful body of water to behold, with narrow and wide dimensions of about three and five miles respectively. It is the source of the Caloosahatchee River, and consequently one of the links in the chain of the transpeninsular waterway. We navigated our boat to about the center of the lake without difficulty, but out there we ran into a "Slough of Despond" of the most discouraging kind. This was a mass of black "gruel" of just the proper consistency to prevent the "Barbee" from moving forward or backward. To make things worse we could not move the boat by hand, as a pole pushed into the black mass would sink to an indefinite depth without appreciable resistance.

The propeller churned up this ink-black loblolly, with the aquatic plants, water moccasins, fish, and what not, without making progress. But a violent electric storm with high wind came to our assistance and blew us into a gruel of less dense consistency, and by degrees we drifted into deeper water, whence we were able to make our way back to the mouth of the canal. After



this experience we realized the force of the information which had been given us by an old boatman as we entered the canal north of Moorehaven. He told us we could not navigate the upper waters of the Caloosahatchee River on a shingle! We do not think he exaggerated.

Once back to the canal, we set to work gathering live plants and herbarium specimens. It was interesting collecting ground, not only on account of the various strange plants, but also because of the uncertainty of the footing. Of course, walking was out of the question except where the dredge had dug into the bottom of the lake below the "peat" and thrown out some of the sand underlying the decayed vegetable matter. Even on this coating of sand one could not tell when he would break through and, in the twinkling of an eye, find himself waist deep or up to the armpits in the black loblolly—as one member of our party can testify.

The intervening territory between Lake Hicpochee and Lake Okeechobee is a collector's paradise. Naturally, water plants and marsh plants are much in evidence. In the lower ground arrowheads (*Sagittaria*), pickerel weed (*Pontederia*), pennyworts (*Hydrocotyle*), persicarias (*Persicaria*), pond weeds (*Potamogeton*), eelgrass (*Vallisneria*), and naiads (*Naias*) predominate. On the higher land, wild cucumber (*Melothria*) was rampant, while two kinds of mallows dominated the landscape; curiously enough these plants of closely related genera did not occur much intermixed. In some places, acres of open land as far as the eye could see, were covered with an almost pure growth of a species of *Kosteletzkya* having rose-purple flowers, while at other places, areas equal in extent were similarly clothed with a rose mallow (*Hibiscus*) which bears myriads of large light-pink flowers.

We returned with the "Barbee" to the Moorehaven public dock for the night,

and the following morning set out afoot for an examination of the country between Moorehaven and Sand Point, about a dozen miles eastward on the southern shore of the lake and south of Observation Island. As we proceeded, the wonderful phenomena of the country gradually unfolded themselves. The natural features of that region are duplicated nowhere else, and unfortunately they are fast being destroyed. After about two years of the progress of civilization only remnants of the once unique pond apple hammocks and other plant associations are left. Moreover, we found many parts of the country afire. Over a large area fire had eaten into the "peat," and numerous subterranean fires were revealed by the smoke which came up through craters where the substratum had burned away and the superimposed "peat" and ashes had caved in. The same member of our party who the day before had fallen into the loblolly of Lake Hicpochee, fell into one of these craters and was partly buried in the hot ashes. Although this gentleman had never, either by word of mouth or action, led any of us to suspect that he believed in mediæval theology, he himself was now thoroughly convinced that if there was any place to be fallen into he was the predestinated man.

Fires were so numerous that the region might well be designated "The Land of a Thousand Smokes."<sup>1</sup> We had smelled the smoke that drifted eastward beyond the middle of the lake during the day and night we were hunting for the lightless beacon.

We passed through sections of virgin primeval forest, as well as through regions partly denuded and regions wholly denuded of all natural vegetation; thus we were treated to a panoramic view of all the stages of devastation. Following the final stage of destruction were

<sup>1</sup> With apologies to Professor Robert F. Griggs in *The National Geographic Magazine* for February, 1918.



#### ON THE PROTECTED EASTERN SHORE OF OKEECHOBEE

Hammock of this character once bounded the whole eastern shore of Okeechobee. Frosts, which sometimes devastate the western shore, do not touch the eastern, because the thirty-mile stretch of the waters of the lake tempers the prevailing westerly winds. In this sheltered region, therefore, the flora is more varied and of greater luxuriance, and harbors more tropical elements, both terrestrial and epiphytic. The hammock floor supports especially beautiful and abundant growths of ferns and fern allies of tropical nature. Little of such hammock is now left, however, and encroaching civilization and cultivation of the region for crops soon will erase the last vestige, losing to science, and to the people, the rich native plant life of this isolated part of the United States



One step in the process of making agricultural land out of dense hammock on the peaty shore of Lake Okechobee (south side of trail between Moorehaven and Sand Point)



Denuded of its luxuriant vegetation, the spongy "peat," from three to fifteen feet deep, needs little ploughing to prepare it for planting



This shows part of a potato field of 200 acres. The "peat," without the use of any fertilizer, may readily yield each year two or three harvests of truck crops, such as potatoes, beans, onions, tomatoes, and peanuts

fields of potatoes, tomatoes, onions, and other vegetables, hundreds of acres in extent.

In some places pond apple trees and



Imagine a weed twelve feet high, with a stem a foot across! The water hemp or "careless" (*Acnida*) is a pigweed which quickly takes possession of the exposed bottom of Lake Okeechobee or of cleared hammock. It attains its giant growth in a single season, producing some wood and reaching the proportions of a small tree

ferns existed in association to the exclusion of nearly all other woody and herbaceous vegetation. Other areas were densely clothed with an impenetrable growth of southern elder, which bears flowers and fruits continuously throughout the year. Here and there were groves of the pop ash (*Fraxinus*), or of the live oak (*Quercus*). The cypress was represented usually by isolated trees. This cypress, for some reason as yet unexplained, occurred in two forms. If the tree trunk was only slightly or not at all buttressed, very numerous "knees" were produced from the roots in the neighborhood of the trunk; while if the trees had developed prominently buttressed trunks, very few "knees" or none at all appeared. Another interesting phenomenon observed was the association of the strangling fig and the cypress. Not a tree of the cypress was observed that did not have accompanying it a strangling fig. This phenomenon was particularly conspicuous as the cypress was devoid of its foliage and the fig was in full leaf.

A few miles east of the settlement we unexpectedly met a friend with a horse and wagon, which he kindly turned over to us for the day. We were thus relieved from carrying our burdens, but did not tax the horse with our own additional weight, as he seemed to be more fatigued than we by walking in the spongy peat.

The lowering of the water in the lake had naturally lowered the water table in the "peat," which normally contained a very large percentage of water. Being deprived of this moisture, the "peat" had shrunk, and in many instances the root systems of the trees were clearly exposed, particularly in the case of the cypress, where the connected system of roots and "knees" was beautifully demonstrated.

The decayed vegetable matter of this region forms a "soil" in which the most rapid growth takes place, and several crops of cultivated plants may be grown

and harvested each year without the use of any kind of fertilizer. In many of the clearings intended for the planting of cultivated crops, annual weeds had appeared and were thriving. One native weedlike plant was conspicuous, a pigweed, botanically known as *Acnida* and popularly as "careless." This annual is a giant among weeds. It produces in one season a stem often more than twelve feet high and a foot in diameter. It is usually much branched, and bears myriads of flowers.

Soil, aside from mere decayed vegetable matter, however, was nowhere in evidence. We passed over areas of what had been formerly lake bottom, as well as the cleared forest lands, and found nothing but spongy "peat."

Later in the afternoon we collected on the prairie-like regions west of Moorehaven and also in the open places in and about the settlement, which probably a year or two before had been covered with saw grass. It was interesting to find how the garden flowers which the settlers had brought in

the previous year had taken possession of this untamed soil. Phlox (*Phlox Drummondii*), evening primroses (*Raimannia Drummondii*, *Raimannia laciniata*), blanket flower (*Gaillardia*), zinnia (*Crassina*), and the flower-of-an-hour (*Trionum*), all grew with greater luxuriance in this wild state than I have ever seen them in cultivation. As a result of growing crops, there had escaped from the fields alfalfa (*Medicago sativa*), tumble-mustard (*Norta altissima*), cowpea (*Vigna sinensis*), beggar-ticks (*Meibomia purpurea*), and several large grasses.

Having used up the time our schedule allowed for our work here, we reluctantly started back through the Moorehaven canal for Lake Okeechobee. In dredging this canal, which is really a channel in the lake, there have been thrown up high banks of a mixture of white siliceous sand and sea shells, a deposit that was formed when the region was the bottom of an ancient sea. Although this material did not seem to have any available plant food in its



Compare this picture of the shores of Pelican Lake in 1917 with the photograph on page 684, showing the same area five years before (1913). The hammock has been destroyed, the water has receded, the humus, dried and cracked, supports only a rank growth of coarse weeds. Vast tracts in this region will be devoted to agriculture, but certain selected areas of unique interest and value should be conserved under Government control.



**CYPRESS STRONGLY  
BUTTRESSED AND  
WITHOUT  
KNEES**

Cypress trees about Okochohee occur in two very different forms, each the result of an effort on the part of the tree, apparently, to obtain a stable anchorage in the spongy humus for the great weight of top growth. In one form stability is acquired through a cone-shaped growth of trunk, broad and buttressed below. In the other, small woody protuberances called "knees" are thrown up by the roots. Cypress in the Okochohee region is either buttressed or kneeed, rarely both. Pond apple trees often show the same sort of buttresses when growing in soft mud (see upper photograph, page 648).

The clinging roots against the trunk of this cypress are those of a strangling fig (*Picus aurea*), whose flat leathery leaves and dangling clusters of branches show against the feathery foliage and delicate flowers of the cypress. A flourishing colony of weeds has taken possession of the clearing. The edge of what is left of the original hammock appears in the distance. After no more than about two years' progress of civilization around Okochohee, only such remnants of the unique pond apple hammocks and other plant associations are left.



**A CYPRESS TREE WITH NUMEROUS KNEES AND LITTLE BUTTRESSED**

Fine branches seen among the cypress limbs are those of a strangling fig, which begins life in the form of a vine and depends upon the cypress for support. It is rare to find a cypress that does not harbor a strangling fig. This solitary cypress was photographed in a field recently cleared on the southern shore of Lake Okochee. In clearing land cypress is often left, perhaps only because so difficult to uproot

composition, luxuriant vegetation had sprung up on nearly every part of the banks. Prostrate herbs, among them *Bramia*, formed dense carpets; while morning-glory vines (*Convolvulus*) formed mats. Plumelike bonesets (*Eupatorium*) and a brilliant yellow coreopsis covered large areas. A score of other kinds of bright-colored flowers were in evidence nearly everywhere. A milkweed relative (*Philibertella*), a stout vine, with stems and branches seventy feet long or more, ran over the shores and banks in much the same way as the railroad vine (*Ipomœa Pes-Capri*) grows on the seabeaches.

At the mouth of the canal we spent several hours in lifting the "Barbee" over the bar, as we had done when we entered. After she glided into deep water, we sailed up to the vicinity of the mouth of Fisheating Creek and then headed eastward for a point on the opposite shore of the lake about midway between Chancy Bay and Pelican Lake, which course represented the widest part of Okeechobee. We were soon in ten feet of water and then made rapid progress to the eastern shore.

Owing to the low level of the water, there was a very wide sandy beach partly carpeted with grasses and sedges. The hammock begins about the top of the ridge with a fringe of cypress. Back of this is a dense growth of maple (*Acer*), holly (*Ilex*), ash (*Fraxinus*), and pond apple (*Annona*). The herbaceous plant cover is so complete that one rarely, if ever, sees the ground upon which he is walking. One of the more interesting herbaceous plants here is the climbing valerian (*Valeriana*), a delicate vine with clusters of small white or pink flowers. Liverworts, mosses, and ferns cover nearly all the ground about the trees and also a great part of the tree trunks themselves. Several kinds of tropical ferns occur in profusion, evidently owing to the protection afforded by the thirty-odd miles of water lying to the westward. Every-

where we had been, both in the Everglades and on the western shore of the lake, vegetation had been killed or severely damaged by the almost unprecedented "freeze" of the preceding February; but on the eastern shore and in the hammock swamps behind it, there was not the least sign of damage from the severe frosts, and vegetation was as fresh and luxuriant as it apparently had been for ages.

After sunset we weighed anchor and proceeded southward to hunt for the beacon that marked the entrance into the lake of the West Palm Beach Canal. Fortunately, this beacon was lighted and we had no difficulty in finding our way into the canal, where we tied up to the bank for the night. At sunrise we moved into the canal for a distance of a couple of hundred yards, where sand and humus were piled up higher than elsewhere, and went ashore to explore a magnificent hammock which clothed the ridge that gradually sloped off into the Everglades toward the east.

This hammock is picturesque beyond description. The trees for the most part are pond apple. The trunks are strongly buttressed, apparently thus developed so as better to maintain an upright posture on the soft mud floor. Herbaceous plants and vines are present in abundance. The most interesting vine is a species of dew flower (*Commelina*), which grows in mats and in dense masses, often with stems and branches more than half an inch thick, climbing into the trees to a height of from fifteen to twenty feet.

Here, too, the milkweed vine, instead of growing on the ground, climbed into the trees where it formed tangled masses of stems and leaves on the tree tops. We found evidence again, in the presence of several tropical species of epiphytic orchids on the pond apples, of the protection afforded by the waters of the lake against the cold westerly winds. The tomato grew wild in the hammock and was laden with myriads



of fruits no larger than a small cherry. Our cook gathered a supply from which he made us soup and stew, which we had for dinner as we started down the canal toward the eastern coast.

After we reached the Everglades several stops were made along the banks for collecting. The first was on the southern bank of the canal at the head of what was formerly Pelican Lake. Four years ago this lake was one of the most beautiful spots I had seen. When cruising in Okeechobee in 1913 we spent an afternoon and a bright moonlight night in Pelican Lake. Then it was filled with floating islands of the water hyacinth and water lettuce. It was surrounded by beautiful pond apple hammocks which were fringed with a growth of water hyacinth and water lettuce made up of plants more robust and larger than had previously been recorded. The hammock islands served as immense heron rookeries and the waters abounded in alligators of all sizes. Today it is a waste. The lowering of the waters of Okeechobee has changed these conditions and, instead of the paradise described, the exposed bottom of the lake as far as the eye could see supported a dense growth of the large pigweed "careless" (*Acnida*). The sight was disheartening.

Similar cases of unique areas that should have been preserved for future generations might be cited by the score. Many localities whose natural features are not duplicated elsewhere could easily have been made state or federal reservations, if the public officials had had the proper interest in such matters. In Florida, aside from Royal Palm State Park, there are no reservations for the preservation of the natural features, except those maintained by a few interested individuals, and a partly developed national forest. Steps for protection of selected areas should be taken at once by state or federal government. It is not yet too late to save much.

As we started down the canal a

plague of horseflies overtook us. No matter how many we killed, their numbers seemed to increase. We passed through still another plague: the Everglades were covered with a moving mass of giant grasshoppers, known in some southern localities as "devil's horses." They are from three to five inches long, with stout yellow and black striped bodies. They are too clumsy to fly and their walk is decidedly awkward, and if birds did not dislike them for some reason, they would furnish a large food supply. The assemblage was moving northward. In many places the southern bank of the canal was a living mass, with myriads of grasshoppers in the rear pushing those ahead into the water where most of them were drowned. The few that reached the northern bank passed on into the Everglades.

Late afternoon found the "Barbee" approaching the pine lands back of West Palm Beach. At that point we came upon a large dredge that blocked the canal. Two boats that had preceded us were also held up. The dredge occupied the width of the canal and was in the act of digging a channel by its side to let the boats pass. While we were waiting for the completion of this channel, we were informed that the canal ahead was closed, that the county officials at West Palm Beach, wishing a road across, had filled in the canal and carried the county road over instead of building a bridge. In the face of such brilliant engineering work, there was nothing left for us to do but to turn around and retrace our course through the Everglades.

Although we had seen a part of the Everglades which would have been denied us had we known in advance that our course was blocked, we were exasperated at the loss of time, and decided not to stop until we reached Lake Okeechobee again. By continuous running we came to the end of the canal sometime between midnight and daybreak.

After a few hours' rest we set out to

hunt for the mouth of the canal to Fort Lauderdale. The channel between Kreamer and Torry islands was too shallow to be navigated and we were forced to run to the westward of both. Even out where formerly there had been deep water we found only enough to float the "Barbee," and all the way to the southern end of the lake we slid slowly along the smooth mud bottom, which was almost as level as a floor. At last a beacon hove in sight and we thought our troubles had come to an end, but as we neared it and turned into the indicated channel we ran up on a mound of putty-like mud. We decided that it was best for all members of the party to jump overboard and walk in different directions until some one should step into deep water. Thus, defying alligators and giant catfish, not to mention other strange animals that might have been prowling in the dark waters, we walked about that part of the lake until one member of the party reported deep water a quarter of a mile to the northward. We gradually maneuvered the boat into this deeper channel and finally found our way to the head of the canal leading to Fort Lauderdale.

As we entered the canal, truck growers begged us to carry their vegetables to Fort Lauderdale; but we could not assist them owing to the shallow water. After we passed through the first lock, in spite of our improvised water ballast, the keel of the "Barbee" repeat-

edly scratched the tops of submerged rocks. When we were within a few miles of the lower lock, although running at slow speed, the keel struck a rock a glancing blow. This turned the boat toward the side of the canal, where the propeller hit a rock with force sufficient to bend the shaft. The bend was not sharp enough to prevent the shaft from revolving, but each revolution was accompanied by an irritating thud. In this condition we crept along to the lock, where we tied up for the night, and in the morning made Fort Lauderdale by running the engine at the lowest speed possible as well as by taking advantage of the slight current of New River.

In order to save a day's time for further field work and to care promptly for the specimens we had collected, we telephoned to Buena Vista for an automobile. As soon as it arrived the party divided, and several members with the perishable specimens hurried to Miami, while others spent the day taking the boat down the coastwise canal.

From the scientific standpoint the cruise was successful beyond anticipation. The vegetation and structure of a part of our country which is nowhere duplicated were studied. Many geological data were discovered from the deposits of fossil marine shells, and a series of photographs obtained of scenery and of plant associations which in the near future will have ceased to exist.

