LAKE OKEECHOBEE.

The exploration of the Okeechobee region consumed the better part of six days, during which time we made a traverse or examination of probably not much less than one-half the area covered by the lake. Our course from the mouth of the canal, which is marked by a fairly conspicuous barrel-shouldered cypress, was S. by E. to Observation Island, about seven miles, two miles S. W. to the western shore, fifteen miles almost due north to beyond the mouth of Fish-Eating Creek, on the northwest shore, fifteen miles E. N. E. to the mouth of Taylor's Creek, which forms the extreme northern (northeastern) apex of the lake, two miles W. to Eagle Bay, and twenty-two miles S. W. to the canal. The distances here given are those of dead reckoning, but the experience of our captain in calculations of this kind leads me to suppose that the figures are not very far removed from the truth. It will thus be seen that our direct examination was confined principally to the western and northern sections of the lake, but from our position at Taylor's Creek we had a clear sweep of some ten additional miles of the eastern shore as well. How much further to the south beyond the furthest point reached by us the lake extends, I am unprepared to say; nor can I determine this question from any of the numerous hypothetically constructed maps of the region. It is, I believe, safe to say that there is not a single map that represents with even approximate correctness the contours of this vast body of water; indeed, the majority of the maps published, and not less, the descriptions, run so wide of the mark in their delineations, that practically no reliance can be placed upon them. And this criticism applies equally to the maps published with the sanction of the State or General Government and those prepared in the interest of special land or railroad companies. Thus, on nearly all the maps the mouth of the drainage canal is represented as opening considerably to the south of the median line of the lake, while Observation Island is located immediately abreast of this opening, or even considerably to the north of it! It has already been seen that the true position of the island is several miles to the southeast of the canal. The limited time at our command, unfortunately, did not permit us to establish the exact position of the canal-opening, but that it could not be much, if anything, below the middle of the lake, is conclusively shown by the open water-way which

extends miles beyond Observation Island. Again, on such maps where the position of Observation Island relative to the canal is in a measure correctly located, two other islands, one of which is the Observation Island of most cartographers, figure north of the canal; neither of these islands could we discover, nor do they appear to exist in fact, unless under the name island it is intended to include sundry island-like clumps of willows and cypress which at intervals break off from, or lie under the lee of, the shore. The extreme length of the lake is generally conceived to be upwards of forty miles, and on some maps, *e. g.*, the United States Land Office map of 1882, Granville's map of 1886, is placed as high as fifty miles. Both of these figures I believe to be largely in excess of the truth, although, from our failure to reach the southern extremity, I might be debarred from making a positive statement to that effect. But every indication leads in the direction of exaggeration in the generally received figures. That the delineated dimensions, or the dimensions taken between well ascertained points, are entirely illusory there can be no doubt. Thus, on the two maps above mentioned, the position approximately corresponding with, or intended to represent, the opening of the canal is placed nearly thirty miles south of the northern apex of the lake, Taylor's Creek; whereas, as a matter of fact, the diagonal distance uniting these two points, as measured by our dead-reckoning, was certainly not more than some twenty or twenty-two miles. Making the necessary allowance for this shrinkage in the northern half of the lake, and granting the correctness of the southern half as delineated, the total length would scarcely exceed thirty-six or thirty-seven miles. My own impression, however, is, that the lake is still considerably shorter, probably not very much over thirty miles. As to the greatest width of the lake I can offer no opinion, not having seen the eastern shore except along the northeast border.

Another error, freely perpetuated on our maps, is the location of the mouth of the Kissimmee River, which is made to correspond with the northern or northeastern apex of the lake. This, as has already been seen, is occupied by a broad bayou known as Taylor's Creek, which is distant a considerable number of miles to the east or northeast of the Kissimmee. The closed or obscured opening of the latter stream, which is in a grass country, renders it difficult to find, whereas the boundaries of Taylor's Creek are sharply defined by opposing walls of noble cypresses, which from their great height, 125 feet or more, present the appearance from a distance of low bluffs. The break in the shore-line is here very distinct, and is apparent at a distance of several miles; hence, by some navigators of the lake the opening is mistaken for the mouth of the Kissimmee, and, doubtless, frequently officially reported as such.*

* Mr. F. A. Ober (Fred. Beverly), in his narrative of the "Okeechobee Expedition,"

PHYSICAL FEATURES OF THE LAKE. The lake may perhaps best be described as a vast shallow pan of freshwater, which probably nowhere much exceeds twenty feet in depth. We took numerous soundings all along our course, probably fifty or more, which gave an average depth ranging from about seven to ten feet. The deepest sounding, made on the diagonal connecting Taylor's Creek and the mouth of the canal, about four miles S. W. of Eagle Bay, gave fifteen feet, but this is the only instance where we obtained this depth. Captain Strobhar, however, informs me that on a previous occasion, and not very far from the same spot, he obtained 22 feet. There is good reason to believe, seeing the general uniformity of the bottom, that this figure represents the approximate extreme depth of the lake, and that only at very exceptional intervals does this amount of depression in the basin obtain.

Practically, therefore, the bottom represents a flat plain, elevated some 7–15 feet—in places less—above sea-level. The same plain is manifestly continued into the floor of Lake Hikpochee—which, as has been seen, has the approximate depth of Lake Okeechobee—and, doubtless, forms also the true fundament to the vast series of swamps and everglades which on all sides surround these two larger bodies of water. We sounded at many points in the channels running into the grass and in the cypress thickets, and usually found a considerable depth of water, 6–8 feet, or even more, and where the bottom was reached in these shallows it consisted almost invariably of vegetable muck, of which there appears to be a heavy accumulation, and not of the solid siliceous sand which we everywhere found to constitute the floor of Okeechobee. I think it may be safely assumed that this vast lacustrine plain of the Floridian peninsula represents, practically unmodified, the surface of the country as it appeared at the time of its latest (or only) emergence from the sea. Whether or not a salt-water lake was formed immediately after the elevation of the land, from which through gradual alteration and a steady indraught of fresh-water, the present lacustrine system of waters was ultimately developed, I am unable to say, although the presumption would probably be that there was no such formation. Yet it is not exactly impossible that the reverse was the case. We failed

published in "Camp Life in Florida" (1876), states that "Taylor's Creek, and another smaller, empty into the lake within ten miles of the Kissimmee, but their channels are so choked with water-lettuce and lilies that an experienced eye is required to discern them" (p. 251). What the "smaller" stream may be it is difficult to say; but surely Mr. Ober could not have properly identified Taylor's Creek, when he refers to the difficulty of determining its channel. The high belt of cypress on either side marks it out absolutely. The broad sheet of water at the time of our visit was entirely destitute of lettuce at its mouth, nor does it seem possible that it could ever be seriously clogged at its junction with the lake. Mr. Ober's references to the contours of the lake are exceedingly vague, and in a manner contradictory, so that little dependence can be placed upon them. Fish-Eating Creek is erroneously said to empty into the lake almost opposite Observation Island!

to detect any salinity in the water, which is fairly potable, nor did we discover the remotest traces of any saliferous deposit. On the other hand, however, the valves of *Venus cancellata* were thrown up in considerable numbers both along the beach of Observation Island and near the mouth of Taylor's Creek, and I also succeeded in scooping up, by means of the landing-net, a fairly large fragment of *Fulgur perversus*, and a single shark's vertebra. The shells were all badly worn, and had more the appearance of the specimens contained in the banks of the Caloosahatchie than of the living form, and I am, hence, inclined to the opinion that they represent fossils rather than living specimens. They may have been washed out of the Post-Pliocene *Venus cancellata* bed, which almost positively underlies the lake, buried some distance beneath the sand. There appears to be, however, no means of absolutely determining this point. That the marine animals above mentioned may have succeeded in introducing themselves at a comparatively recent period, after the complete formation of the fresh-water lake, is just barely possible, but very unlikely. In our numerous drags we failed to bring up a single living marine type of animal, nor even a fragment that could reasonably be referred to a living animal of such type—unless, indeed, the numerous individuals of a species of Pandalus, a caridid shrimp common to the waters, be taken to indicate such an organization.* This shrimp was also found in Lake Hikpochee.

It is frequently conceived, and as often reported, that Lake Okeechobee is a vast swampy lagoon, or inundated mud-flat, the miasmatic emanations arising from which render access to it a matter of considerable risk or caution. This is very far from being its true character. The lake proper is a clear expanse of water, apparently entirely free of mud-shallows, and resting, as has already been stated, on a firm bed of sand. All our soundings and drags indicate that this sand is almost wholly destitute of aluminous matter, and nowhere, except on the immediate borders, where there is a considerable outwash of decomposed and decomposing vegetable substances, is there a semblance to a muddy bottom. The water itself, when not disturbed, is fairly clear, and practically agreeable—although held in bad repute by the few who have visited its shores—and by the greater number of our party it was used in preference to the barrel-water with which the schooner was provided. More generally, however, it is tossed into majestic billows, which rake up the bottom, and bring to the surface a considerable infusion of sand, rendering the surface murky. Steadily blowing winds are frequent, presaging heavy swells; we were compelled to lie at anchor for an

* A diminutive shell, much resembling in outline certain forms of Bythinella, but with a longitudinally costulated surface, was sufficiently plentiful in the grass brought up by the dredge; its affinities could not be definitely determined.

entire day during one of these high seas, when the waves beat most unmercifully against our little craft.

The border line of the lake is in most places not absolutely defined, owing to a continuous passage of the open waters into those of the Everglades; on the whole, however, the delimitation of the latter region is fairly well marked, the growth of saw-grass or flag terminating rather abruptly. Where the Everglades constitute the border line, which is the case for the greater part of the west coast, there is necessarily no true shore, and, indeed, it is the common supposition that no landing can be effected in such a region. This supposition is, doubtless, true in its general application, but not absolutely so. We secured a landing opposite Observation Island at a spot where the vegetable accumulation, living and dead, of flag, lily, and grass was so dense as to permit of a safe footing, although numerous holes and pit-falls everywhere revealed the unstable character of the fundament. A pole could readily be thrust into this vegetable bottom to a depth of four or five feet, or even more.

For some distance along the north shore, but more particularly on the northeast, there is a true beach line, made up of oceanic sand. This beach extends for nearly two miles almost due west of the mouth of Taylor's Creek, and probably not less than eight or ten miles, if not considerably further, to the southeast of that stream. It shelves very gradually into the lake, and rises out of it with the same moderate slope. At the localities visited by us I nowhere found it to rise more than about four or five feet above the surface of the water, although not unlikely it may attain a greater elevation. It everywhere supports a dense growth of hard woods —oak, maple, palmetto, etc.—which form a fringe to the almost interminable expanse of saw-grass and cypress-swamp which follows at a very moderate distance in the rear.

Observation Island.—This island, which lies a few miles S. by E. or S. E. of the mouth of the canal, is perhaps the largest island in the lake, although not impossibly some larger island may exist in the southern bayous not yet explored. It is currently, and even officially, reported to be some two miles in length, but I much doubt if its greatest (north and south) expanse greatly exceeds a half-mile, or, at the utmost, three-quarters of a mile. Along its western and southern borders it is well-nigh inaccessible, owing to a heavy growth of small cypress and custard-apple (?), whose gnarled stems and stumps form an effective barrier to approach. On the east, as also on the north, there is a much more open sand-beach, on which there was a considerable break of water at the time of my visit. The width of the island is at all points very insignificant, and the elevation probably nowhere exceeds four or five feet.

Numerous birds take shelter in the almost inaccessible recesses of

this water-bound islet, which is reputed to be one of the most favored of the Floridian heronries. We observed towards night-fall large flocks of the white ibis migrating hither, and similar departures in early morning. The great white heron and the egret were also sufficiently plentiful, but perhaps less so than the water-turkey or snake-bird, whose stoical but uncouth presence gave life to the miniature wilderness.

The only other animals beyond birds collected on the island were a few insects, a scorpion, several centipedes (Iulus), and species of Limnea, Planorbis, Physa, and Cyclas.

TAYLOR'S CREEK.—We spent somewhat more than two days in the exploration of this stream, anchoring a short distance above its mouth in eight feet of water. The width of the channel is at this point several hundred feet, and remains uniform, with a nearly uniform depth of water, for not much less than a half-mile, or even more, beyond which it gradually begins to contract, but without shallowing to any extent. In how much this "creek" is a true creek in the ordinary acceptation of the word, or a simple bayou opening out from the lake, we were unable to determine, owing to the vast masses of floating vegetation, water-lettuce principally, which choke the different channels in their upper courses, and permitted a furthest penetration to our skiffs of probably not more than two or two and a half miles. I found an unmistakable outward current during my first ascent of the creek at a distance of over a mile from its mouth, and up to the furthest point reached by me, but whether this was a natural current, or one produced as the result of direct wind action, or as depending upon a recession of the waters of the lake, could not be satisfactorily ascertained. During my second ascent, on the day following, the water over the same stretch, or over a part of it, was either stationary or slightly receding in the opposite direction. There can be no doubt, whatever, that the direction of flow up to the farthest point reached by us is largely influenced by the condition of the lake—the rise and fall of its waters as depending upon wind action, and not impossibly, also, tidal influences. The absence of shore-lines and of other necessary data rendered impossible, during the short period of our stay, the determination of the actual existence of tidal action in the lake. From a periodic rise and fall of the water in the mouth of Taylor's Creek, measuring some eight or ten inches, but which did not occur at equal periods of time, I am inclined to believe that such action does exist, although the question can, perhaps, still best be considered an open one.

The great body of Taylor's Creek opens out from the lake northward for about three-quarters of a mile, or a full mile, is then deflected northwestward, and after about a quarter of a mile divides into two main arms or branches, one of which is directed to the west and the other con-

siderably more to the north. But no direct course is maintained by either of these branches for any great distance. It is not exactly impossible that other branches, choked at the time of our visit, may open out at seasons into the main channel of equal value with the above, which we were unable to discover. The creek receives three important accessions from the east before the first deflection above indicated.

Nowhere along that portion of the creek explored by us did we find a true bank or shore, the water on either side spilling off into the vast expanse of forest-swamp, principally cypress, which here opens out from the lake. The heaviest timber growth is along the eastern tributaries and immediately about the mouth of the creek, where the parallel walls of majestic cypresses, draped from top to bottom in their funereal hangings of Spanish moss, and towering to a nearly uniform height of 125–150 feet, exhibit to surprising advantage the sylvan wonders of this primeval solitude. It would be vain to attempt to depict by word the solemn grandeur of these untrodden wilds, the dark recesses, almost untouched by the light of day, that peer forbiddingly into a wealth of boundless green—or to convey to the mind a true conception of the exuberance of vegetable life that is here presented. At no time before our visit had I been so thoroughly impressed with the wild grandeur of an untrodden wilderness—nowhere where I so keenly appreciated the insignificance of my own humble being in the sea of life by which I was surrounded.

I made several attempts to penetrate the maze of waters that constitute the "floor" of the forest, and out of which the latter rises, but found the tree-trunks and cypress knees almost everywhere too numerous, rendering it impossible to direct the skiff. The water was uniformly limpid, and nowhere did it appear to be covered with a miasmatic scum of vegetable organisms. Large fields of lettuce float freely on its surface, impelled in given directions by the ever-changing currents that sweep through the interior; where heavily packed these floating gardens are practically impenetrable, and readily carry with them obstacles of a movable character, such as a boat, that might be caught in their path.

The predominating trees of these swamps are the cypress, bay, live-oak, water-oak, and maple, which together impart the physiognomy to the vegetation; occasional palms appear here and there in the less secluded parts of the forest, but evidently neither the watery bottom, nor the exclusion of light which the dense overhanging canopy of interlaced branches affords, is favorable to their development. Although the trees rise to a very considerable height, but few of them attain to really great dimensions. The majority of the larger cypresses do not exceed five or six feet in diameter, and the vast bulk of the trees measure still less; an oak, the largest tree seen on the creek, was estimated to measure about eleven feet a few feet above the roots. A remarkable climbing

plant, much recalling in habit the cipó matador of the South American forests, accompanies many of the larger trunks very nearly to their loftiest crown, holding them in a tight embrace, but apparently without exercising much compression, or causing any great discomfort to its host. There are usually one or two coils on a trunk, from which ponderous cables, measuring as much as eight or ten inches in diameter, and tapering inferiorly, depend in straight, or very nearly straight, lines to the bottom. I was unfortunately unable to identify any leaves as belonging to this plant, which possibly ascends as a feeble climber from below, and attains its great expansion in its upper course. The absolutely smooth trunk is grayish-white, and of a still lighter shade than that of the water-oak.*

Animal life is very prolific in these wilds, and at almost all times the forest resounds with the echoes of some of its more musical denizens—the shrill cry of the limpkin or screamer, the hoarse croak of the great blue heron, or the castanet rattle of that amphibious multitude, the frogs, whose orchestration appears never to be final. Towards even-tide, when the hooting of the great owl bids the sun to hie, and calls forth the slumbering voices of the night, the dryadic music attains its highest pitch; once more the castanet rattle, and finally all is quiet, save the hoarse bellowing of the alligator, which breaks from far and near upon the stillness of the midnight air.

The larger birds, such as the herons, snake-birds, and ibises are very abundant, but the smaller forms were at the time of our visit conspicuous by their absence. We found no trace of either the roseate spoon-bill or the flamingo, although not impossibly both are found here at certain seasons of the year; the latter is said to breed along the southern borders of the lake. The only time that we met with the spoon-bill was during our traverse of the Okeechobee canal, in the Everglade region between Sugar-berry and Coffee-mill hammocks. We observed several flocks, of some ten to thirty individuals each, of parakeets on Taylor's Creek, and obtained one specimen. These birds frequent the loftiest branches of the forest, calling attention to their gambols by the garrulous tones which they unremittingly send forth.

We met with no quadrupeds in the region, although the tracks of deer and of a large cat, possibly the lynx, were fairly abundant on the sand beach which marks the entrance to the Creek. On one occasion we also heard the distant cry of what appeared to be the puma or Florida lion. Many of the smaller quadrupeds, doubtless, are found here, and possibly even in considerable numbers, but we had no occasion to come across their tracks.

* Prof. Gray has kindly directed my attention to the habits of Clusia, to which not unlikely the plant above described belongs. It appears, however, to be very distinct from *Clusia flava*, and may, therefore, represent a species not hitherto described as a member of the American flora.

The bass is sufficiently plentiful in the Creek, and probably constitutes a considerable part of the food of the alligator, which literally swarms here. We were more than astonished at the vast numbers of these creatures, which could be seen or heard at almost every point—here lazily swimming on the surface, there reclining on an intermatted bank, or again splashing unseen from a bed of lettuce and flag. We observed at one time from the deck of our boat no less than nine of these animals unconcernedly swimming in quest of prey, crossing and recrossing the stream in the most methodical manner, suddenly disappearing on an alarm of danger, but reappearing after a brief interval of complete immersion. During my first ascent of the stream, which probably consumed in the neighborhood of five hours, I must have seen or heard in my immediate proximity between fifty and seventy-five alligators, and not improbably many more. They appear especially plentiful at about the middle of day, when the elevated temperature calls them from their aqueous homes. They delight in the masses of floating vegetation that hang matted together on the shore line, whence they can readily see their prey without discovering their own presence. Their power of perception is very acute, and in probably nine cases out of ten, as far as our own experience was concerned, they observed intruders long before they themselves were detected. In no instance did they manifest a disposition to give battle, even when approached to within short range of the boat; on more than one occasion I was sufficiently near to have struck them with a medium-sized pole, or even with the paddle, but the reptiles seemed to entertain no disposition to attack, preferring the easy victory bought by a general immersion. At the same time, they do not always appear to shrink from man's presence, as frequently I observed them heading directly for my boat, disappearing only when so close as to cover me with their downward splash. They are exceedingly tenacious of life, and will execute apparently conscious movements sometimes hours after the head will have been battered in by both ball and axe, the method of execution practiced here. In how far these movements are in the nature of reflex action, excited by some extraneous stimuli, it is not always easy to determine, but in many cases they are without doubt strictly coördinated. On one occasion where I was compelled to use one of our dingeys, containing a young alligator supposed to have been dead for a number of hours, for the purpose of collecting a wounded anhinga, I was surprised, on lifting the bird into the boat, to find the alligator suddenly come to life, and make a dashing onslaught on its unfortunate victim.

The Floridians frequently speak of two varieties of alligator, the red-eyed, which is reported to be the more savage, and the common black-eyed. We observed several individuals of the former, which is also

distinguished by a lighter-colored armor, but unfortunately none of the specimens actually obtained by us seemed to show the distinguishing character—or, in other words, all of them were of the common type. Not improbably, as suggested by Dr. Leidy, the red-eye is an albinistic variety. It must be observed, however, that the red-eyed variety in swimming appears in its whole length on the surface of the water, whereas the common form has usually only its nose and eyes, or the head and a portion of the convex body exposed; at least, this was our observation. It is just possible, although not very probable, that we have two distinct species of alligator represented in these southern wilds, and if the crocodile occasionally makes its appearance in Biscayne Bay, why may not also the cayman, or another of its South American congeners? We searched among our specimens for a crocodile, but without success.

The largest alligator killed by us measured about ten feet, but the greater number were much below this figure. We observed, however, several of considerably larger size, and one whose length was estimated at between fourteen and fifteen feet. From several of the individuals we took a number of the peculiar mouth-infesting leech which the species harbors, and from the stomach of one a wholly undigested young bass, measuring about three inches.

The only other reptiles observed in this region were a few individuals of the goitered-lizard (Anolis), and a species of water-snake, apparently new to science, which I picked up in a lettuce-bonnet in Eagle Bay, about two miles west of the mouth of Taylor's Creek.

A few words relative to the ophidian fauna of the peninsula may perhaps not be amiss in this place. It is the common belief that snakes are very abundant in the State, and that traveling in the forest or bush region is made dangerous through their presence. In how far this may be true I am unable to say, but our experience seems to indicate that the abundance of these reptiles, of both the venomous and non-venomous species, is not nearly as great as is currently reported. It is true that our explorations were mainly confined to a border-tract country, and largely to a region of swamp and water, but yet we saw sufficient of the mainland to permit us to form a general notion as to the occurrence of these animals. The total number of snakes seen by us during our entire explorations was about eight, of which at least two were the common black snake (*Bascanion constrictor*), one the water-snake above mentioned, and the remainder in greater part moccasins. Mr. Willcox, who remained along the west coast several weeks after the completion of our general explorations, observed three or four additional individuals along the Homosassa, two of which (moccasins) were secured. We found no trace of the much-dreaded rattlesnake, although the sad experience of a member of a hunting party of the year previous only too truly proves its

presence here. The arid sand tracts covered with a dense growth of saw palmetto are the reputed favorite haunts of this animal, and it is here, probably, that the greatest precaution need be had in traveling. Our first moccasin, the one killed on Perico Island, Big Sarasota Bay, was found on a tract of this kind, coiled on the stalk of one of the palmetto leaves. As has already been said, it manifested no disposition to attack, even after being struck with a rake, and it is the common observation here that, unlike the rattlesnake, this equally venomous serpent rarely provokes an encounter, preferring to remain quiet except under immediate provocation, or when impelled in the direction of a food-supply. While gathering fossils in one of the banks of the Caloosahatchie I was for some time in unconscious proximity to one of these animals, whose head, as I am informed by Mr. Willcox, who accompanied me, was less than two feet of my own. Despite our close range, the reptile made no attempt either to escape or to attack, remaining motionless on the overhanging branch from which it was suspended. All things considered, the danger to travelers in Florida from snake bites is inconsiderable, and probably not much more than in many of the proverbially snake-ridden districts of some of our northern States, Pennsylvania or New York, for example. We certainly met with no trace of that swarm of venomous serpents which Bartram reported issuing from almost every stump, nor is it likely that the somewhat unfavorable period of the year during which our journey was undertaken, the hibernating period, will account for the diversity of our success in snake hunting or snake seeing.

Our anchorage in the mouth of Taylor's Creek was almost the only locality where we were seriously annoyed by mosquito pests, although one of our nights in the Caloosahatchie palm forest was passed to the tunes of the little piper. We were, however, in advance of the mosquito season, May—August, when the air is represented to be thick with this social insect. The general dearth of insect life was astonishing, and far from realizing that we were traveling towards the region of its greatest development, it appeared just the reverse. Only on the water surface, or in the lettuce-bonnets, if we except the mosquitos, was there a semblance to anything like profusion. The spiders were here especially plentiful, representing a number of distinct types (Lycosids, Phalangids, etc.), some of them of remarkable beauty. But the nectar-loving insects of the north, the Lepidoptera and Hymenoptera, were practically entirely wanting, a necessary consequence of the almost total absence of flowering plants. This remarkable paucity in the insect life of the region must doubtless be attributed in great part to the early season, and possibly also in a measure to the effects of the recent cold wave of the north.

We found numerous small mollusks, one or more species of Planorbis (*P. lentus*), Limnea (*L. columella*), Physa (*P. gyrina*), and Sphærium (*S.*

stamineum), attached to the under surfaces of the lettuce bonnets, or to their roots, which also supported numbers of diminutive leeches, and two or more forms of crustaceans, one of them a species of Pandalus. The shells were in nearly all cases very thin, and translucent.

Fauna of Lake Okeechobee.—All our observations tend to belief that the fauna of the lake is a very deficient one, and that it is distinctly uniform for the greater part of its extent. We dragged at intervals all along our traverse, with the result of bringing to the surface scarcely more than a half dozen species of animals. Indeed, if we leave out of account the immediate border line of the lake, the entire catch consisted almost exclusively of two species or varieties of Paludina (*P. Georgiana, P. lineata*), and two or three species of Unio (*U. Buckleyi, U. amygdalum*). These mollusks, together with a minute Bythinella-like gasteropod of uncertain relationship, were exceedingly abundant in the lake just off the mouth of the canal, and the dredge came up laden with their shells. Only a comparative few of the shells were without the animals, and in such cases they were largely water-worn, and decalcified. A large proportion of the living Unios had their umbones eroded. Out toward Observation Island the mollusks became much less numerous, but on the north of the lake, between the mouth of the Kissimmee River and Taylor's Creek, they again became plentiful, especially along the beach line of the latter water, where the shells, in company with those of *Venus cancellata*, already mentioned, were thrown up in considerable abundance. They were also fairly plentiful in the vegetable muck of Eagle Bay. The remaining species of Mollusca observed in the lake were the forms to which reference has already been made as occurring on the shore of Observation Island, and on the leaves and roots of the lettuce-bonnets of both Taylor's Creek and Eagle Bay. They are *Limnea columella, Planorbis lentus, Physa gyrina*, and *Sphærium stamineum*. Off Observation Island I scooped up a rock made up essentially of minute Bythinellæ (?), but whether this was of an absolutely recent formation, or a fragment derived from some hidden fossiliferous deposit, I was unable to determine with positiveness.* The species of shell contained in the rock was identical with that dredged up in association with the Unios and Paludinas.

A large proportion of the hauls brought up considerable numbers of a fresh-water shrimp of the genus Pandalus, identical with the species

* The affinities of the little gasteropod are doubtful. The surface of the shell is distinctly costulated, and to this extent different from that of any species of the genus with which I am acquainted. Ober mentions a minutely fossiliferous rock occurring toward the southern border of the lake, which is not unlikely structurally identical with the fragment above mentioned.

found in Lake Hikpochee and the connecting canal, which in its general characters approaches very closely some of the more northerly marine species. In Eagle Bay I collected a solitary young cray-fish, the only specimen of this group of the decapod Crustacea observed during our entire trip. The red larva of a species of annelid, measuring about three-quarters of an inch in length, is sufficiently abundant in the bed of the lake, but we were unable to discover the adult which it represents. The same species was also abundant in Lake Hikpochee, while a slightly differing, emerald-green, form was found in the canal connecting the two lakes.

Of the vertebrate life of the lake we found but few traces. The only species of fish obtained by us were the black-bass and cat-fish, both of them of good size. A specimen of the latter, obtained some distance out from the mouth of the Kissimmee River, measured about twenty inches in length. It appears to be specifically distinct from any of the described forms, and I have accordingly proposed for it the name of Okeechobee cat (*Ictalurus Okeechobeensis*). We found the bass very plentiful just at the entrance to Eagle Bay, where the fish were readily caught by means of the trolling line. This method of fishing was also tried for a long time on the open expanse of the lake, but without success. We observed here at intervals a larger fish jump from the water, but the impossibility of a near approach prevented us from ascertaining the species; not improbably it was a sturgeon.

We found the alligator nowhere about the lake, except on its immediate border line—as in the lagoons opposite Observation Island, or in Eagle Bay. This condition was also observed in the case of Lake Hikpochee. Whether these animals perform long journeys by water, or not, I am unable to say, but as far as our own observations go, it would appear that they do not. I noticed two individuals off the mouth of Taylor's Creek swimming leisurely in the lake at a distance of perhaps two or three hundred feet from the actual border.

*** The remarkable parasite described on page 46, and doubtfully referred to Clusia, is, I am informed by Mr. A. H. Curtiss, of Jacksonville, Fla., a species of fig (*Ficus aurea*). It is said to at first feed on other trees, "but finally, by sending down multitudes of intergrafting roots, it completely enwraps and smothers the supporting tree and forms a hollow trunk of its own."