



Frontispiece—On the Thlatopopkahatchee-Fisheating Creek—in the Indian Prairie. There nature doubles her charms. Great variety in the vegetation marks the stream's course through the prairie. Commonly a grove of cabbage-palms borders the stream. Then a cypress-head as shown on the left-side of the illustration, may appear. On the right may be seen prairie or marsh, a pine grove, and in the distance a sweet-bay hammock. All is mirrored in the water. The surface of the stream abounds in floating islands of water-hyacinth which in some places unite into unbroken floating meadows.

OLD TRAILS AND NEW DISCOVERIES

A RECORD OF EXPLORATION IN FLORIDA IN THE SPRING OF 1919

With Plates 253 and 254

Exploration of new and little-known parts of Florida which had so greatly enriched our knowledge of the *Opuntiae* thereabouts in recent years, convinced the writer that there was also much more to be learned in that State than was known prior to 1918, concerning the cacti of the *Cereus* group. His attention was directed especially to the genus *Harrisia*, for there was evidence of its occurrence in many parts of both the southern half of the Florida peninsula and on the keys. As this evidence had a timely importance, moreover, in view of the monograph of the genus *Harrisia* contemplated by Doctors Britton and Rose, it was deemed worth following up without delay. We therefore organized a cactus-hunt. The Board of Scientific Directors of the Garden approved. Mr. Charles Deering, to whom we are already so deeply indebted, once more put launch and automobile at our disposal for the field-work. And it is thus that we are able to make the following report on botanical exploration of Florida in the early months of 1919.

We were enroute for Miami, Florida, the last week in April.

The season in the North was backward; but, even so, the shrubs and trees had begun to don their green, either singly or en masse; various water-plants, both broad-leaved and narrow, were expanding their foliage above the surface of the ponds and streams; and many flowers were in evidence all along the way.

Among our native shrubs in bloom, the spice-bush (*Benzoin*) and the shad-bush (*Amelanchier*) were conspicuous, while the cultivated trees were conspicuously represented by the apple (*Malus*), the pear (*Pyrus*) and the peach (*Amygdalus*). The herbaceous plants that attracted the eye readily along the way in their respective habitats were bloodroot (*Sanguinaria canadensis*), buttercups (*Ranunculus*), fire-pink (*Phlox subulata*), may-apple (*Podophyllum peltatum*), false meadow-rue (*Syndesmon thalictroides*) and various naturalized weeds that grew in cultivated fields and along the fence rows.

South of Philadelphia, and particularly south of Washington, vegetation appeared much more advanced. There, for several hundred miles, the Japanese honeysuckle (*Nintooa japonica*) was the naturalized plant most in evidence. This often much-abused vine seems to be excellent for holding sloping roadsides and railroad embankments; and, in addition to being evergreen or nearly so, it usually has a quite continuous flowering season, or several flowering seasons, except in mid-winter.

In western Delaware, pine trees had appeared; first the poverty-pine (*Pinus virginiana*), then the pitch-pine (*Pinus rigida*). The most conspicuous evergreen shrub accompanying these in the fall-line hills of Maryland was the calico-bush or mountain-laurel (*Kalmia latifolia*). Although not in flower, the numerous deep-green leaves, of the same fresh glossiness all the year round, made the plant notable. Thence, on down into Florida, one may observe not less than seven additional kinds of pines, or nine kinds altogether. It was always striking, where pine trees and broad-leaved trees grew associated, to see how different were the greens they presented—the greens of the broad leaves so bright and, as one might say, joyous; those of the pines so dull and sombre.

In Virginia and the Carolinas spring had progressed apace. Here meadows and pastures often supported so copious a growth of dandelions (*Leontodon Taraxacum*) that the myriads of flower heads suggested a carpet of gold; while other pastures were so thickly overgrown with a winter-cress (*Barbarea*) that, because of the particular yellow of its flowers, they seemed sheathed in brass. Also there were old fields here and there that seemed to be covered with a bluish mist, an optical illusion, caused by the myriads of the small blue flower of the toad-flax (*Linaria canadensis*).

Thus we took a fleeting wild-flower census: violets (*Viola*), dewberries (*Rubus*), phlox (*Phlox*), wild-strawberries (*Fragaria*), pitcher-plants (*Sarracenia*), fleabanes (*Erigeron*), bladderworts (*Utricularia*), Virginia-cowslip (*Mertensia*), sneeze-weed (*Senecio*), flags (*Iris*), beard-tongues (*Pentstemon*), false-indigo (*Baptisia*). These were the more conspicuous. But also the woods were gay with dogwood (*Cynoxylon*), sweet-bay (*Magnolia*) and viburnums. Here, too, the ground was covered, often by the acre, with a beautiful white or pinkish azalea usually not more than a foot tall.

That old favorite of the South, the cultivated China berry (*Melia Azaderach*), was in bloom; and curiously enough, several weeks later I found it in the same condition in tropical Key West.

Nor were the palms wanting in this plant panorama, once we were in South Carolina. First we saw palmetto (*Serenoa serrulata*), then the blue-stem (*Sabal Adansonii*), and finally the cabbage-tree (*Sabal Paimetto*). With the exception of the needle-palm (*Rhaphidophyllum Hystrix*), the above-mentioned palms represent all the kinds that are found north of peninsular Florida. In Florida, however, nine other kinds grow naturally, these often represented by countless individuals.

Two interesting conditions were observed in passing through the various swamps. First: in the numerous swamps away from rivers, the early flowers of the spatterdock or bonnets (*Nymphaea*) and the water-lily (*Castalia*), seemed to be smaller than the later flowers, a condition usually, if not always, the reverse with our common herbs, where the early flowers are found conspicuously larger than the succeeding ones. Second: in the river swamps or bottoms, or the dry or partly dry plain between the river and the former banks of the river, at ordinary low water, hickories (*Hicoria*), oaks (*Quercus*), gums (*Nyssa*), maples (*Acer*), and elms (*Ulmus*), as well as the cypress (*Taxodium*), all develop conical bases or buttresses, evidently so as to make a more extensive root system for anchorage in the alluvium, particularly in seasons of high water.

Also, in depressions in the districts of little elevation, we observed groups of trees of the black-gum (*Nyssa biflora*) similar to those of the pond-cypress (*Taxodium ascendens*) in similar situations called cypress-ponds. The ponds with these dis-

tinctive groups of gum-trees may be called "gum-ponds." An investigation of their flora would doubtless be interesting.

The most attractive spring-flowering plant in all the swamps is the native wisteria (*Krauhnia frutescens*). This is a woody vine that climbs into the shrubs and trees and bears numerous drooping clusters of beautiful blue flowers. This species and another, which occurs in the Mississippi Valley, are the only representatives of the genus in the New World. The other species occur in eastern Asia.

With northern Florida, the chromatic scale and seasonal sequence of "the flowers that bloom in the spring" came to an end. The Florida flat-wood and the minor plant-regions have rather little to show, at a distance at least, with the changes of the season and latitude.

We reached Miami during the last week of April. The greater part of May was spent in the field. I was accompanied by Mrs. Small, who cared for the herbarium specimens incidentally collected. With the permission of Dr. David Fairchild, we established our field-headquarters in the laboratory building of the Plant Introduction Garden of the United States Department of Agriculture, in Miami.

Experience in the field and information gathered from time to time indicated five promising regions in Florida for discoveries in the genus *Harrisia*: (1) the sand-dunes along Saint Lucie Sound; (2) the islands of Tampa Bay; (3) the Cape Sable region, including the Madeira Bay district to the east and the Ten Thousand Islands to the north; (4) the Upper Florida Keys; (5) the Lower Florida Keys.

We took the field almost immediately after reaching Miami, and thereafter our active field-day, both on land and on water, almost invariably lasted from sunrise to midnight.

MIAMI AND TERRA CEIA ISLAND

We first set out for the mouth of the Manatee River, our objective being Terra Ceia Island in McGills Bay. Our course lay along the eastern coast of the State as far north as either Jupiter or Fort Pierce. Various plant associations were traversed over this course.

First, the pine-woods are dominant. Of course, creeks with their bordering hammocks or prairies were crossed from time to time.

Then, north of the settlement of Hallandale, the "scrub" appears. This plant association occupies a formation of almost snow-white sands which are evidently ancient, now stationary, dunes. The southernmost dunes are low and nearly flat, but northward they become more undulating, and finally a few miles north of West Palm Beach, become conspicuous hills. Yet, to one's great surprise, among these hills, which attain a considerable elevation for that region, are situated a number of large cypress heads, some of which extend nearly or quite to the coast.

The characteristic tree of the "scrub" is the spruce-pine (*Pinus clausa*), but in its southern extension one finds a mixture of the Caribbean-pine or slash-pine (*Pinus caribaea*) and the sand-pine, or sometimes the Caribbean-pine exclusively. The conspicuous shrubs of the "scrub" are the saw-palmetto (*Serenoa serrulata*), the rosemary (*Ceratiola ericoides*), the prickly-pear (*Opuntia ammophila*), a heath (*Xolisma speciosa*), and scrub-oaks (*Quercus*). Various, but not numerous, herbs, both coarse and delicate, are associated with the shrubs, and vines are present. Among the latter a parasite (*Cassytha*), resembling the dodder in habit and color but really related to the laurels, is by far the most conspicuous. It commonly grows so luxuriantly that it actually smothers the shrubs, sometimes over large areas.

In the marshes among these dunes, and in and about the ponds, there was an abundance of aquatic and semiaquatic plants chiefly with yellow flowers. A score of yellow-flowered plants might be mentioned to one showing a different hue. One of the more conspicuous, although in no way showy plants was a tall sedge (*Dichromena latifolia*). This grew scattered or in colonies. The stalk was inconspicuous or invisible from a distance; but the whorls of long ghostly-white bracts at the top of the stalk were very conspicuous and suggested, especially toward dusk, so many little will-o'-the-wisps. It is one of the few sedges in which fertilization is accomplished through the agency of insects.

The old settlement of Jupiter, eighty-three miles north of Miami, was soon reached. There we had to decide whether we would strike out for the Okeechobee region over the old Fort Bassinger trail which was used during the Seminole Wars,

or drive further north to Fort Pierce to enter the Okeechobee country. Inquiries not bringing forth any definite information, as usual, we decided, as we had already been over the Fort Pierce route, to try the Fort Bassinger trail, with Okeechobee City fifty odd miles to the northwest and Fort Bassinger about twenty miles further on along the Kissimmee River.

For the distance of a few miles the trail had been improved by surfacing the more or less improved grade. We passed beyond the "scrub" and the high pinelands, then crossed some streams with rich bordering hammocks.

We now approached "Hungry Land," so-called, they say, because a herd of stolen cattle were here penned up and allowed to starve, when the frightened thieves fled. But, in any case, it is well named. It is a desolate region east of the Saint Lucie slough; not like the general surface of the earth, one-third land and two-thirds water, but—well, to be charitable—say half land, half water. The more conspicuous plant associations were cypress-swamps, ponds, prairies, and low pine woods.

The ponds were partly dried up, but only to be so for a few days, as will be noticed on a subsequent page. Most of them, both as to the dry edges and the shallow water, supported a marvelously copious growth of the erect bladderwort (*Stomosis juncea*). Acre after acre was almost a pure growth of the plant, inconspicuous in itself, but very conspicuous in such masses.

Another phenomenon that attracted our eye particularly was the numerous small pine trees, two or three years old, springing up among the cypress trees in the cypress swamps. They seemed out of place. Perhaps the lowering of the general water-table, consequent upon the decided lowering of the water of Lake Okeechobee, has brought about conditions permitting these pine trees to grow where formerly it was too wet.

After several hours in Hungry Land we came to the Hungry Land slough, which seems to represent the boundary line between two geological formations, namely: the Palm Beach Limestone and the Pleistocene. This slough, with its extensive hammocks, geographically separates Hungry Land, which lies between it and the Atlantic Ocean, and the Allapattah Flats, which lie between it and Lake Okeechobee.

We crossed the slough, which has lately been dredged as part of the Saint Lucie Canal, on a ferry, and entered the Allapattah Flats. Here the ground soon became noticeably higher than that of Hungry Land, and the landscape was enlivened with bush clovers (*Petalostemon*), devil's shoe-strings (*Galactea*), thyme (*Pycnothymus*), grass-pinks (*Sabbatia*), asclepiads (*Asclepiadora*), bonesets (*Eupatorium*), goldenrods (*Solidago*), asters (*Aster*), and thistles (*Cirsium*).

These "flats" have long been a rendezvous for the Cow Creek Indians and we soon could discern many camps in the distant pine wood towards the west and an occasional Indian walking, or riding on horseback through the woods. The land continued to rise and the pine trees became more scattered. Then open stretches appeared, and, finally, the trail led out to an extensive prairie. Far to the west we saw a long, evidently tall hammock, but in this flat country one would have almost sworn that this was a range of hills.

We had not time to stop for an examination of the flora of the prairie, but two shrubs were particularly noticeable. Parts of the prairie were covered with a dense growth of the wax-myrtle (*Cerothamnus*), the bushes ranging from one to three feet tall. Other areas were covered with a small oak, usually only six to ten inches tall—this lack of visible development probably made up for by an extensive growth underground.

At a fork in the trail we decided to take the left hand or westerly branch, as it seemed to lead toward the distant hammock. Although we had several times seen this hammock from the other side and had been in it, its identity at this time did not dawn upon me. On approaching it we saw that the trail led through it. When part way through the timber we could look beyond the cut into space, and a little further on a vast sheet of water appeared. It was Lake Okeechobee! We drove out onto a beach which only a few years ago was still the bottom of the lake. More than that, we were soon actually driving over the very course we had sailed over five years previously¹ in a forty-five foot cruiser!

But how much everything had changed since that time! Instead of a natural beach close to a primeval hammock, we

¹ Journal of the New York Botanical Garden 15: 69-79. 1914.

found several hundred yards of exposed new weed-clothed lake-bottom, down from the old beach line; and as for the hammock, it was wrecked. Fire had been in it, perhaps more than once; and, in many places, instead of the once magnificent verdure, one saw only dead giant cypress trees, standing desolate, or prone in the wholly or partly burned humus where once had thrived an almost impenetrable mass of ferns and other herbaceous plants.

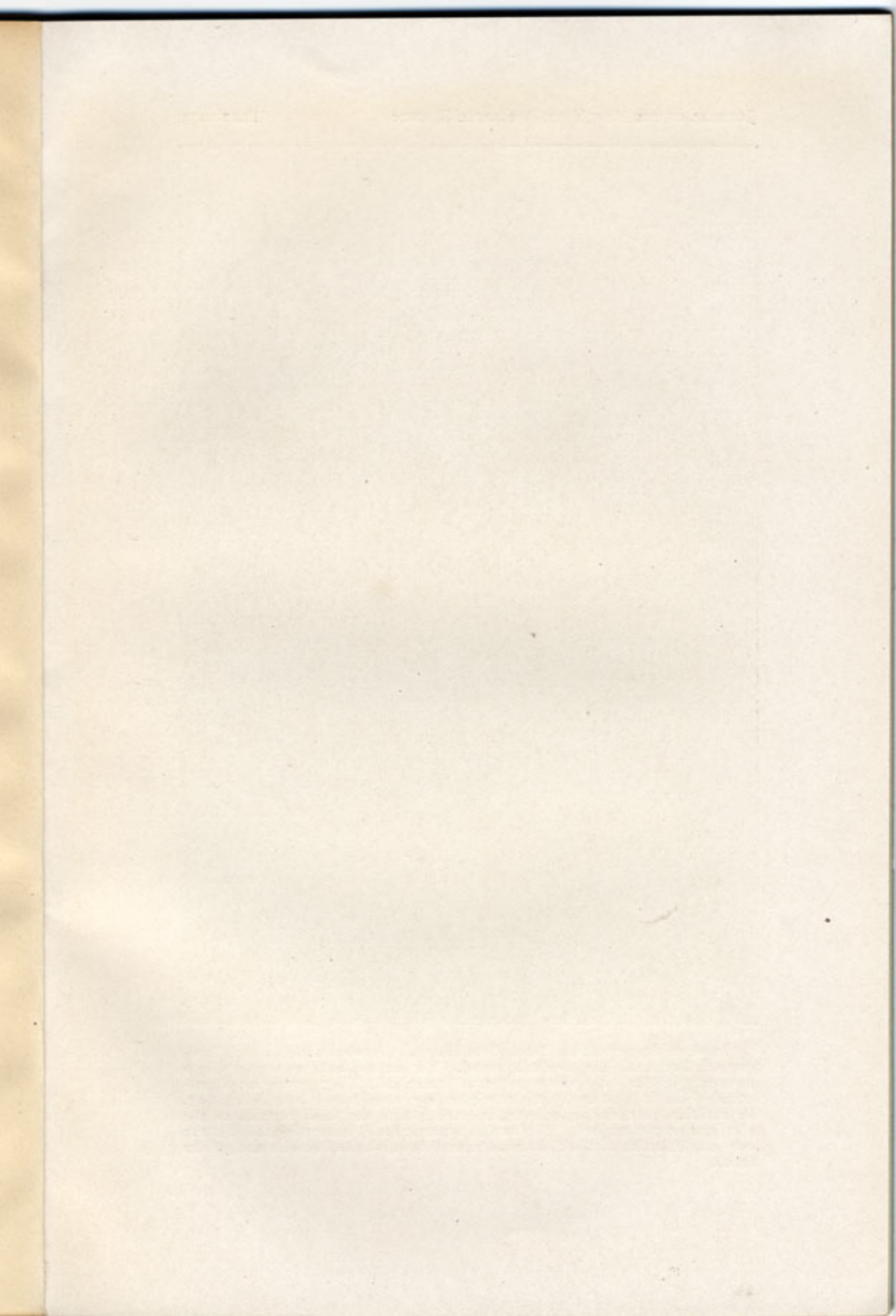
Sixteen miles over the former lake-bottom and through a portion of the destroyed hammock brought us to Okeechobee City.

Early the following morning we set out for Bradentown, nearly two hundred miles further on. We continued on the Fort Bassinger trail to the Kissimmee River, and thus on to Fort Bassinger itself, a course we had already traversed in the opposite direction one night last December.¹ Covering it in daylight, however, gave us quite a different impression of the region. The scattered pine trees north of Lake Okeechobee soon gave way to open prairie flanked in the far distance by pine-woods or hammock, east and west. The higher parts of the prairies were mostly grass-clothed, while the lower portions were clothed with almost a pure growth of flag (*Iris*) as far as the eye could see. The flags were mostly past flowering and bore clusters of cucumber-like capsules, the weight of which had borne the weak flower-stalks to the ground.

Seldom did the trail fail to yield something of interest. About half-way to Fort Bassinger we passed a cypress-head which served as rookery for a flock of wood-ibis, and many of these beautiful birds were roosting on the trees, shining whitely against the shadows.

It was midway to the Kissimmee River that growth of scattered pine trees, small cabbage-tree hammocks, and live-oaks appeared, albeit the land continued low. Further north there was an extensive growth of myrtle (*Cerothamnus*), gallberry (*Ilex*), heath (*Xolisma*), and scrub-oak (*Quercus*), as well as considerable turf. On approaching the Kissimmee we found curious circular areas of saw-palmetto (*Serenoa serrulata*) and

¹ Journal of the New York Botanical Garden 21: 25-38, 45-54. 1920.





In shore hammock on Terra Ceia Island. *Harrisia aboriginum* in foreground; hammock-jungle in background. The cactus plants are usually fifteen to twenty feet tall, and commonly much branched. They grow in a soil composed of shells piled up by the aborigines and sand blown in from the bay. In addition to these ingredients, in some places the fossil remains of the aborigines are abundant. The cactus is particularly interesting, as it is the only one this side of the Gulf Stream with brown-haired flowers and yellow fruits.

small persimmon trees (*Diospyros Mosieri*)¹, and groves of live-oaks that looked almost like apple-orchards.

Then after crossing the wide flood plain of the Kissimmee we came to the shallows and blind channels of the river. These were choked or carpeted with dense growths of aquatic grasses (*Panicum*), pond-weeds (*Potamogeton*), naiads (*Naias*), and arrow-heads (*Sagittaria*).

The settlement of Bassinger lies east of the Kissimmee, while Fort Bassinger proper, of Seminole War times, was on the western side of the river.

Crossing the river west of Bassinger, we left the Okeechobee prairie and were soon on the Istokpoga prairie, traveling east and north of Lake Istokpoga, a little-known body of water about ten miles in diameter. We then crossed Istokpoga Creek, which connects the lake of the same name with the Kissimmee River, and is apparently the only outlet of the lake. It is lined with beautiful hammocks. The dense hammock about Lake Istokpoga itself, plainly visible in the distance, is a botanical storehouse, as yet wholly unexplored. We do not even know whether its arboreous growth is coniferous (cypress) or broad-leaved, or both. After circling many miles toward the west and crossing a creek flowing from Lake Arbuckle into Lake Istokpoga, we met the pine woods again.

A meandering trail soon led us to a most insignificant stream apparently, but this stream proved to be the boundary between two conspicuously distinct geological formations; for thence the trail entered immediately a series of curious old sand-dunes wholly unlike the lands we had left. These dunes ran in somewhat parallel ridges, now close together, again separated by extensive "parks"; and the sand, although snow-white and loose, supported a veritable flower garden. In general, the region forms a watershed, the streams on the eastern

¹*Diospyros Mosieri* n. sp. A tree seldom as large as *D. virginiana* or commonly shrub-like; differs from *D. virginiana* in the smaller flowers, the staminate only about one-half as large, the short and broad calyx-lobes, the stouter stamens, and the short, broad, turgid seeds. The type specimens were collected in pine woods near the Humbugus Prairie, west of Little River, Florida, in fruit, by J. K. Small, C. A. Mosier, and G. K. Small, No. 6927, July 8, 1915; in dead ripe fruit, by C. A. Mosier, November 1917, and in flower, by J. K. Small, April 1920.

side flowing into the Okeechobee basin, those on the western side forming tributaries of the Pease River. Curiously enough, the backbone of this plateau has a chain of large and small lakes on it, the magnet of several settlements.

After crossing a series of other ridges we came to Sebring. Thence we traveled northward on the plateau to Avon Park. Another leg of our course westward brought us into the valley of the Pease River at Zolfo Springs.

In the intervening country we found small forests of the persimmon in full flower. South of Zolfo Springs terrestrial orchids (*Limodorum Simpsonii* and *Gymnadenopsis nivea*) appeared in the marshes for the first time since we left the eastern Okeechobee region. As for the pine woods, the conspicuous plant here was a curious yellow-flowered legume called *Chapmania*. This has a deep-seated, woody root and a slender wand-like stem, bearing yellow flowers whose petals do not at first sight suggest a papilionaceous corolla at all. It was named for Dr. A. W. Chapman,¹ long a resident of Florida, and the first botanist to construct an interpretation of the flora of the southeastern United States. The hammocks of the valley were fragrant with the sweet-bay (*Magnolia virginica*) and numerous herbs and shrubs were in bloom, notably the tall blackberries (*Rubus*) and the wild purple leather-flower (*Viorna crispa*). Following the valley southward for about twenty miles, we arrived at Arcadia.

Although we had traveled many miles to the west, we were still over forty miles in a bee-line from the coast of the Gulf of Mexico. Incidentally, the intervening country is essentially unsettled and is accessible by a very poor trail.

We soon crossed the Pease River and once again struck into the wilderness. Two settlements are on the trail between the Pease River and Sarasota on the Gulf, according to the map,

¹ Alvan Wentworth Chapman (1809-1899) was a graduate of Amherst College who went to Georgia as a teacher, studied medicine there, and soon afterward entered upon the practice of his profession in Florida. For more than half a century his home was at Apalachicola, where he died in his ninetyeth year. His "Flora of the Southern United States," first published in 1860, and running through several editions, was for nearly fifty years the only manual of the flowering plants of the southeastern states.—JOHN HENDLEY BARNHART.

but these are barely visible to the naked eye. The region is wild and lonely, bisected by the Myakka River with its wide prairies. On either side of the prairies are unpeopled pine woods. And through all of this runs a trail that is mostly sand, sand that is very loose and often deep. The sand was various in color; and there, instead of the snow-white sand forming ridges, it filled the low places. But all of it was hard to travel through. At many places, to use the language of the country, our motor seemed "powerful weak." Still, we did manage to crawl along. Night was coming on.

Several miles beyond the tiny settlement of Myakka, when it was dark, we found that we had missed the trail and that we were on some sort of an indigenous branch trail, so common to the country. Perhaps the branch would lead back into the main trail, as branches often do. We continued. It was very dark, but the stars were out. By the stars we could tell that we were traveling not west, toward our destination, but south into a still more savage wilderness. We persevered, and at last were rewarded, or so we thought, by seeing several bright lights to the westward, then yet another branch trail that would lead us there.

But our lights—alas!—merely betokened a forest fire.

The fire was extensive. It had curiously run into about a dozen lines, and each of these lines cut the trail with a hurdle of flame. But we could not, or would not, turn back. We took some photographs, then beat out enough of the flame to make a safe passage for our extra supply of gasoline, and went ahead.

Several miles of meandering through the dark woods brought us eventually back into the main trail, and thus, in due time, other and less sinister lights appeared ahead. They were the lights of Sarasota. After that, plain sailing, the highway to Manatee, another's hour's run, and we were in Bradentown, our objective. An eleven o'clock supper, then bed.

According to prearranged plans, the following morning found a motor boat ready to carry us to McGills Bay and Terra Ceia Island. Before we started we were joined by Mr. Alfred Cuthbert, who generously entertained us during our stay in that part of the country.

Cactus plants, an abundance of prickly-pears (*Opuntia Dillenii* and *O. austrina*), came into evidence as soon as we landed on Terra Ceia Island, but these were not what we sought. While wandering about in the woods we came upon a cabin, and a girl who lived there said she thought we would find other cacti further up the shore. Also, she volunteered to guide us past the "dead bodies" in the trail! We followed. The bodies were there, sure enough, but only skeletons, happily. They were the fossil remains of aborigines dug from a shell midden in making a drainage ditch.

Terra Ceia Island itself is a vast kitchen-midden, or ancient artificial shell heap, built up by the former inhabitants with their discarded oyster, clam, and conch shells. The bones we saw, evidently strongly impregnated with lime, were in a good state of preservation. The skulls were particularly interesting. Many of us have been taught that a diet of sea-food, particularly develops the brain. Now these ancient people lived largely, perhaps wholly, on fish and "shell-fish"; but from what we know of their history they were not intellectual giants. Their diet did evidently develop their heads, however. The skull-bones of the specimens we observed varied from one-half an inch to nearly three-quarters of an inch in thickness.

After this venture in archaeology, we broke into the hammock at several points and soon found our prize, a tall columnar night-blooming cactus with stout stems growing to a height of twenty feet. It proved to be a new species of *Harrisia*,¹ differing from all the other known Florida kinds in having brown wool and yellow fruit, the other kinds having white wool and red fruit. Fortunately, we secured one flower-bud about to open and one ripe fruit. The fruit was mailed directly to the Garden for painting, while the bud was taken to Mr. Cuthbert's house, where we sat at the festive board from six o'clock till midnight, shortly before which the bud opened and we secured a description of the flower. More closely than in any of the other Florida species, the flower-limb resembles the expanded flower of a water-lily.

¹ This species was named for the prehistoric inhabitants of that region, *Harrisia aboriginum*, and published in THE CACTACEAE 2: 154. 1920.

A botanical survey of Terra Ceia Island would doubtless prove interesting in other respects. Its flora has more tropical elements than any of the neighboring islands. It is probably the northern limit of the Gumbo-limbo (*Elaphrium Simaruba*) on the western coast, which species is represented there by a group of very large trees. Armed shrubs were much in evidence. The cat's-claw (*Pithecolobium*), the wild-lime (*Zanthoxylum*), the nicker (*Guilandina*), the devil's claws (*Pisonia*), the prickly-pears already mentioned, and other spiny plants often made the hammocks almost impenetrable.

Having accomplished our purpose we set out for headquarters, Miami, early the following morning. Instead of returning by the route we had just been over, however, we set out in the opposite direction, heading for the Tampa region. One reason for our selection of this route was a possible visit to the fern-grotto described in a former paper,¹ and which should have an interesting spring flora, besides being a remarkable fernery. But after driving north of Plant City for several miles we found the highway in such abominable condition that lack of time forced us to abandon this itinerary. Somewhat discouraged, we turned back and started through the southern end of the lake region.

West of Plant City we observed several ridges of "scrub." East of it were hammocks with oaks (*Quercus*), hickories (*Hicoria*), and red-gum (*Liquidambar*), prominently developed. Of course, there were pine woods and a mixture of pine woods and oak woods.

Evening found us again at Avon Park, which is situated in a very interesting floral region.

One locality just west of the town attracted our attention particularly. It was a park-like area between hills. The ground was thickly covered with an intermingled mass of a morning-glory (*Stylisma*) and toad-flax (*Linaria floridana*). The conspicuous shrubs at the height of their flowering season were a large-flowered prickly-pear (*Opuntia ammophila*) and the largest-flowered papaw (*Asimina obovata*). The adjacent hills were, moreover, in places yellow with the numerous flowers of a rare false-indigo (*Baptisia LeContei*).

¹ Journal of the New York Botanical Garden 21: 25-38, 45-54. 1920.

The following morning we continued our journey eastward and soon came to the crest of the sand-plateau referred to in a preceding page. There we made our first extended stop for collecting miscellaneous plants. The pine of those ancient dunes was not the spruce-pine (*Pinus clausa*), the normal tree of such dunes, but the long-leaf pine (*Pinus palustris*). The broad-leaved trees were mostly represented by the turkey-oak (*Quercus Catesbaei*) and a kind of hickory (*Hicoria*). Shrubs were more numerous than trees, both in kinds and quantity. In this category may be mentioned the scrub-plum (*Prunus geniculata*), our smallest and latest discovered eastern plum, at this time not only past the blooming season, but also without fruit. Associated with the plum was a curious kind of titi (*Cyrilla*) just coming into flower. The only two genera of the Yucca family east of the Mississippi River were represented by *Yucca filamentosa* and *Nolina atopocarpa*. Dozens of different kinds of herbs were in full flower with a great range of colors, but the most showy plant, both in quantity and color, was the blue lupine (*Lupinus diffusus*). This plant was in evidence everywhere in high pineland and was particularly conspicuous on account of its silvery foliage and sky-blue flowers. The most interesting vine of the sand-hills was the small bullace-grape or muscadine (*Muscadenia Munsoniana*). This widely distributed grape of southern Florida usually has leaves from two up to four inches in diameter, but the plants we found on the sand-hills had leaf-blades almost uniformly with a diameter of less than an inch.

New plants were not wanting. There were not only new species, but a new genus was represented by an abundance of a prostrate shrub.

One particularly attractive new species of uncertain relationship, with the habit of a yellow-flax (*Cathartolinum*), was abundant in the white sand. The new genus to which reference has already been made¹ was found with both flowers and ripe fruits. It belongs to the knotweed family and is related to the genera *Polygonella* and *Thysanella*.

Examinations of those ancient dunes at successive seasons would doubtless yield additional novelties, for the seasonal

¹ Journal of the New York Botanical Garden 21: 48. 1920.

periods of the plants, particularly annuals, under the desert conditions prevailing there, are evidently exceedingly short.

A spiderwort (*Tradescantia*), perhaps new, should be mentioned here on account of the delicious violet-fragrance of its bright-blue flowers. It was abundant in the high pineland.

Leaving the sand ridges and continuing eastward we were soon back on the Istokpoga prairie. And here, in one low place, we found a veritable orchid garden. Two terrestrial orchids, a snake mouth (*Pogonia*) and a grass-pink (*Limodorum*) grew amidst the low grass in countless thousands.

Fire! Fire!! Fire!!!

This word might be repeated scores of times during a day's travel in southern Florida. In nearly every direction one turns clouds of smoke go rolling skyward. On this occasion nearly the whole Istokpoga prairie was on fire. And far to the southeast was that continuous cloud of smoke from the delta of the Kissimmee River. A doleful story, for the hammock and humus there has been burning for years, the heaviest rains having failed to extinguish it.

Observation on the Kissimmee flats shows the herbaceous vegetation to be composed of very low, often prostrate, plants. Those blooming at the time we were there were two kinds of figworts, a hedge-hyssop (*Gratiola*) and a false-pimpernel (*Ilysanthes*). The shrub, scattered over the flats, was a bright-yellow St. John's-wort (*Hypericum nudiflorum*). We had noticed the trunks of the cabbage-trees (*Sabal Palmetto*) in the vicinity of the flats to be broadly girdled about three feet above the ground, and were at a loss to account for the condition. However, a little observation soon solved the problem. The cattle of the region, being unable to rid themselves of flies collected on their sides out of reach of tail or tongue, walk around the cabbage trees scraping their sides against the rough trunk, thus getting rid of the flies, but gradually wearing the tree away.

As the afternoon was well spent, we hurried across the prairie to the head of Lake Okeechobee, thence down the eastern shore as the sun set, and out on the prairie east of the lake just before darkness fell. Thence we made our way over the trail to the eastern coast as fast as possible. In the fifty odd miles to Jupiter we saw no signs of a human being except the ferry-

man at the Saint Lucie slough, the lights of a few lone houses nearby, and the campfires of scattered Seminole Indians here and there in the pine woods. We reached West Palm Beach at midnight and spent the remainder of the night there. Early the following forenoon found us in Miami.

(To be continued)

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On Punta Blanca at mouth of the Caloosahatchie. Fire-place of the aborigines in foreground; dense hammock in background. The original surface of the kitchen-midden was as high (about four feet) as the top of the rock, the remains of the fire-place. The loose material, mainly shells and fossil skeletons of the aborigines, was removed for road-making. Continuous fires of generations burned the shells and the action of the elements concreted the residue into a solid mass of lime. Since their disuse by the natives the shell heaps have become covered by a dense hammock-jungle.

OLD TRAILS AND NEW DISCOVERIES

WITH PLATES 255 AND 256

(Continued)

FLORIDA KEYS

Two days later we set out for another cactus center, namely, the Florida Keys. The "Barbee" had started for Key West on Monday morning, and the writer left Miami the following day for that port by train. Both boat and train reached Key West at six o'clock Tuesday evening. Several among many interesting observations made from the train may be worthy of notice. First, it is often said that the cocoanut tree always grows with its swollen trunk-base curved towards the prevailing wind or toward the water. This does not hold in the case of the cocoanuts on the keys, for they grow in various postures. Second, vegetation has sprung up and now thrives on the lime-rock ballast of the concrete viaducts connecting different keys: beggar-ticks (*Bidens leucantha*), sand-spurs (*Cenchrus carolinianus*, *C. echinatus*), rush-grass (*Sporobolus domingensis*), horse-weed (*Leptilon canadense*), pepper-grass (*Lepidium virginicum*), and spurge (*Chamaesyce* sp.). These appeared to be the most abundant kinds. Third, a great many century-plants (*Agave*), both of native kinds and introduced, were in flower, a feature which gave, especially to Key Vaca and its neighboring islands, a most unusual aspect.

Cactus-hunting interested Mr. Cuthbert so much, that according to prearranged plans he joined us at Key West in order to make the cruise through the Keys to Miami.

We spent a day searching all parts of Key West for cacti. Prickly-pears were abundant, of course, and we found plenty of the recently described *Opuntia zebrina*, which was collected once before on that island, and also some scattered remnants of the tree-cactus (*Cephalocereus keyensis*) towards the eastern end of the key; but the main object of our search, a prickly-apple (*Harrisia*), failed to appear anywhere. After gathering some miscellaneous specimens we gave up our search there and prepared to leave the island early the next morning.

Big Pine Key was our next destination. A strong east wind prevented us from taking the outside or more direct course. Consequently, we started on the inside course, which runs in a somewhat semicircular curve around a labyrinth of small islands on the inner side of the reef. After bucking a bad sea for several hours, we located a stake about a mile east of Harbor Key and found our way into Big Spanish Channel, whence we picked our way gradually southward between No Name Key and Big Pine Key.

Inquiries at the settlement on Big Pine for the locations of hammocks with which we were not already acquainted failed to bring much encouraging information. Most of the former large hammocks had long ago been destroyed in making charcoal for supplying Key West, and furthermore, during our former explorations there we had never met with any of the kinds of cacti we now sought. However, the report of some hammock growth towards the upper end of the island decided us to retrace our course for about five miles and land at a point indicated by our informant. We were not long in locating the site of a former hammock by the character of the shrubs and an occasional surviving tree. An extended search in that region failed to disclose any cacti, however, except prickly-pears. We did find, though, a shrub new for Florida. This was a kind of candle-wood, *Dodonaea Ehrenbergii*, a plant first found on Hispaniola, and not previously known this side of the Gulf Stream.

Failing of our object there, we retraced our course to the settlement, where we made a search of several remnants of hammocks, but the search was wholly barren of results so far as cacti were concerned.

However, at last we heard of a hammock near the southeastern tip of the key which, so they said, hunters shunned

"because cacti grew so thickly there that dogs couldn't get through." We at once returned to the "Barbee" and moved to the lower end of the island. After landing on the extensive plain that stretches beyond the pine woods, we located a charcoal-burner's trail and followed it. This trail led toward an insignificant-looking hammock, which, from a distance, the writer had theretofore taken to be a mere button-wood swamp. We entered the hammock and there, to our great surprise and delight, our eyes were confronted with cacti of no less than eight different kinds. There were not less than five genera. But most pleasing to behold was that plant we particularly sought, a species of *Harrisia*.

Not many years ago only six kinds of cacti were recorded from all Florida, or, in fact, from all the Southern States; but here we had found eight quite distinct kinds growing in one small area. These cacti fall naturally and equally into two categories: *Opuntia Dillenii*, *O. keyensis*, *O. australis* (maritime form), and *Acanthocereus pentagonus*, these representing common plants in tropical and subtropical Florida: *Cephalocereus keyensis*, *C. Deeringii*, *Harrisia* sp.?, and *Opuntia* sp.?, representing rare plants.

In order to understand the relationship of the *Harrisia*, however, we needed the flowers and fruits. Curiously enough, the numerous plants at the time of our visit had only young flower-buds and immature fruits. The prickly-pear just referred to had neither flowers nor fruits, but its vegetative characters showed it to be a new species of a group of the genus *Opuntia*, the Semaphores, none of which had previously been found this side of the Gulf Stream.

This most remarkable natural cactus-garden east of the western American deserts has maintained itself in spite of the fact that its other shrubby and arboreous elements have been cut out many times for furnishing wood for charcoal, charcoal burning having been in progress there for perhaps half a century. This is doubtless the hammock where Dr. J. L. Blodgett and others in the earlier half of the last century collected

¹ John Loomis Blodgett (1809-1853) was born at South Amherst, Massachusetts, and studied medicine at Pittsfield. After a brief residence in the Gulf states, and two years in Liberia, he settled at Key West, where he spent nearly fifteen years as physician and druggist. He was the first to make important botanical collections on the lower Florida keys.—JOHN HENDLEY BARNHART.

several typically West Indian shrubs that have not been found in Florida since. In fact, our incursion into that hammock was perhaps the first of its kind in more than three-quarters of a century. It is hoped to make an early survey of that locality for plants other than cacti.

This locality proved extremely interesting, not only from a botanical standpoint, but also from that of geology. Although it has long been known that the main groups of the Florida Keys, the Lower and the Upper, were in a general way separated by the Bahia Honda Channel, the writer has never been able to get information as to the real line of demarcation. The position of this hammock on the southern tip of Big Pine Key, however, gave a clue, at least, to the real line of division between the groups. The hook at the southern end of Big Pine Key has always seemed an extraneous part of the island. It is largely covered with marl, but the examination of this hammock showed that the rock structure is coral and not oölitic limestone. It is thus of a different geological period from that of the body of Big Pine Key. It is coral built up on the lower edge of Big Pine and really formed of an island now a peninsula, with an east-west long axis similar to that of the Upper Keys. Now to prophesy a little: Newfound Harbor Keys and Loggerhead Key also, with an east-west long axis, will doubtless be found to be of coral rock, instead of limestone, as they are now indicated on geological maps. The determination of this point and an exploration of their hammocks are looked forward to with much interest. If this prophecy comes true, the line of demarcation between the two groups of Keys will not be a north-south line, running between Bahia Honda Key on the east and Little Pine Key and No Name Key on the west, but an east-west line, from a point between Bahia Honda Key on the south and No Name Key on the north, running across the isthmus south of the limestone or pineclad part of Big Pine Key on the south, and the limestone keys on the north. Thus, instead of a complete separation of the two groups of islands, we would have an overlapping of the groups where they approach each other.¹

¹ Since this paper was in type, the writer found that the conditions existing at the southern end of Big Pine Key and on one of the Newfound Harbor Keys, as stated above, were recorded by Samuel Sanford in a paper on "The Topography and Geology of Southern Florida," published in the Second Annual Report of the Florida State Geological Survey.

Among the interesting phenomena at this meeting point of the coral-rock and the oölitic limestone—and they are too numerous to record in this paper—may be mentioned the intermingling of the two tree-cacti of the East. In spite of the devastation of half a century, we found many fine trees of the key tree-cactus (*Cephalocereus keyensis*) formerly known only from Key West, and reported from Boca Chica Key, and the Deering tree-cactus (*Cephalocereus Deeringii*), heretofore known only from coral-rock on Umbrella Key and the Matecumbe Keys,¹ all indicating an interesting meeting place of plant species as well as of geological formations.

Having secured the desired specimens, we set out in the evening for Madeira Bay. We ran over the reef outside as far as the Bahia Honda Channel, where we turned into the Bay of Florida and started up the inside channel. A short stop was made on Bahia Honda Key. This differs from most, or perhaps all of the larger keys in having the rock foundation covered with a rather thick accumulation of sand; it is really a large but rather low sand-dune. On it two plants may be found in abundance that are not known to grow elsewhere this side of the Gulf Stream. One of these is a copiously branched and very copiously flowered vine of the morning-glory family (*Jacquemontia jamaicensis*) which has never been found elsewhere on the Florida Keys. The other is a remarkably spine-armed shrub of the madder family, *Catesbaea parviflora*, a relative of, but more diminutive in every way than the lily-thorn or spine-apple (*Catesbaea spinosa*) of the Bahama Islands, where our plant is also a native. It formerly grew on Big Pine Key, but it is apparently extinct there now. There is no tall vegetation on the island, and besides the herbaceous elements and scattered, scrubby, woody plants, low palms are usually the most conspicuous objects in the landscape.

After getting under way again, the east wind freshened and we decided to go as far as Bamboo Key and anchor for the night in its lee. Night fell before we reached Key Vaca, but we continued steadily and rapidly towards our objective, evidently more rapidly than we suspected, for the island we took to be Bamboo Key turned out to be Channel Key, at least six miles

¹ Journal of the New York Botanical Garden 17: 198. 1916; 18: 199-203. 1917.

beyond Bamboo Key; for unsuspectingly, in attempting to run in behind the island, we piled up on a shallow sand-bar, nothing the like of which is about Bamboo Key. By reversing the engine at once we pulled the boat off without delay. Bamboo Key is so low and devoid of hammock¹ that we had evidently passed it unobserved in the dark.

We had made better time than we suspected, owing doubtless to the increased power of the motor, as a result of the damper air of the night; but our Bahamian crew insisted that it was due to the fact that "water is always thinner at night than in the day time!"

Having passed our proposed anchorage, we decided to keep going until we reached Long Key, about five miles distant. By successfully locating the stakes of a channel through some shallow banks and keeping well to the north of some wreckage with which we were acquainted, we soon reached the anchorage.

At sunrise we resumed our journey and called at Lignum Vitae Key. There we secured a supply of a peculiar kind of prickly-pear for study, and then made all possible speed towards Madeira Hammock. During the preceding evening thunder storms were around us in all directions, but the weather cleared and we were treated to a wonderful sunset. The atmosphere during the following day was exceptionally clear and extremely bright. It was impossible to locate the horizon, and small keys in the distance seemed to stand high above the water, thus looking not like islands but aeroplanes.

As soon as we cast anchor at the entrance to Madeira Bay, we crossed the bay in a row-boat and went ashore, where we found more specimens of *Harrisia*. The plants of this genus are either terrestrial, or epiphytic, and sometimes grow on the trunks or branches of trees ten or twelve feet above the ground.

Madeira Hammock is full of animal life, and we invariably have experiences there with some branch of the animal kingdom—sometimes with rattlesnakes, often with yellow-jackets, oftener yet with mosquitoes. On this occasion one member of our party was enabled to study wasps at close range. He collided with a nest. In addition, the horse-fly season was on in southern Florida. Although we had met with only a few flies

¹ Journal of the New York Botanical Garden 18: 107. 1917.

in the hammock, when we returned to the "Barbee" the cabin was swarming with them, and we were well on our way before we were rid of the pests.

The sun was setting as we sailed away from Madeira Bay. After passing Pigeon Key we spent the evening hunting or rather haunting bars, banks, and barriers. If we did not at once find the channel stakes on a bank we would run along the bank in one direction or another until we picked them up. Thus, after negotiating one channel after another, we came to anchor at midnight in Black Water Sound, about a mile west of Snake Point and Jewfish Creek. With the wind in our favor we hoped to get a few hours of uninterrupted sleep safe from the attack of mosquitoes. Our hopes were realized—for two hours. Then all on board awoke at the same time, fighting for life. The mosquitoes had "boarded" us in a cloud. The battle lasted an hour. Then, suddenly, the mosquitoes had disappeared, and all hands fell off to sleep again as peacefully as if nothing had happened and slept soundly until awakened by dawn. Whence those mosquitoes came and whither they went is still a mystery.

The sun rising on Barnes Sound found us on the last leg of our cruise, which terminated in the early afternoon at Miami, where we disembarked and cared for the collections.

MIAMI AND MARCO ISLAND

After an interval of three days, which was devoted mainly to local investigations in the vicinity of Miami and in cactus studies at Buena Vista, a third extensive excursion, again by land, was inaugurated. The country from the mouth of the Caloosahatchee to the Ten Thousand Islands was our most distant field. Our route was the same as that of the excursion to the Manatee region as far as Okeechobee City. Two weeks had elapsed and the season had advanced.

The two conspicuous and strongly contrasted plants of the "scrub" along the eastern coast were the Caribbean-pine (*Pinus caribaea*) with dark-green foliage, and the saw-palmetto (*Serenoa serrulata*) with whitish foliage. The leaves of the saw-palmetto that grows in the "scrub" are nearly always glaucous or grayish-white. In the rocky pinelands of the Everglade Keys the leaves are either green or grayish-white, while in the

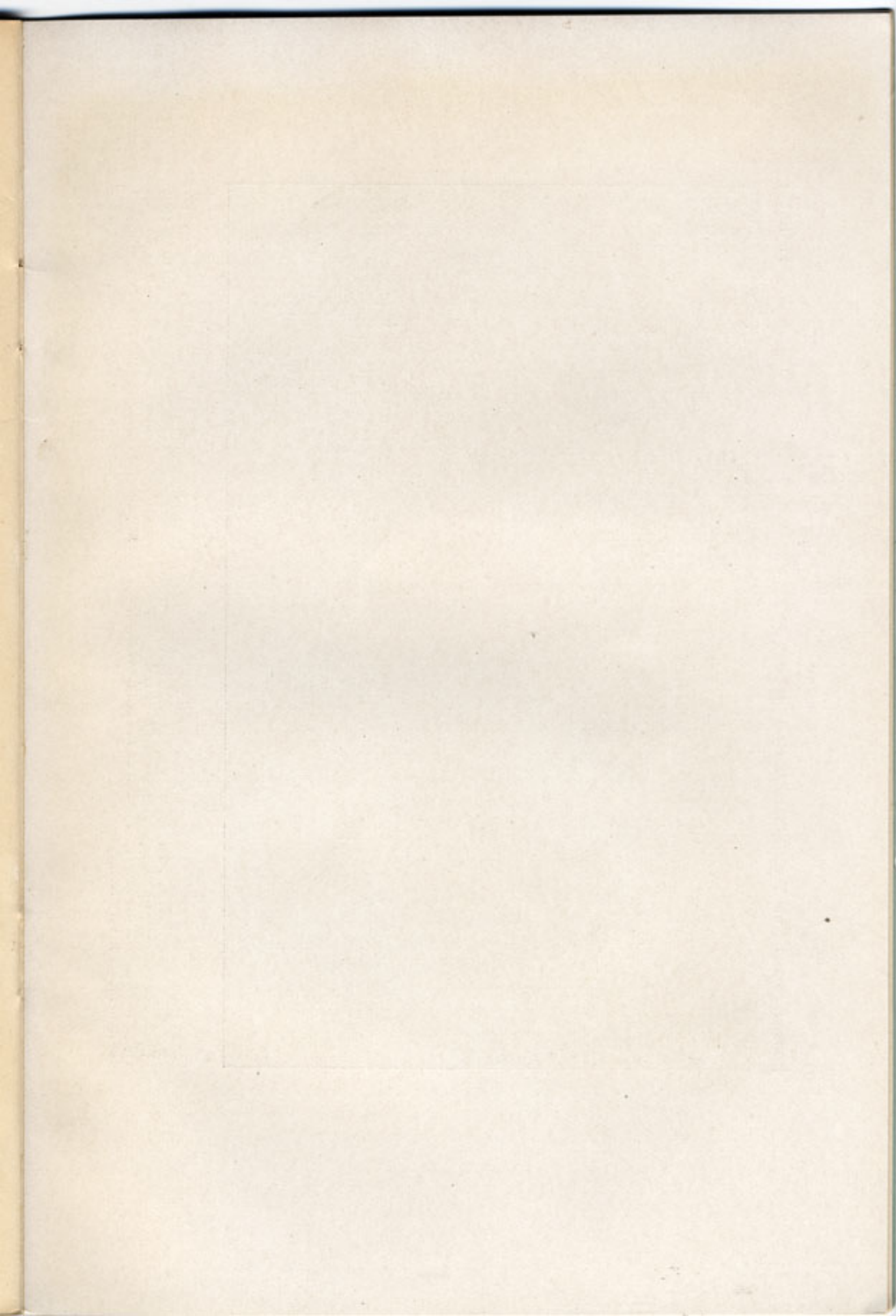
sandy pine woods and hammocks in other parts of the state they are typically green. The palm plants of the "scrub" are typically more robust than those of other localities. The reason for these variations presents a problem for some one to solve.

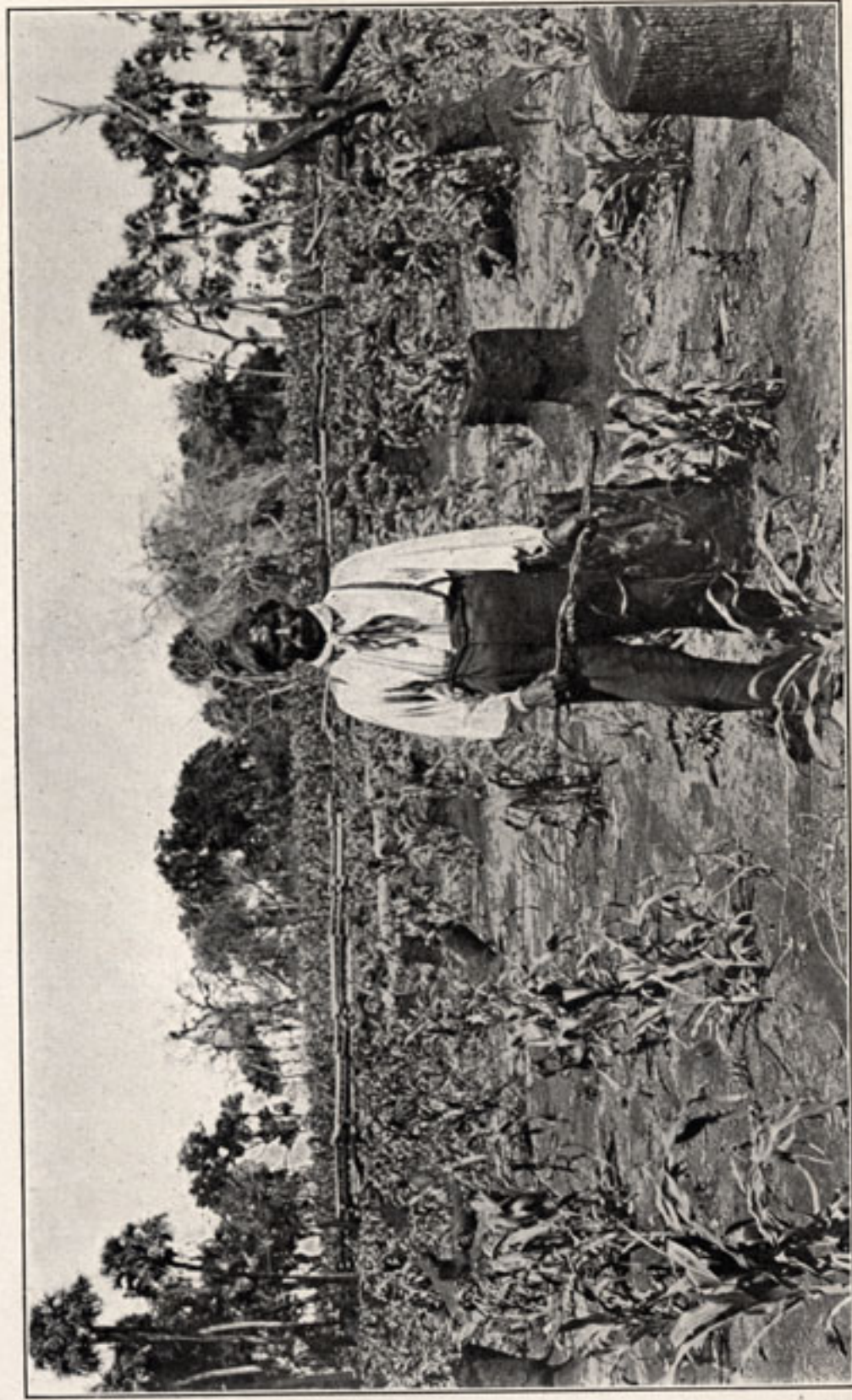
The beautiful, not to say elegant, tar-flower or fly-catcher (*Befaria racemosa*) stood in noticeable clumps here and there in the pine woods and high prairies. The low prairies, both in the coastal region and inland, seemed covered with drifts of golden-yellow snow, if such a phenomenon can be imagined, on account of the copious growth, bearing countless myriads of flowers, of bladder-worts, mainly *Stomosisia*, and the numerous ponds were thus made into mirrors with golden-yellow frames. In some of the lower prairies where the bladder-worts were less plentiful, other colored flowers predominated; meadow-beauties (*Rhexia*) and orchids were often abundant. Among the latter, grass-pinks (*Limodorum*) furnished bright colors, while the dainty-orchis (*Gymnadeniopsis nivea*), though lacking color, was conspicuous on account of its habit, suggesting so many tiny lamps scattered over the prairies.

If it were not for these numerous showy plants, Hungry Land would be desolate indeed. It is practically uninhabited, and in addition to the moss-draped hammocks and cypress-swamps, in some places the Florida-moss (*Dendropogon usneoides*) hangs in long streamers from the pine trees. Even Indians do not live there.

The land on the western side of Hungry Land slough, the Allapattah Flats, is somewhat less depressed and less depressing. It is inhabited by few white people, but by the Seminoles in considerable numbers, as we discovered by experience. Since our recent journey through that land, heavy rains had submerged parts of the trail. At one submerged point where the trail forked we inadvertently took the left-hand branch instead of the right and in a short time found ourselves in the midst of a number of Indian camps. We soon retraced our mistaken course and hastened on through the Allapattah (Seminoles for alligator) Flats.

Plant life was represented in many interesting ways. However, two phenomena were particularly impressed on the writer: the often extensive turf formed of a sedge (*Eleocharis*) and the





Mr. Billy Bowlegs in his corn-field on Indian Prairie, west of Lake Okkechobec. Bowlegs is a descendant of the famous Indian Chief of a century ago. His field was once a palmetto hammock as is evidenced in the plate, by the palm stumps still standing among the corn. The palmetto trunks have been made into a snake fence to be seen in the background, which separates the fields of father and son. The son's corn, several weeks older, may be seen on the far side of the fence. The soil of the prairie is sand, but in the palmetto hammocks the accumulated humus of ages makes it very fertile.

brilliant yellow of a Saint John's-wort (*Hypericum aspalathoides*), which, when the numerous flowers were in large masses, presented such a striking yellow that it was almost painful to the eyes. Steady traveling soon brought us to Okeechobee City, whence we set out westward for the crossing of the Kissimmee River. The vegetation changes suddenly beyond the pine woods west of Okeechobee City. Palmetto hammocks appear, as do also live-oak hammocks, both dense and open, and hammocks of mixed trees. On the prairies a maze of cattle trails run between and among myriads of large broom-like clumps of a stiff grass (*Spartina Bakeri*) and peculiar circular patches of the saw-palmetto. The latter plant was then in flower nearly everywhere and the violet-scented fragrance of its flowers filled the air.

After crossing the Kissimmee at Cabbage Bluff we headed southwest for the Caloosahatchee. There were no made roads as far as Fisheating Creek, so we were able to make good speed. The natural packing of the sand of those prairies is so firm that the traffic of horses, oxen, wagons, and, of late, automobiles, over a trail never seems to impair it to any serious extent; but when it is disturbed so as to make a roadbed, it soon becomes practically impassable, until it is surfaced with some hard material.

Out across the great palmetto prairie we presently penetrated probably the most remarkable growth of cabbage-trees (*Sabal Palmetto*) in existence. This palm grows there singly or in groups of dozens, hundreds, and thousands, forming groves essentially to the exclusion of all other trees. The magnitude of the growth was most impressive and often most beautiful.

The trail winds in and out among the hammocks in blind curves, and as we took one of these we nearly collided with an Indian, Billy Stuart, who was out with his family on a "joy-ride" in his ox-car. As he was making perhaps one mile an hour we averted a head-on collision. We even stopped for a short visit and before we separated Billy invited us to call at his camp, at the same time explaining to us how to find it by leaving the trail at a designated hammock, on our return trip.

By the time we reached Fisheating Creek it was dark, and cloudy as well. But we crossed the creek and found the trail leading to the Caloosahatchee. When about half-way to the

river we lost the trail, though, and later when the clouds cleared the stars indicated that we were traveling through the open pine woods towards the southeast instead of on the prairie to the southwest. Several lights appeared far ahead, so we hastened toward a supposed settlement to inquire concerning our whereabouts. When we came near the lights, instead of houses we found some burning stumps, the remains of yet another forest fire. Consequently, the only alternative was to double our course until we recovered the trail. This done, we made the Caloosahatchee in good time, crossed it at LaBelle and followed it to Fort Myers, reaching our destination just before midnight. We had covered the distance from Miami in about fifteen hours, including time for lunch and that consumed in twice losing the trail.

The next morning we set out for our most distant objective, namely Marco and vicinity. Traveling southward, after passing through several miles of sandy pineland, we came to the Lossmans River limestone which supports a succession of cypress swamps, and which was in some places overlaid with ancient sand-dune, the "scrub." The cypress trees of the swamps were sometimes associated with a peculiar-looking pine, the trunks of which were very slender and tall. After crossing several streams, whose bordering hammocks would also doubtless prove to be interesting collecting grounds, we came to the settlement of Naples, a town which is built on a spur of the "scrub," that here abuts directly on the Gulf of Mexico. Here, moreover, we found the northern limit of the Ten Thousand Islands, a region which extends southward along the coast to near the Northwest Cape of Cape Sable, or a distance, in a direct line, of about seventy-five miles. We crossed areas of "scrub," back of the coastal islands, about half way between Naples and Marco, which region perhaps represents the southern known limit of the "scrub" on the western side of Florida. The "scrub" thus extends about equally as far south on the west coast as on the east.

The higher land there rapidly fell away and gave place to extensive salt marshes or prairies, where the more conspicuous vegetation was made up of the cabbage-tree (*Sabal Palmetto*), the saw-palmetto (*Serenoa serrulata*), and buttonwood (*Conocarpus erecta*), all of which, or particularly the two palms,

thrive equally well under the influence of salt water or fresh water, and also in either wet land or dry. Finally, we came within sight of the settlement of Marco, fifty-odd miles south of Fort Myers, where the white race is now engaged in the same pursuit that its prehistoric red race followed, namely, the oyster and clam business.

After arousing some of the inhabitants sufficiently to encourage them to cross the sound and learn our desires, we found that, with the usual foresight of such people for business, one of the ferry-lighters was at the bottom of the sound and the other was on the ways being repaired. Thus, the main object of our excursion, an examination of the hammocks about Caxambas Pass, was defeated. Leaving our car on the northern shore, we crossed the sound for a short investigation of the flora of the immediate vicinity of the settlement of Marco, leaving the Caxambas end of the island for future attention. This completed, we recrossed the sound and began to retrace our course northward.

Hard luck had evidently overtaken us at last.

An anticipated visit to the Royal Palm Hammocks of the Cape Romano district was also defeated, although we managed to get within about four miles of our objective. After repeatedly "bogging" in the dry sand of a side trail on the one hand and in the soft mud of the adjacent prairies on the other, we sought the main trail and set out for Fort Myers. Herbarium specimens were collected from the different plant associations. But the "scrub" was negatively interesting, that is, the season seemed to be very backward and very few plants were in flower. However, one notable shrub, a kind of lead-plant, an undescribed species of *Amorpha*, was found in full bloom. This plant was quite conspicuous, both in the matter of foliage and inflorescence, and, curiously enough, it seems to be most closely related to the lead-plant (*Amorpha canescens*) of the western plains.

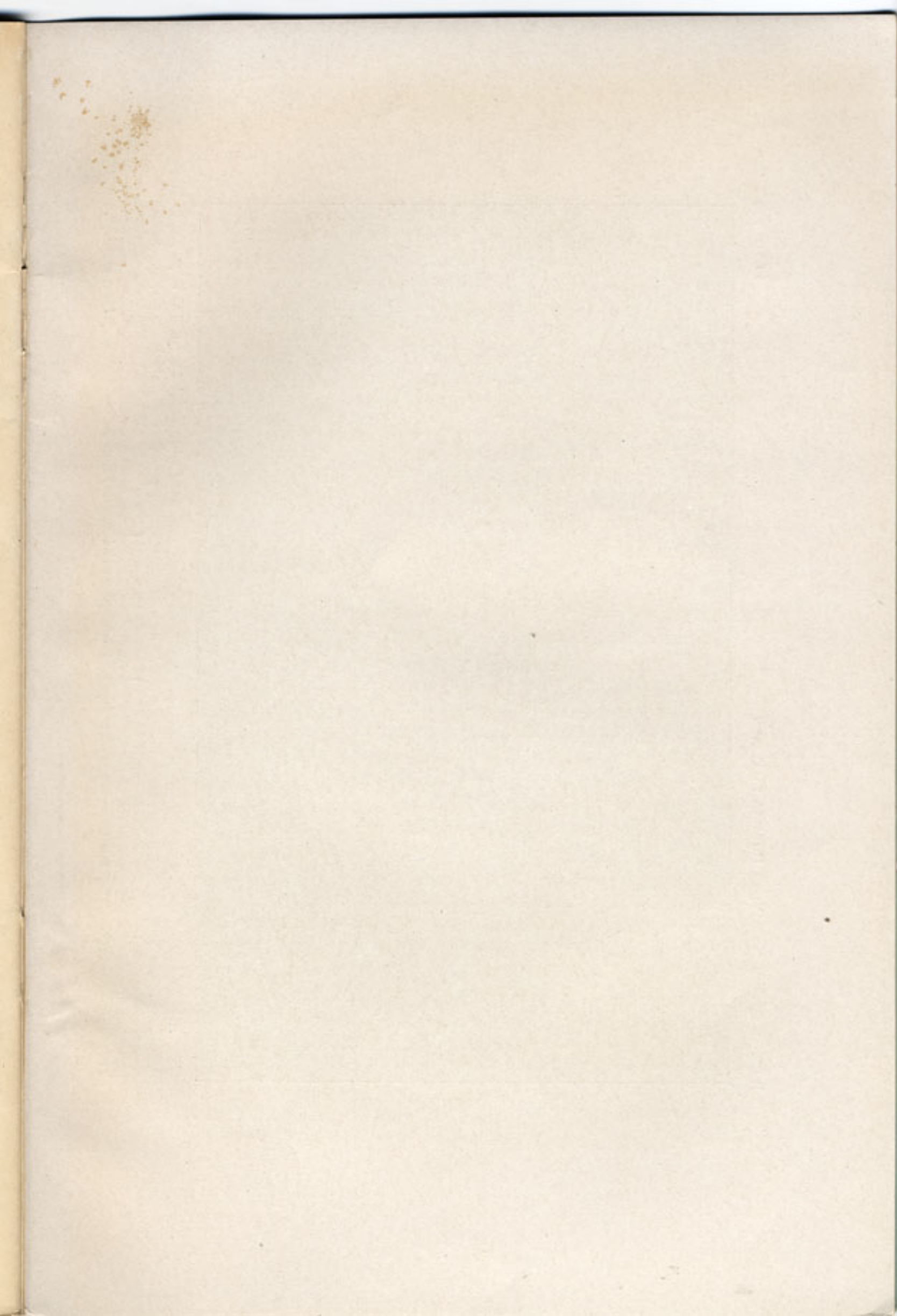
The following morning we drove to Punta Rassa, which is situated at the mouth of the Caloosahatchee. With the cooperation of several fishermen, we were able to visit a number of islands at the mouth of the river. At Punta Blanca, at the mouth of the Caloosahatchee, the most likely place for the occurrence of *Harrisia*, we failed in our search, although the

plant was said to grow there formerly. Many of the plants usually associated with *Harrisia* were present, and several other kinds of cacti were plentiful. However, the locality proved very interesting historically as well as botanically. Unfortunately, most of the hammock had long been destroyed by the digging away of the shells of the once evidently important kitchen-midden. The shells and numerous human remains had been and are still being carried away for making roads in the vicinity of Fort Myers.

This locality, like the shores of other estuaries, was probably one of the places of rendezvous for the fierce Calusas, the aborigines of southern peninsular Florida and of the Keys. It was in this vicinity, it is said, that the Calusas captured and held as prisoners for a century, at least, an expedition of Caribs from the West Indies in search of a fountain of youth. They were maintained as a separate settlement. It may be that the Big Cypress Seminoles (Creeks) have the blood of the old Calusas and Caribs in their veins.

The most interesting object at Punta Blanca was the old fire-place and perhaps also sacrificial altar of the Calusas, for human sacrifice is said to have been practiced. The constant fires burned the accumulated shells into a solid mass of lime, which increased in height as the kitchen-midden was gradually built higher. When the shells in recent times were removed for road-making material, this concreted fire-place was spared. But to pass from more ancient history to more modern: One of our fisherman navigators related to us the local interpretation and belief regarding the occurrence of the human skeletons in the shell heaps at Punta Blanca. The story runs as follows: In the early part of the last century a vessel bringing a large number of negro slaves from Africa was discovered and chased by a fleet United States revenue cutter. The slave vessel took refuge in the waters about what is now called Punta Blanca when the revenue cutter opened fire and killed all the negroes. Their bodies were then buried on the adjacent shore!

The same evening found us speeding up the valley of the Caloosahatchee. We reached a frontier settlement about bedtime and spent the night there, a night that will long be remembered, for giant cockroaches, big spiders, and scorpions played hide-and-seek over the bed till daylight. Dawn was welcome





In a slough north of Eagle Bay, Lake Okeechobee. This slough, now filled with a pop-ash hammock, was evidently, when the land was less elevated, the bed of a river which flowed from the prairies into Lake Okeechobee. Even now, water stands in it to the depth of one to three feet during part of the year. The ash trees consequently are amphibious. Notice the peculiar growth of the trees. Several stems or branches arise from a large, partly bruised base. The numerous epiphytes on the trees are several kinds of wild-pines (*Tillandsia*) and an orchid (*Eucydia tampense*).

when it at last arrived and we made haste to get away over the prairie trail. The massive hammocks on Fisheating Creek and its tributaries and adjacent sloughs were not only conspicuous, but beautiful. The pale under-sides of the sweet-bay leaves turned up by the breeze showed in striking contrast against the deep green fresh foliage of the associated trees.

The prairie flowers became more numerous day by day. Spider-lilies (*Hymenocallis*) were scattered throughout the turf. Marsh-pinks (*Sabbatia*) and meadow-beauties (*Rhexia*) formed bright patches in all the slightly depressed places. But the flower most notable, not on account of its size, but because of its countless numbers, was the yellow-eyed grass (*Xyris*) whose heads stood above the other herbaceous vegetation nearly everywhere as far as the eye could see.

In order to fulfill our social duty and make that call at Billy Stuart's camp, we left the trail where directed to do so. We had not proceeded an eighth of a mile before we saw an Indian perched on a stump about a quarter of a mile away, evidently with his eye on us. We met him and found he was Billy Bowlegs, evidently a descendant of the former celebrated chief of that name. He directed us to Billy Stuart's camp, which we found without difficulty. There were many camps in that region, all situated in palmetto hammocks. The hammocks, when cleared of the palms and shrubbery, also furnished the fields for growing corn, and many fine crops of maize were observed. We had a long talk with Billy Bowlegs in his corn-field. Among other things he said he liked cultivating crops very well; but hunting was more to his liking.

The social functions being over, we made all possible haste to cross the Kissimmee River. A boy who was on the ferry directed us to a short trail running from the Kissimmee to Okeechobee City. We could hardly believe him, but we agreed to try the new course and followed his direction. We found he was right and were surprised to learn that nearly half the distance of the trail we were used to traversing was eliminated. But, more interesting than the saving of distance was the finding of a new and very characteristic type of hammock. It was only a few hundred yards wide, but an indefinite number of miles long. The arboreous growth was almost exclusively of an ash (*Fraxinus*), but its habit was different from that of any

ash with which the writer is acquainted. The very short and broad bases of the trees were divided usually into from a half dozen to two dozen trunks. The trunks and limbs of the trees were copiously laden with epiphytes, both orchids and bromeliads, the latter predominating. The conspicuous orchid was the tree-orchid (*Encyclia tampense*), the only epiphytic orchid of southern Florida that does not definitely occur also in the West Indies. The bromeliads were chiefly *Tillandsia recurvata*, *T. bracteata*, *T. utriculata*, and the long-moss, *Dendropogon usneoides*.

We had so far been favored with good weather, but were now completely surrounded with severe thunder storms and we made haste to get into the region east of Lake Okeechobee. Along the recently opened right-of-way between Okeechobee City and the lake we found a sunflower (*Helianthus cucumerifolius*), a native of eastern Texas, naturalized in the ditches. A thistle (*Cirsium*), discovered on the eastern shore of the lake several years ago, was very plentiful in the cleared hammock land. This thistle has numerous close-set leaves and many medium-sized flower-heads, and it grows to a height of twelve feet. The discovery of the cucumber-leaved sunflower, as a naturalized plant, was fortunate, as it gave the writer an opportunity to compare it with its Florida relative, *Helianthus debilis*. He has maintained these very distinct species, although the "closet botanists" have for over a century considered them to represent but one species.

The wide beach, lately the bottom of the lake, was covered in most places with a sedge (*Cyperus LeContei*) and dog-fennel (*Eupatorium capillifolium*). The latter plant, as well as other tall herbs, were veiled with dense white spider-webs which were drawn tightly around the foliage. Blown to and fro by the wind of an approaching storm these veiled plants appeared like thousands of shrouded ghosts moving over the wide shore. By collecting quantities of these spider-webs on their horns the wild cattle roaming on the lake-shores all have the appearance of wearing white nightcaps.

The now nearly spent storm, as well as night, overtook us just after we passed through the Okeechobee hammock and light rain accompanied us through the Allapattah Flats. Hungry Land had evidently had a drenching rainstorm, as nearly

all the land, together with the numerous plants mentioned on a preceding page, was submerged. Thus flood and darkness put a stop to further collecting.

Minor investigations were prosecuted when we were not absent from Miami on these extended excursions. Among several localities of interest visited, the region back of Cape Sable may be recorded. We passed through Royal Palm Hammock, where it was gratifying to see the several acres of former forest that was fire-swept and completely destroyed a few years ago, rapidly reforesting itself. Since the custodian of the park cleared the debris from the devastated area within the last two years, the progress of the natural growth has been remarkable. Under Mr. Mosier's guidance we visited a hammock about twenty miles southwest of Royal Palm Hammock. This hammock is somewhat similar to another in the same region, mentioned in a former paper.¹ As we gain more knowledge of the Long Key Pineland and Cape Sable it appears that a disconnected chain of pine-islands and high hammocks connects the two regions, and the intervening territory, when accessible, will doubtless prove an extremely interesting collecting ground.

Our visit to the hammock mentioned above was mainly for the purpose of collecting a peculiar epiphytic fern that had been found there several days earlier. The fern seems to be a species of tropical polypody (*Polypodium Plumula*) with much elongated leaves. These were up to about three feet in length, while they were only between one and two inches wide. The blades were tightly curled, somewhat after the manner of the resurrection-fern, when we found them, and three days' time was required to expand them after they were placed in water.

The spring vegetation of the Everglades was well advanced and the difference between the high and low grounds of the prairie was there more pronounced than had been noticed elsewhere. The lower areas are really natural drainage sloughs; but they are in strong contrast with the deeper sloughs. The latter, in which humus, as well as moisture, collects abundantly support a copious growth of herbs and often also of shrubs, while the former, being shallow and quite even, retain neither humus nor moisture and in addition are subject to frequent

¹ Journal of the New York Botanical Garden 20: 191-207. 1919.

prairie fires. These are barren or nearly barren in the dry season, and thus stand out in strong contrast with the higher and well plant-clothed parts of the prairies.

The Everglades presented quite a different appearance from what they did six months previously. This was particularly so in the regions where the cypress grew. The distant massive cypress heads instead of presenting a mass of gray branches, showed up as immense green domes, while the stunted, scattered, or spaced pond-cypress on the prairies had been transformed from scraggly spectres¹ into trees with light green foliage and copious tassels of flowers.

Different also was the review of the woods and fields as we sped northward on our return. Summer was there and everywhere, whatever the calendar may have said.

JOHN K. SMALL.

¹ Journal of the New York Botanical Garden 21: 53. 1920.

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