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A BIOLOGICAL RECONNAISSANCE OF OKEFINOKEE  
SWAMP: THE BIRDS.

*Plates XIV-XX.*

BY ALBERT H. WRIGHT AND FRANCIS HARPER.

THE famous Okefinokee, 'the greatest natural wonder' of Georgia, and 'one of the least known areas of its size in the eastern United States,' covers parts of Charlton, Ware, Clinch, and Pierce Counties, and extends a little beyond the Florida line. It is about 39 miles in greatest length by 26 miles in greatest width, and occupies some 660 square miles. Among the fresh-water swamps east of the Mississippi, it is exceeded in size only by the Everglades; and in the richness of its historical and literary associations, in its diversified topography, in the marvelous beauty and charm of its interior, and in its extraordinary interest as a faunal and floral area, Okefinokee Swamp is unique.

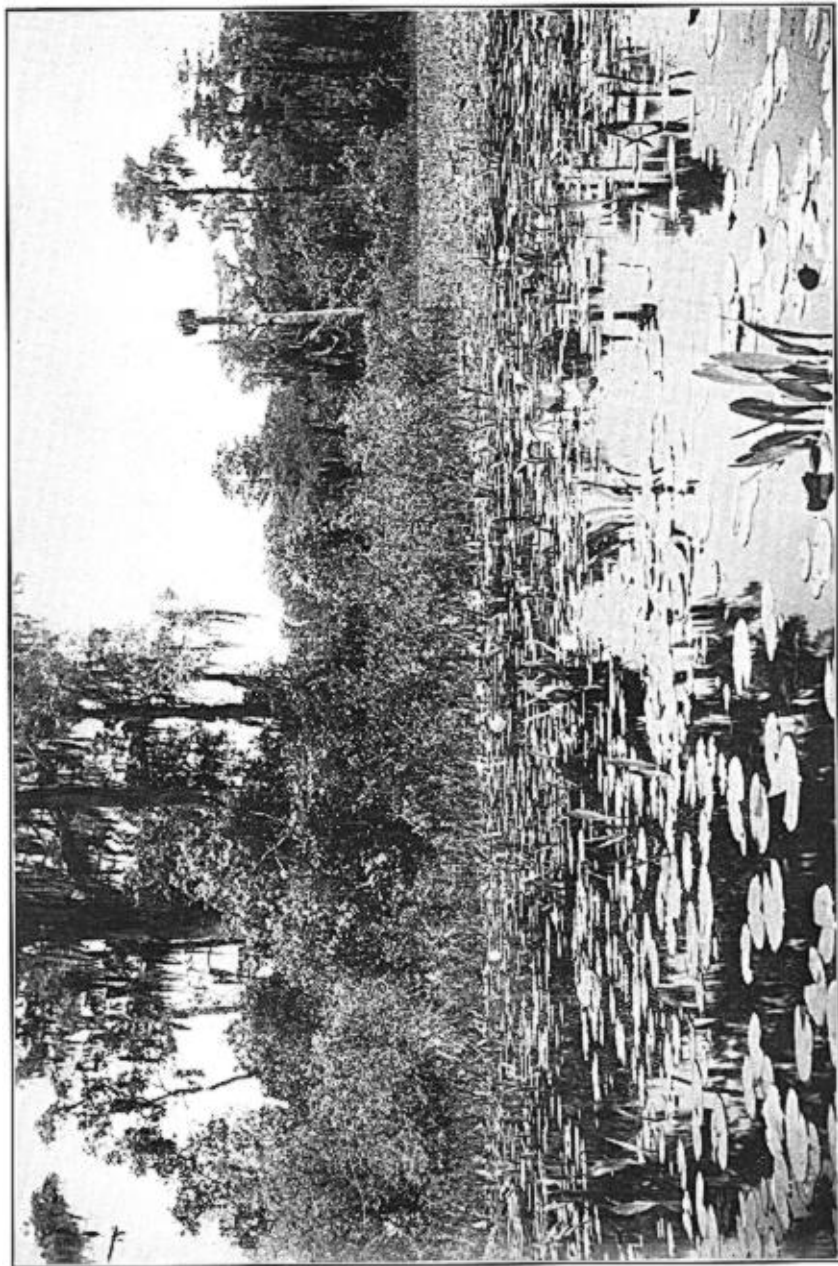
## HISTORY.

A volume might be written concerning the history of the Okefinokee, of which we shall give here only the briefest abstract. From very early times this swamp has been the subject of strange legends and fanciful speculation. As long ago as 1682 it appeared on a map<sup>1</sup> as a 'Lacus Mag[nus]' at the source of the St. Mary's River (Rio de May), and in 1776 it was represented<sup>2</sup> as the 'Great

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<sup>1</sup> Winsor, J. Narr. & Crit. Hist. America. Vol. IV, 1884, p. 227.

<sup>2</sup> The American Military Atlas, 1776, Map 5.



CYPRESS 'HEADS' ON CHASE PRAIRIE, WITH A FISH HAWK'S NEST.

Swamp Owaquaphenoga,' its boundaries reaching almost to the Flint River. This was the heart of the country of the Lower Creeks and Seminoles, who enshrouded the swamp with mystery and peopled it with an immortal race which neither they nor the Spaniards could conquer. In Bartram's well-known account<sup>1</sup> of this pleasing legend, one of the islands in the swamp is represented as 'a most blissful spot of the earth; . . . it is inhabited by a peculiar race of Indians, whose women are incomparably beautiful,' and are called 'daughters of the sun.'

The Okefinokee has repeatedly served as a refuge for non-combatants or the weaker side in wars. During the Revolution some Indians who were unwilling to take part in the war settled here. In the Seminole or Florida War it proved an almost impregnable fastness for the Creeks and Seminoles. At this period a number of the places in the swamp and its vicinity received their present names, e. g., Billy's Island and Billy's Lake (after Billy Bowlegs, a Seminole chief), and Floyd's Island (after Gen. John Floyd, who dislodged some Indians from this island). In the Civil War Confederate deserters sought its protection, and even to-day miscreants flee here to evade the arm of justice.

The swamp has been the subject of untold memorials and petitions on behalf of the legislatures and the officials of Florida and Georgia. In 1800 the first good boundary line between these two states was established by Ellicott, and his famous mound in the southeastern corner of the swamp is not yet entirely obliterated. In 1829, in 1850 (approximately), and finally in 1879, the Okefinokee commanded attention because of a projected ship canal connecting the Atlantic Ocean with the Gulf. At the last date a careful survey of its confines was made for the federal government. It was proposed to send feeders for the canal into the swamp, and the canal itself was to pierce its southern part.

Of drainage investigations and commercial operations in the swamp, a few excerpts from McCallie's 'Drainage Situation in Georgia'<sup>2</sup> will suffice to furnish an account. He speaks first of 'Col. R. L. Hunter's survey of the Okefinokee Swamp, made in 1856-7. . . , with a view of ascertaining the practicability of its

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<sup>1</sup> Bartram, Wm. *Travels, etc.* Phila., 1791, p. 25.

<sup>2</sup> McCallie, S. W. *Bull. 25, Geol. Survey of Ga., 1911, pp. 14-18.*

drainage, the cost of the same, etc. . . . There was furnished to the Governor a map of the swamp, with the elevation around the whole swamp and lines of ditches, which it was estimated would drain the swamp at a cost of \$1,067,250. . . .

'On November 4, 1875, by direction of Governor J. M. Smith, the party of the Geological Survey operating in Southern Georgia joined the "Constitution Expedition," organized by the proprietors of the paper of that name in Atlanta, and remained until December 14th. A line of levels was run by Mr. C. A. Locke, engineer of the "survey," from Mixon's Ferry on Suwanee River to Trader's Hill on St. Mary's, . . .

'In 1889, the Okefinokee Swamp, or that part of it owned by the state of Georgia, comprising an area of 380 square miles, was purchased by the Suwanee Canal Company at 26½ cents per acre. The object of this company in acquiring the swamp was, first, to utilize the timber which was known to exist therein in large quantities, and subsequently to drain the swamp and use the lands for agricultural purposes. With these objects in view, the canal company began, in September, 1891, the construction of a canal from St. Mary's River to the swamp, a distance of about six miles. Later this canal, which was 45 feet wide and six feet deep, was continued into the swamp for something like 12 miles. . . . The Suwanee Canal Company, under the presidency of Captain Henry Jackson, of Atlanta, was successful in winning a large amount of cypress and other timber from the eastern side of the swamp, but operations were discontinued before the canal was sufficiently completed to have but little effect in draining the swamp as a whole. The large holdings of the Suwanee Canal Company have, within the last two or three years, been acquired by the Hebard Lumber Company, which is at present engaged in cutting and preparing for market the timber in the large cypress forest on the northwestern margin of the swamp.'

Few men of scientific interests or training have ever entered the swamp, and still fewer have traversed or explored any considerable part of it. Paul Fountain, in his 'Great Deserts and Forests of North America,' speaks of visiting it in 1871 and 1876, but his description is so far from what would be expected of one who had been in the interior, that it is extremely doubtful if he saw more than the borders of the swamp.

Doubtless the first ornithologist to see the real Okefinokee was Mr. C. F. Batchelder, who, about twenty-five years ago, entered on the eastern side and went as far as Black Jack Island, where he remained a day or two.

Maurice Thompson's writings contain some interesting references to the Okefinokee. His observations on the nesting of the Ivory-billed Woodpecker, so delightfully described in 'A Red-headed Family,'<sup>1</sup> were made 'in one of those shallow cypress lakes of which the larger part of the Okefinokee region is formed'; and he remarks further that 'Near by, to the westward, lay one of those great gloomy swamps, so common in southeastern Georgia, so repellent and yet so fascinating, so full of interest to the naturalist, and yet so little explored.' What appear to have been later experiences with the Ivorybill in the same locality are recounted in 'An Archer's Sojourn in the Okefinokee.'<sup>2</sup> In this paper, however, he states that his *locus* was exactly twenty miles southeast from Blackshear, Ga., on a branch of the Satilla; and this places it in or near an area sometimes known as Little Okefinokee Swamp, which is entirely separate from the real Okefinokee, and miles distant from it. In 'My Winter Garden,'<sup>3</sup> also, Thompson speaks casually of having been 'deep in the Okefinokee'; and yet it is almost inconceivable that he could have seen for himself the marvels of the swamp's interior without treating them extensively with his gifted pen.

In August, 1902, R. M. Harper and P. L. Ricker spent two days in the swamp, devoting their attention chiefly to botanical exploration. They traversed the whole length of the canal and made a side trip to Bugaboo Island. The former has published the most complete account<sup>4</sup> of the swamp that has yet appeared. Not only this article but also Dr. Harper's notes on the plants have helped us in the preparation of the present paper.

Prof. Albert M. Reese, while studying the breeding habits of the alligator, visited the Okefinokee in the summers of 1905 and 1906, on the second occasion 'penetrating the swamp to its centre.'<sup>5</sup>

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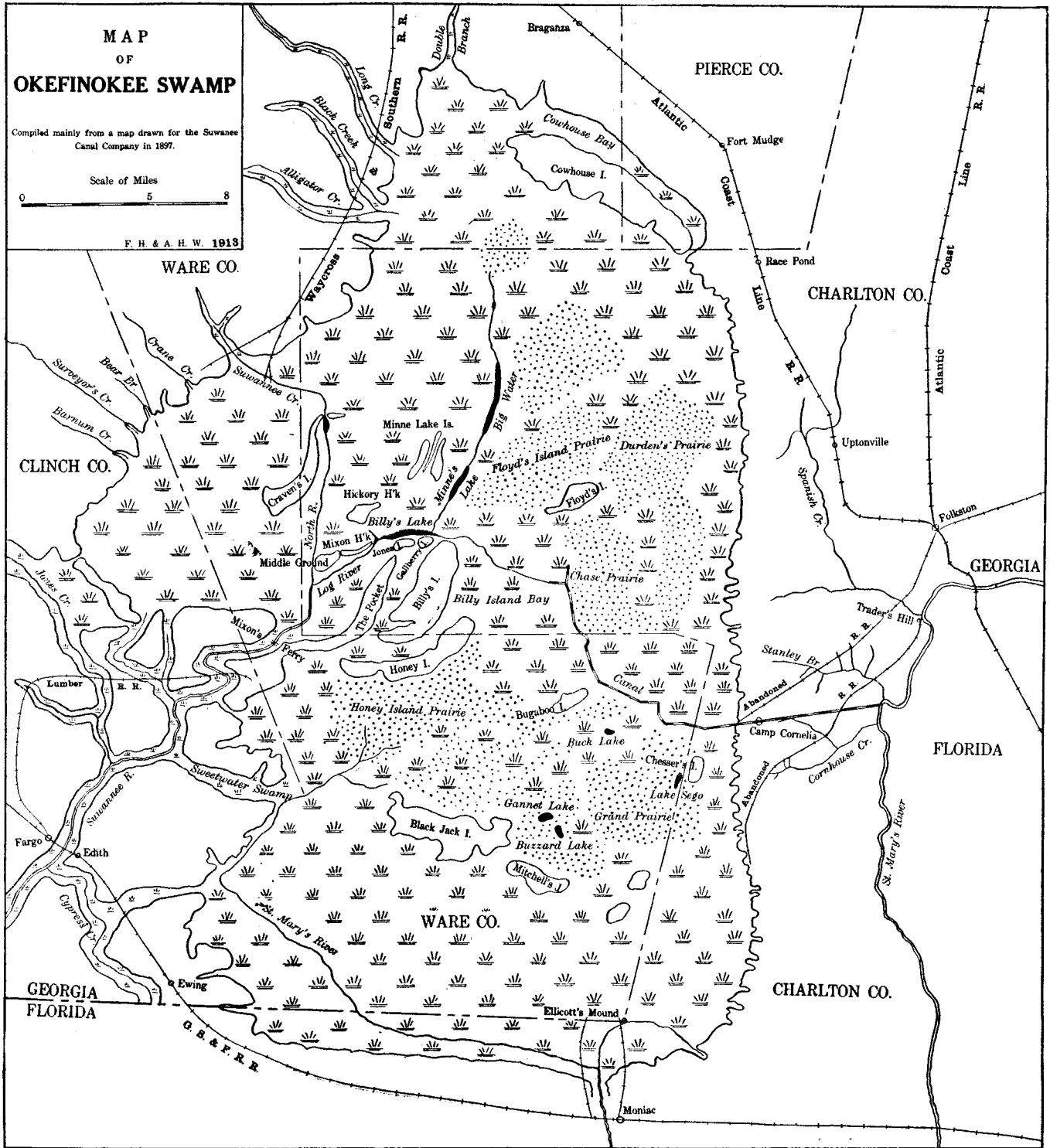
<sup>1</sup> Thompson, Maurice. *By-ways and Bird Notes*. New York, 1885, pp. 23-39.

<sup>2</sup> ——— *Atlantic Monthly*, LXXVII, April, 1896, pp. 486-491.

<sup>3</sup> ——— *My Winter Garden*. New York, 1900, p. 222.

<sup>4</sup> Harper, R. M. *Okefinokee Swamp*. *Popular Science Monthly*, LXXIV, June, 1909, pp. 596-614.

<sup>5</sup> Reese, A. M., *Smith. Misc. Colls.*, XLVIII, 1907, Quart. Issue, Vol. III, Part 4, pp. 381, 382.



The Soil Survey of the Waycross Area, published by the U. S. Department of Agriculture in April, 1907, contains a fairly good description of the northern end of the swamp.

Prof. J. M. Reade, of the University of Georgia, and Mr. Huron Smith, of the Field Museum of Natural History, both Cornellians, entered the swamp by way of the canal in December, 1909, and made botanical investigations during a stay of a week.

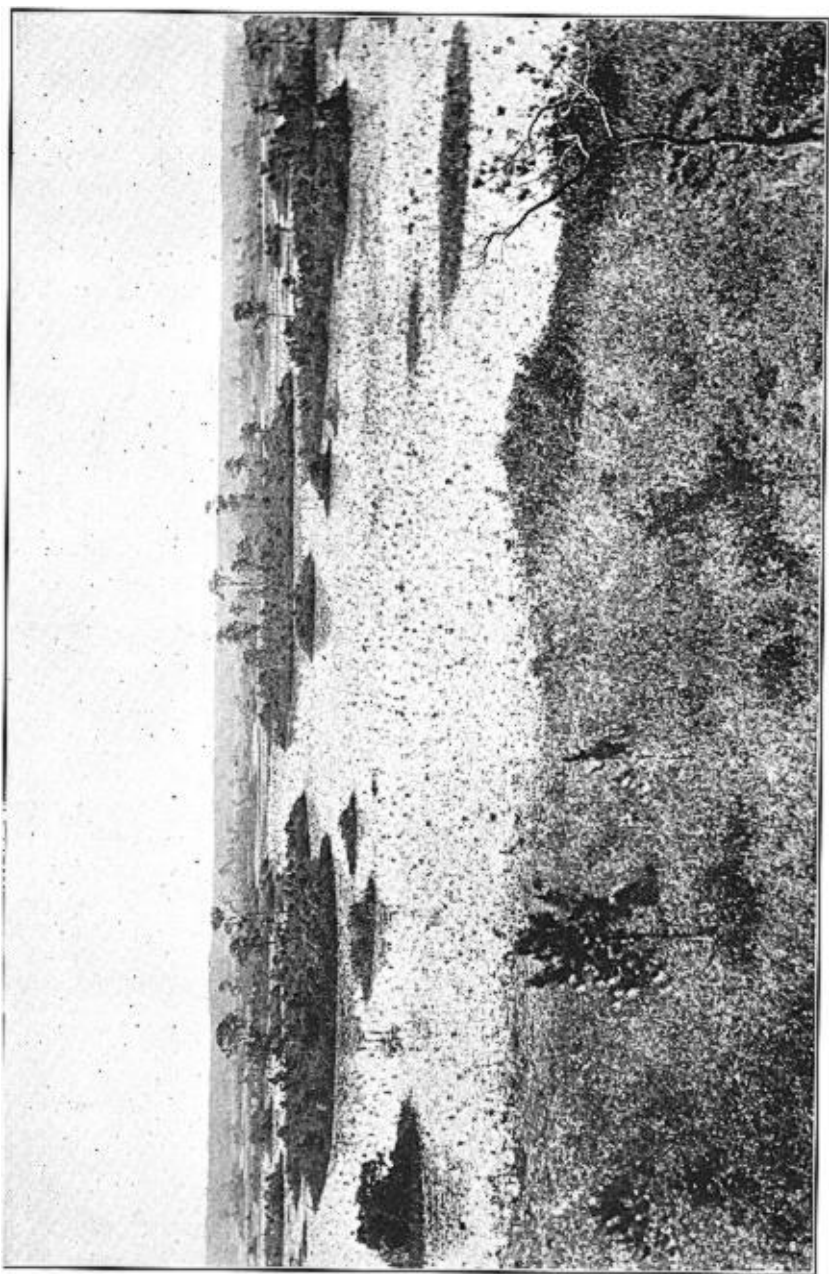
Our own observations covered most of the period from May 6 to July 13, 1912. On the first-mentioned date Harper, with David Lee as guide, entered the swamp by way of Suwannee Creek on the northwestern side, but finding the route practically impassable after the first few miles, they made a detour through Waycross and Braganza to the northeastern side. Setting out again by boat from Cowhouse Island on the morning of May 8, they reached Billy's Island that night, meanwhile having passed through the Big Water, Minne's Lake, and the eastern end of Billy's Lake. During the next fortnight, with Billy's Island as a starting point, trips were made to Mixon's Hammock, Honey Island, the canal and Chase Prairie, Floyd's Island Prairie, and Floyd's Island. An effort to reach the Minne Lake Islands was also made, but failed. On May 23 they departed from the swamp, as they had entered, by way of Cowhouse Island.

On May 28 the Cornell University Expedition proceeded from Fargo on the southwestern side of the swamp. The party included Professors J. C. Bradley and C. R. Crosby, of the Dept. of Entomology, Dr. A. H. Wright, of the Dept. of Zoölogy, S. C. Bishop and M. D. Leonard of the class of 1913, Headmaster W. D. Funkhouser of the Ithaca High School, and Paul Battle, of Bainbridge, Ga. Mr. E. L. Worsham, State Entomologist of Georgia, and Mr. C. S. Spooner, Asst. State Entomologist, accompanied the party during the first week, and to them we are indebted for several favors. Professor Bradley had made previously (1909, 1910, and 1911) brief reconnaissances on the eastern (Suwannee Canal) and northwestern (Suwannee Creek) borders of the Okefinokee. From Fargo, the party was transported on a lumber tramway to a point about two miles from Mixon's Ferry. Thereupon, with guides whom Mr. R. W. Bennett, of the Fargo Land Company, had kindly secured for us, we began a walk of ten or twelve miles over corduroy

roads, sometimes waist-deep, to Billy's Island, where camp headquarters were established. The route from Fargo to the camp, by way of Mixon's Ferry, the Pocket, Jones Island, and Gallberry Island, was frequently traversed. Billy's Island, Billy's Lake, and Mixon's Hammock were quite thoroughly explored. Honey Island, Honey Island Prairie, Floyd's Island Prairie, and Floyd's Island were visited for periods covering from one to three days. A special trip was made to a heronry between Fargo and Mixon's Ferry. Two attempts were made to reach the Minne Lake Islands, the first from Minne's Lake due west, and the second from Billy's Lake due north. The entire party was successful in making the second trip. On July 13 we left the swamp, coming out by way of Billy's Lake, Log River, and Suwannee River to Mixon's Ferry — a course frequently explored during our sojourn in the swamp.

A few words should be said here concerning the Lee family of Billy's Island, to whom we are indebted for much valuable information concerning the Okefinokee and its natural history. Throughout our stay in the swamp we were in daily contact with these people, and employed four of the men as guides. The family settled here about thirty years ago, and have remained the only permanent inhabitants of the swamp's remote interior. (Two other families, long known as inhabitants of the swamp, are the Mixons on the western, and the Chessers on the eastern borders.) During their long residence in the heart of the swamp the Lees have gained an unusually intimate acquaintance with the various forms of its plant and animal life. They not only have names for practically all the birds except some of the smaller and less distinctive Passeres, but could also give interesting and very trustworthy accounts of their habits. They are likewise familiar with most of the other vertebrates. Their knowledge of the plants of the swamp is scarcely less full; and there were few species that they could not name for us. While most of their local names are either exactly or recognizably similar to those in general use in the South, others appear to be altogether unique; and we consider them all of such interest as to be worthy of inclusion in the annotated list of species.





CHASE PRAIRIE, WITH PINE 'HEADS.'

## HABITATS.

In the eastern United States few, if any, areas of equal extent afford such exceptional opportunities for the study of animal life in a primeval state as does Okefinokee Swamp. Handicapped as we were by time and the difficulties of exploration, we can make this report only a preliminary survey of ecological conditions which might well occupy years of immediate and attentive study, before the commercial encroachments destroy this paradise for the present-day naturalist.

As R. M. Harper<sup>1</sup> has pointed out, 'The various aspects of different parts of Okefinokee Swamp seem to depend almost entirely on the distance of the sandy bottom below or above the water level.' The swamp may be divided conveniently into four major ecological divisions: the islands, the cypress 'bays,' the prairies, and the watercourses. The cypress 'bays' and the prairies are probably about equal in area, and cover by far the greater part of the swamp. A glance at the map (Plate I) will show the extent of the islands and the more important prairies. Though all of the swamp, exclusive of the islands, is inundated, the smallest of the four divisions is the open watercourses.

*The islands.* These are covered for the most part with pine barrens (Plate XVII). The long-leaf pine (*Pinus palustris*) predominates in the drier areas, and the slash pine (*P. Elliottii*) in the more moist situations. Beneath the pines is an abundant and practically continuous growth of saw-palmetto (*Serenoa serrulata*). Intermixed with it is a heath (Ericaceae) society, composed of several species of huckleberries (*Gaylussacia*) and blueberries (*Vaccinium*), 'poor grub' (*Xolisma ferruginea*), 'gallberry' (*Ilex glabra*), and 'calico bush' (*Kalmia hirsuta*). The huckleberries and blueberries grow in the utmost profusion, and form an important element in the food of many birds and mammals. A third and lower group of plants consists of sedges and other small herbs. The islands are so flat and rise so slightly above the level of the swamp, that there is very little drainage; and after rains the sandy soil is covered with water in many places. Over the limited

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<sup>1</sup> *Loc. cit.*, p. 606.

land surface crawl numerous snakes, among which may be mentioned the spreading adder (*Heterodon platyrhinus*), black snake (*Zamenis constrictor*), king snake (*Ophibolus getulus*), and three species of rattlesnakes (*Crotalus adamanteus*, *C. horridus*, and *Sistrurus miliarius*). The Florida terrapin (*Chrysemys floridana*) and the southern soft-shelled turtle (*Trionyx ferox*) come upon the islands in large numbers to deposit their eggs, which furnish a much-prized article of diet for the predaceous mammals, such as the opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), Florida bear (*Ursus floridanus*) skunk (*Mephitis elongata*), and wild cat (*Lynx ruffus*). That the ground-loving birds maintain themselves while so many enemies are rampant in these restricted quarters, is surprising. Furthermore, some of the islands are often burnt over by the residents or by hunters in order to improve the grazing or to facilitate hunting. Among the birds that are most typical of this habitat and show a decided preference for it, are the Bob-white, Red-cockaded Woodpecker, Wood Pewee, Florida Blue Jay, Southern Meadowlark, Pine-woods Sparrow, White-eyed Towhee, Summer Tanager, Pine Warbler, Brown-headed Nuthatch, and Bluebird. The Sandhill Crane, Florida Red-shouldered Hawk, Yellow-billed Cuckoo, Southern Hairy Woodpecker, Pileated Woodpecker, Red-headed Woodpecker, Red-bellied Woodpecker, Kingbird, Crested Flycatcher, Yellow-throated Warbler, Carolina Wren, and Florida White-breasted Nuthatch also occur here (and most of them commonly), but at the same time are found in greater or less numbers elsewhere within the swamp.

The pine barrens surrounding the swamp bear a general resemblance in topography and vegetation to those on the islands, but are for the most part somewhat higher and drier. They have suffered much from the lumbering and turpentine industries. Among the birds, the Wild Turkey, Mourning Dove, Sparrow Hawk, Southern Hairy Woodpecker, Flicker, Chuck-will's-widow, Nighthawk, Purple Martin, and Brown Thrasher appear to be more common in the environs than in the pine barrens within the swamp. Among the other groups, it is asserted that such forms as the gray fox (*Urocyon cinereoargenteus*), 'salamander' (*Geomys*), and coachwhip snake (*Zamenis flagellum*) do not reach the Okefinokee islands. An intensive study and comparison of the two faunas would doubtless reveal other interesting differences.

The hammocks occupy practically the whole of some of the smaller islands, and the borders of some of the larger ones (Plate XX). The tree growth here consists of such species as 'spruce pine' (*Pinus Tæda*) 'live oak' (*Quercus geminata?*), 'water oak' (*Quercus nigra*), 'loblolly' (*Magnolia grandiflora*), 'sweet bay' (*Persea pubescens*), and sweet gum (*Liquidamber Styraciflua*). Saw-palmetto forms a conspicuous part of the undergrowth. The Pileated Woodpecker, Red-bellied Woodpecker, Crested Flycatcher, Acadian Flycatcher, Cardinal, Hooded Warbler, and Carolina Wren are the common birds of this habitat; it is noteworthy, however, that none of them are confined to it. Our few records of the Red-eyed Vireo within the swamp were made in the hammock on Billy's Island.

*Cypress 'bays.'* (Plates XX and XVIII.) The dominant plant growth of the 'bays' is the pond cypress (*Taxodium imbricarium*); and probably nowhere else in the world does it attain a heavier growth or finer proportions. The river cypress (*T. distichum*) also is found in some places, especially along the lakes and 'runs.' Among other important trees are the black gum (*Nyssa sylvatica*), red bay (*Gordonia Lasianthus*), white bay (*Magnolia virginiana*), and sweet bay (*Persea pubescens*). The red maple (*Acer rubrum*) is less common. From the trees hang great festoons of Spanish 'moss' (*Tillandsia usneoides*). The undergrowth consists of such plants as the 'hurrah bushes' (*Pieris nitida* and *Leucothoë racemosa*), 'gallberry' and other shrubs, tall ferns (*Lorinseria* and *Osmunda*), and poison ivy (*Rhus radicans*). In many places the 'bamboo vine' (*Smilax laurifolia*) and the muscadine (*Vitis rotundifolia*) bind the undergrowth into an impenetrable tangle. As a general rule, these shrubs and vines are more abundant at the edges of the 'bays' along the watercourses, where they receive more sunlight than within the depths of the cypress forests. During our stay the water in the 'bays' stood at an average depth of several feet, but in drier seasons this depth is greatly reduced and the underlying muck is exposed over large areas.

The southern gray squirrel (*Sciurus carolinensis*), raccoon, Florida bear, and wild cat are at home in the cypress 'bays.' The pied water snake (*Natrix taxispilota*) and the cottonmouth (*Ancistronodon piscivorous*) drop from the bushes along the 'runs' as one

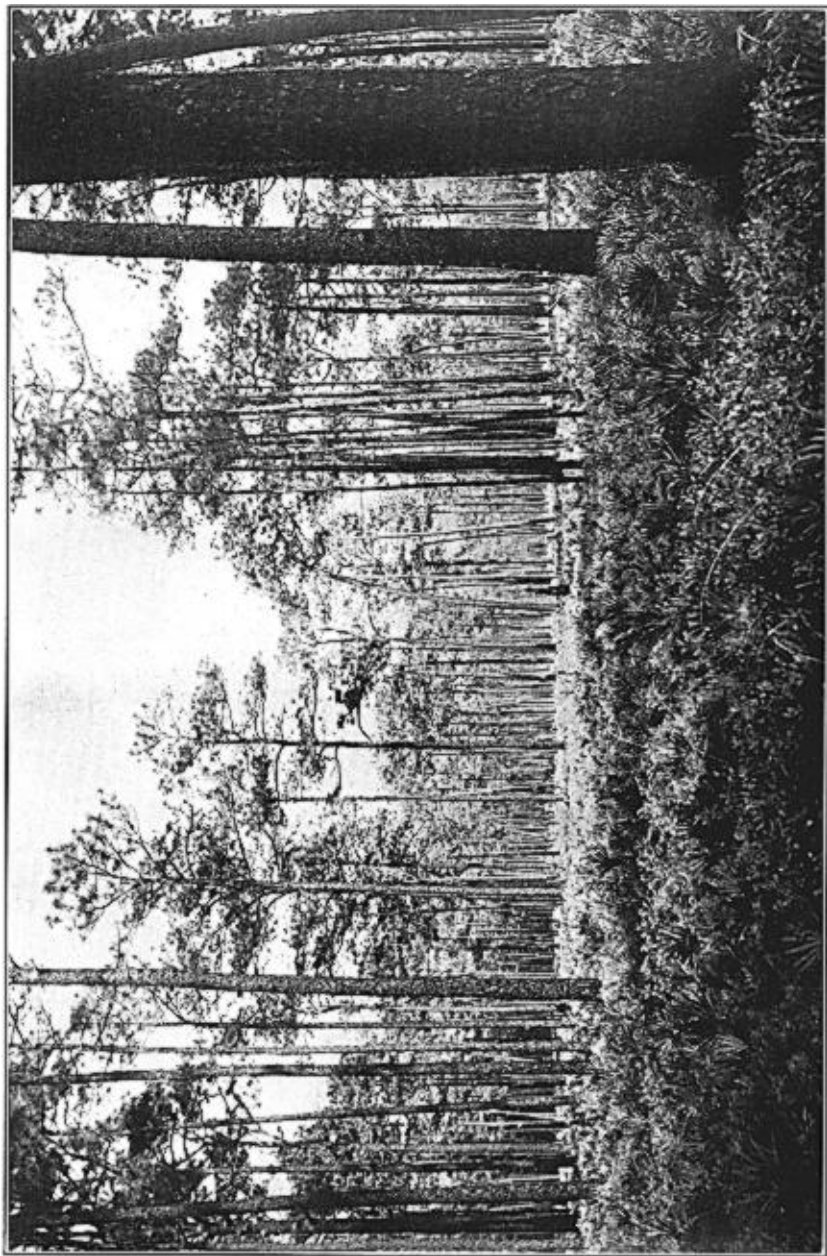
paddles by. The birds most typical of this habitat are the Florida Barred Owl, White-eyed Vireo, Prothonotary Warbler, Swainson's Warbler, and Parula Warbler. Others that are not confined to the cypress 'bays,' but are more common here than in any other habitat, are the Florida Red-shouldered Hawk, Yellow-billed Cuckoo, Pileated Woodpecker, Acadian Flycatcher, Cardinal, Carolina Wren, Tufted Titmouse, and Carolina Chickadee. Among the more generally distributed forms that occur here in numbers are the Red-bellied Woodpecker, Crested Flycatcher, Yellow-throated Warbler, Hooded Warbler, and Florida White-breasted Nuthatch.

There are several minor ecological divisions that bear more or less resemblance to the cypress 'bays.' These are the cypress ponds, sphagnous bogs, and prairie 'heads.'

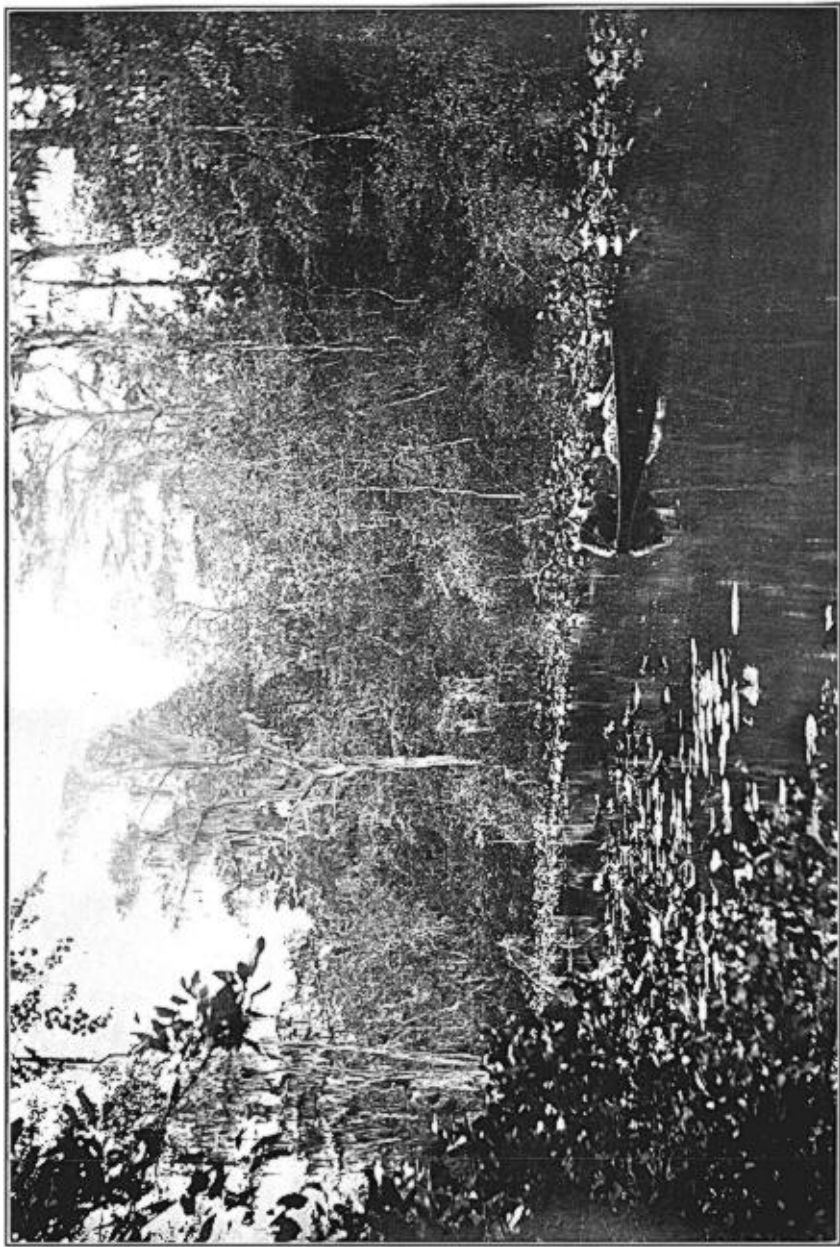
Within the larger islands are many small cypress ponds, generally of only an acre or two in extent. (Plate XIX.) They do not differ greatly from the cypress 'bays,' although the trees are not so close together and the undergrowth is for the most part confined to the edges. Frequently an alligator makes this its haunt. Practically every one of the ponds furnishes a home for a pair of Prothonotary Warblers and for a pair of Florida Yellowthroats as well. The flocks of Florida Grackles are found most commonly here, and the Carolina Chickadee is frequently noted. The Wood Ibis also is said to feed in these ponds.

In some cases the cypress 'bays' directly adjoin the islands. A number of islands, on the other hand, are enclosed by sphagnous bogs of varying width, beyond which lie the prairies. In the bogs the cypresses are smaller and grow much more openly than in the 'bays'; the slash pine also is common. The plants of the undergrowth, which is extraordinarily thick, are much the same here as in the 'bays,' but they also include the pitcher plants (*Sarracenia minor* and *S. psittacina*). A dense bed of sphagnum, which sways and quivers underfoot, rests upon the water and muck. Some of the prairie 'heads,' (Plate XVI), in which slash pines replace the cypresses, and where the sphagnum grows in great profusion, may also be included in this division. Our observations in this habitat, though very limited, apparently show that the bird species are far from numerous.

The cypress 'heads' or 'houses' (Plate XIV) on the prairies vary



PINE BARRENS ON BILLY'S ISLAND.



in size from a clump of a few trees to areas of a mile or more in extent, the latter differing little, if at all, from the cypress 'bays.' The smaller 'heads' are generally covered with buttonbushes (*Cephalanthus occidentalis*), 'hardwood' (*Cyrilla racemiflora*), white alders (*Clethra alnifolia*), 'hurrah bushes,' and 'bamboo vines'; and enclosed within this shrubby tangle are white bays sweet bays, and a few taller cypresses. Some islets of this sort contain ground dry enough to furnish camping sites. The Yellow-billed Cuckoo, Kingbird, Florida Grackle, Yellow-throated Warbler, Florida Yellow-throat, and Carolina Wren are common here. We also found the Water-Turkey, Ward's Heron, and the Fish Hawk nesting in these 'heads.'

*Prairies.* (Plate XVI.) The 'prairies' of the Okefinokee are by no means prairies in the ordinary sense of the term. One prairie may differ considerably from another, but all are essentially flooded marshes, or shallow lakes filled to a great extent with aquatic vegetation. In wet seasons one may pole his boat almost at will over these expanses; during dry summers, however, the muck is exposed, and little water is left except in the deeper parts, such as the 'gator holes.' On Floyd's Island Prairie the water is so shallow, even during the wettest seasons, and the sphagnum and other aquatic plants grow so profusely, that navigation is extremely difficult, if not impossible, over a large portion of this area. The plants of the prairies have their roots in the underlying muck, which in turn rests upon a sandy bottom. The vegetation is arranged in several distinct zones. In the deeper and more open parts, the species of greatest abundance and most widespread distribution is the white water-lily (*Castalia odorata*). Interspersed with it are arrow-head (*Sagittaria*), 'wampee' (*Pontederia cordata*), 'bull-tongue' (*Orontium aquaticum*), arrow arum (*Peltandra*), and other characteristic aquatic herbs. Here and there the water-lilies are replaced by purple bladderworts (*Utricularia purpurea*), upon the seeds of which raccoons and winter Ducks feed regularly. In the shallower parts, thick beds of 'maiden cane' grow. This zone is especially noticeable around the edges of some of the cypress 'heads,' the shrubs and trees of which rise in succession behind it. Saw-grass, also, grows with the 'maiden cane' in some small open glades (which may be likened to prairies) within the cypress 'bay' north of Billy's Lake.



The bears wander from 'head' to 'head' across the prairies, and in the sphagnum bordering the 'heads' are seen the trails, or so-called 'slides,' of otters (*Lutra hudsonica*). Among the water-lilies abound ribbon snakes (*Eutaenia sackenii*), killifishes (*Fundulus* and *Gambusia*), and several species of frogs (*Chorophilus*, *Acris*, *Hyla* and *Rana*), whose evening chorus is one of the features of the swamp. In some of the deeper parts, which are either naturally free of vegetation or kept clear by alligators (*Alligator mississippiensis*) and hence called 'gator holes'—there are also southern soft-shelled turtles and warmouths (*Chaenobryttus gulosus*). These parts are a foraging ground for the Water-Turkey, Wood Duck, and Fish Hawk. Ward's Heron, the American Egret, the Little Blue Heron, the Green Heron, and the Sandhill Crane feed where the water is not too deep, and in dry seasons these and other waders doubtless occur on the prairies in much larger numbers than we found them during the period of exceptionally high water in 1912. The Florida Redwing nests here among the aquatic plants rising above the surface.

*Watercourses.* (Plate XVIII.) This habitat may be considered to include all the bodies of open water in the swamp, among which may be mentioned Billy's Lake, Minne's Lake, the Big Water, the abandoned logging canal, Buzzard Lake, Gannet Lake, and the upper courses of the Suwannee River. (See map.) The surface of the water in the swamp varies in level as much as 15 feet between various points. Consequently, throughout most of the swamp there is a perceptible current in the direction of the Suwannee River; it is especially noticeable in the narrow 'runs' or water trails that afford the only means of traversing the cypress 'bays' by boat. Most of the lakes are simply wider and deeper parts of these 'runs'; and Billy's Lake, the largest body of water in the Okefinokee, is probably not over a hundred yards in its greatest width. (The width of some of the lakes is unavoidably exaggerated in the map.) Yellow water-lilies or 'bonnets' (*Nymphaea macrophylla*) form an abundant and characteristic growth in the 'runs' and along the borders of the lakes; the swamp loose-strife (*Decodon verticillata*) and purple bladderwort (*Utricularia purpurea*) are also found here.

Some of the characteristic vertebrate forms of the water courses



A CYPRESS POND ON BILLY'S ISLAND.



1. HAMMOCK ON FLOYD'S ISLAND.
2. A RUN THROUGH A CYPRESS BAY (BILLY ISLAND BAY).

are the pied water snake, pilot snake (*Coluber obsoletus*), southern soft shelled turtle, alligator snapper (*Macrochelys lacertina*), alligator, large-mouthed black bass (*Micropterus salmoides*), warmouth, and other basses (Centrarchidae), two pickerels (*Esox americanus* and *E. reticulatus*), and various catfishes (*Ameiurus*) and killifishes. The summer birds of this habitat are few in number, including only the Water-Turkey, Wood Duck, and Fish Hawk. The Chimney Swift, which skims low over the surface, may also be mentioned. In the winter, when Coots and various species of Ducks arrive from the north, the numbers of water birds are considerably augmented.

The close affinity of the Okefinokee avifauna with that of the Florida peninsula is shown by the presence of such birds as Ward's Heron, the Limpkin, the Florida Blue Jay, and the Florida Red-wing. The last two, while intermediate between the typical species and the subspecies, are distinctly referable to the Florida form. The same statement could very likely be made concerning the Night-hawk if we had secured specimens. Other birds of the swamp whose ranges extend only slightly further north along the Atlantic coast are the Sandhill Crane, Florida Red-shouldered Hawk, Florida Barred Owl, Florida Grackle, Pine-woods Sparrow, White-eyed Towhee, and Florida White-breasted Nuthatch. In contrast to the Blue Jay and the Red-wing, the Bob-white of the Okefinokee belongs decidedly to the northern form, though the specimens show some slight tendencies toward the characters of *Colinus virginianus floridanus*.

#### LIST OF SPECIES OBSERVED.

1. **Anhinga anhinga.** WATER-TURKEY.—These birds are common on some of the larger waterways of the Okefinokee. They seem to be congregated chiefly along the Big Water and on the Suwannee River, where single birds or small groups were frequently seen soaring high in the air. On Billy's Lake a few were observed. In some years they have nested at the north end of Minne's Lake. On May 21 a colony of three or four nests was located in a cypress head on Floyd's Island Prairie. Curiously enough, the birds were sitting on empty nests, and a broken eggshell halfway down one of the cypress saplings was the only material evidence of breeding. No eggs were found when the same place was visited on June 27. Sometimes the Water-Turkeys nest in isolated pairs, and at

other times in the heronries. On June 18 a nest was found about five feet above the water in a buttonbush (*Cephalanthus occidentalis*). It consisted of a platform of sticks, larger and more compact than the surrounding nests of the Little Blue Heron. On the edge of this dung-covered nest four young were resting. The old bird perched in a pine tree at a distance, and did not approach while we were present.

The natives say that this species sometimes gorges itself to such an extent that it becomes unable to fly, and can make its escape only by the water. At the approach of our boat in the Minne Lake Run, a Water-Turkey plunged head foremost from its perch and disappeared, though indicating its swift course beneath the surface by the shaking bonnet stems. A bird alternately flapping and sailing across a bit of bonnet-strewn prairie, against a background of moss-hung cypresses, presents a striking and beautiful spectacle.

A Water-Turkey's bill is no mean weapon, as attested by the blind eye of one of the native boys, who received a thrust from a tame bird.

2. **Aix sponsa.** WOOD DUCK; 'Squealer'; 'Summer Duck'.—The Wood Duck is still found in considerable numbers on the lakes, streams, and flooded prairies of Okefinokee. It is apparently the sole summer resident of its tribe in the swamp, for the Florida Duck is unknown there. The Big Water and Honey Island Prairie are especially favored haunts. Several broods of young were observed in late May and early June. At such times they are often found in flocks as large as eight to sixteen. They eluded our pursuit by swiftly scurrying along the bushy borders of cypress 'heads.' The natives not infrequently capture the tender, half-grown young with dogs, and eat them with considerable relish. We were shown a hole in a dead pine on Billy's Island where both the Wood Duck and the Pileated Woodpecker had nested at different times. After the nesting is over and the young can fly, the Wood Ducks are said to betake themselves in considerable numbers to particular spots in the prairies, such as the southern part of Floyd's Island Prairie, where they associate with the Hooded Mergansers ('Frog Ducks'), but remain apart from the other Ducks of the fall and winter. The shrill little whistle of the male is very distinct from the louder and comparatively hoarse quack of the female.

3. **Guara alba.** WHITE IBIS; 'Curléw'; 'White Curléw'.—The White Ibis is reported as quite common in the swamp, but our own records are not numerous. Eight or nine birds were seen flying over the northern part of the swamp on May 8. On June 19 we observed three 'Curléws' flying high over Billy's Lake. A week later a flock of eight was flushed from a small pond on the outskirts of the swamp. During the last week of the party's stay, July 7-13, they became more common in the swamp itself. They breed in colonies with Egrets and other Herons. In 1910 they nested with Egrets on Minne's Lake. The following summer they resorted to the same place, but were fewer in number. For years they have roosted in cypress 'heads' on Floyd's Island Prairie, to and from which they were seen going morning and evening. These flocks are said to consist

sometimes of a single file of two or three hundred birds, while at other times they fly in a V-formation like Geese. The natives speak of 'Brown Curlews' which often fly and feed apart from the white forms. They also designate some brown and white ones as 'Pieded Curlews' or 'Black-pieded Curlews,' which roost with the other two. These are doubtless the younger phases of the one species. The hunters eat these 'Curlews' either 'stewed like chicken' or fried as are Wood Ibises.

4. **Mycteria americana.** WOOD IBIS; 'Flinthead'; 'Ironhead'; 'Mulehead'; 'Baldhead'; 'Wood Gannet.'— Fairly common. It is said that in dry weather the Wood Ibises occasionally resort to Billy's Island in flocks of one or two hundred. At such times the temporary pools in which killifishes are stranded prove enticing feeding grounds, as do the small cypress ponds on the islands. On May 30 two individuals were recorded flying over Honey Island, on the south edge of which the species has formerly roosted. On June 18 four of these remarkably fine birds circled and circled over a colony of Little Blue Herons, revealing from time to time in their turns the sheen of their backs. While a few were seen in May and June, they began in July to assemble in flocks. In descending the Suwannee on July 13, our party flushed flock after flock until 200 or more birds were sailing overhead. The members of the party observed that while rounding a bend in the river, they would hear a resounding noise like some one pounding on a hollow stump, and in every case the apparent cause was a Wood Ibis. The appearance of the birds when soaring very high in the air is Buzzardlike.

This species is considered a game bird, and is eaten whenever it can be secured. The native recipe is: 'Cut the breast crosswise; dip it in a little flour; wet it up; pack it; and then fry it.'

5. **Botaurus lentiginosus.** BITTERN; 'Marsh Hen.'— Uncommon. On June 17 we flushed our only 'Marsh Hen' along the Suwannee. It is said to frequent the prairies.

6. **Ardea herodias wardi.** WARD'S HERON; 'Po' Job'; 'Po' Jo'.— Fairly common. Generally distributed on the prairies and along the water-courses, and frequently seen flying over the wooded portions of the swamp. They were most common on Floyd's Island Prairie, where several were recorded on May 21 and 22, and a dozen more on June 25-27. This has been a favorite roosting place for several years. At dusk on June 25 and 26 we observed several birds coming into the prairie for the night. Here, on May 22, a nest with one well-grown young was located in a cypress 'head' some 60 or more feet above the water. Along the Suwannee River numbers were seen, and on June 18 several were found in a large colony of the Little Blue Herons on the west of the river. Here a nest was espied in a pine tree at least 70 or 80 feet above the water. The natives pronounced the 'Po' Job,' good eating; but when we tried a young one, all agreed that it was too bitter for our tastes.

7. **Herodias egretta.** EGRET; 'Plume-bird'; 'Big White Plume-bird'; 'White Crane.'— Formerly common. On May 20 Mr. Bryant Lee

found a number of these birds in a large colony of Little Blue Herons between Mixon's Ferry and Fargo. On June 18 three adults were observed at the same place and they proved fairly tame. Before the plume law of Georgia was enacted, hunters used to kill as many as 200 in a day in this resort. In 1910 there was a colony of 175-200 Egrets and White Ibises on Minne's Lake, and another of the same species and numbers was found in 1909 on the Big Water. On June 25 and 27 we saw two very shy Egrets flying over Floyd's Island Prairie. From July 7 to 12 a quartette of Egrets frequented a swampy bog between Gallberry and Billy's Islands. In the morning, even before daylight, our party always found them feeding in the bog, and in the evening, roosting in near-by trees. Although they were wild, and received considerable attention, they did not leave the place.

8. **Florida cærulea.** LITTLE BLUE HERON.; 'Blue Scoggin.'—Common. A colony of several hundred birds was reported nesting in Cowhouse Bay in May. During this month a few adults and one immature bird were observed in the northern part of the swamp, and on June 27 several others were seen over Floyd's Island Prairie. Along the western borders of the swamp, in former years, there were two or three colonies of Little Blue Herons. One at Scoggin Pond was forsaken this year for the first time. Between Mixon's Ferry and Fargo there is another which is said to have been in existence for a long time. It was reported by Mr. Bryant Lee to contain about 500 nests with eggs and young on May 20. On our way to the same colony on June 18 we saw adults either coming or going almost every minute. The heronry is surrounded on three sides by a thin rim of pines, within which the squeaking, chickenlike calls of the young were heard. Here, in a swampy tangle where one goes waist-deep, the meager platforms of sticks are placed. The growth is mainly button-bush (*Cephalanthus occidentalis*), 'hurrah bush' (*Leucothœ racemosa*) and 'latherleaf' (*Clethra alnifolia*). The nests were from three to seven feet above the water; the average was four or five feet. At this season we found only half a dozen nests with eggs, and about as many more with young. All the other nests were empty, and many were more or less displaced. All about us were the white young in the higher bushes and pine saplings, some of which were bending beneath a load of ten to twenty birds. No more than six dead young were found in the whole heronry. From one position we could easily count 200-250 birds, of which only ten or twelve were adults. In all we saw 800-1000 young birds in this heronry, and no doubt many of stronger ones had left with the adults for the feeding grounds. On the previous day we had observed them on the Suwannee River. In the whole heronry we saw no more than three young in which the blue of the wings had begun to show. We learned on inquiry at the turpentine still three miles away that the negroes in former years used to gather the eggs in baskets for culinary purposes. It is almost equally certain that the birds were used for food. So far as we could determine, neither of these practices was indulged in this year.

9. **Butorides virescens virescens**. GREEN HERON; 'Indian Pullet'; 'Indian Hen.'—Not common; much less numerous than either Ward's or the Little Blue Heron. A few were observed on the borders of the prairies and along the edge of Billy's Lake.

10. **Nyctanassa violacea**. YELLOW-CROWNED NIGHT HERON.—Not until nesting was completed were any of these Herons seen. For several days (July 7–11) an adult and three young were watched in a cypress swamp near our camp. An adult and one young were taken at Billy's Lake on July 8.

11. **Grus mexicana**. SANDHILL CRANE; 'Whooping Crane.'—These birds are fairly widespread in their distribution within the Okefinokee, which is one of their few remaining retreats east of the Mississippi. They have here lost neither their watchful alertness nor their keenness of vision. A number of our records were only musical memories. The birds were often flushed on the edges of the islands, where it was an easy matter for them to escape through the cypresses; in fact, if they had not announced their start, they might often have slipped away undetected. Their note is one of the finest sounds of the swamp. It is so unbirdlike, and yet rings so clear, is so far-reaching, and possesses such measured qualities, that the listener longs for an instant repetition. We found the Cranes on Billy's, Honey, and Floyd's Islands, and on Chase and Floyd's Island Prairies. We seldom observed them alone; they usually traveled in pairs or in parties of three or four. They are said to breed in the prairies, but at other times seem to prefer the pine woods with their growth of saw-palmetto and ericaceous plants. Here they find vast quantities of huckleberries, and are doubtless attracted also to pools where killfishes and tadpoles have entered at high water. We never realized what service their legs render them, until we winged one close at hand. All we ever saw of the bird after it alighted was a feather and some long strides in the sand. Unfortunately, the natives have a decided penchant for the 'Whooping Crane,' and never lose an opportunity to secure the 'fine eating' it affords them.

12. **Aramus vociferus**. LIMP KIN.—On May 13 one or two individuals of this now uncommon species were observed flying over a prairie southeast of Honey Island. Its singular appearance on the wing and its weird cry were noted. It probably breeds here.

The records for Georgia seem to be very few. Its nesting in the state between the years 1853 and 1865 has been mentioned by H. B. Bailey (*Auk*, VII, 1883, p. 42). William Bartram, writing of his experiences on the Altamaha River in 1773 (*Travels*, 1791, p. 49), says, 'The crying-bird, another faithful guardian, screaming in the gloomy thickets, warns the feathered tribes of approaching peril.'

13. **Actitis macularia**. SPOTTED SANDPIPER; 'Sweet.'—The Spotted Sandpiper was a distinct surprise as a summer resident of the swamp. Not only is this several hundred miles south of its known breeding range, but one would not expect it to find a suitable haunt in the Oke-



finokee. The lakes and runs are practically shoreless; they are simply open spaces in the otherwise continuous cypress swamps. However, the logs and driftwood near the edges of Billy's Lake serve as teetering stands; half a dozen were seen here on May 11, one on June 5, and still another a few days later. Earlier in the spring one or two were reported from the canal.

The species probably does not breed in this latitude. (See Wayne, *Birds of South Carolina*, 1910, p. 55.)

14. *Colinus virginianus virginianus*. BOB-WHITE; 'Partridge.'—Abundant in the pine barrens, both on the islands and in the country surrounding the swamp. A female taken on June 27 had in her crop seven grasshoppers, two snails in shells, two beetles, several spiders, one daddy longlegs, and numerous blueberries (*Vaccinium*). The oviduct of the same bird contained a fully formed egg. About the middle of May a nest with eggs was found by the natives on Billy's Island. They assert that Sparrow Hawks and probably wild cats prey upon the 'Partridges.'

15. *Meleagris gallopavo silvestris*. WILD TURKEY.—Rather scarce; more common in the country west of the swamp. It was formerly common in the swamp itself, but about fifteen years ago the decrease began to be perceptible, and the natives hold that it is due in part to the depredations of wild cats. The last Turkey was killed on Billy's Island about three years ago. A gobbler was flushed in The Pocket by a dog on June 26, and another was heard in the same place a year previously. On July 2 we heard a Turkey in the thick palmetto cover on one of the Minne Lake Islands.

16. *Zenaidura macroura carolinensis*. MOURNING DOVE; 'Turtle Dove.' Fairly common in the pineries about the edges of the swamp. It is said to occur sparingly on Billy's Island in the summer.

17. *Cathartes aura septentrionalis*. TURKEY VULTURE; 'Buz-zard.'—Common throughout the swamp. The natives have never found its nest. They told us, however, of several roosts, including one at Mud Valley (south of Billy's Lake) and another in the dead tops of some cypresses in a small 'head' on Floyd's Island Prairie. It is astonishing how soon the Buzzards appear over a spot where an alligator has been shot, and how quickly they transform its carcass into a bare skeleton.

18. *Catharista urubu*. BLACK VULTURE; 'Carrion (Cyarn) Crow.'—Not uncommon, but the preceding species outnumbers it by two or three to one. It is frequently seen associating on the wing with the Turkey Buzzard. The natives report that the two species also roost together, and that when a quarrel takes place, the Carrion Crow is always the overlord. The alligator hunters recognize the services of both birds in disposing of the offal in the vicinity of their houses and camps.

19. *Elanoides forficatus*. SWALLOW-TAILED KITE; 'Fish Hawk.'—Fairly common. Whenever these graceful birds appeared, it was an event worthy of attention. We seldom saw them coursing lower than the tree tops. Not infrequently they performed their easy gyrations as they passed over our camp, which was in a clearing. On one occasion a member of our

party saw a group of five birds turn repeated somersaults in the manner which Wayne has previously recorded (*loc. cit.*, p. 69). At another time we watched a pair ascend to a height thrice that of the tallest pines, when suddenly they shot headlong downward for some two or three hundred feet, halting on a level with the tree tops as quickly and easily as they began.

20. **Accipiter cooperi**. COOPER'S HAWK; 'Blue Darter.' One was observed on Honey Island on June 1.

21. **Buteo borealis borealis**. RED-TAILED HAWK; 'Rabbit Hawk.'—A pair were observed sailing over Floyd's Island on June 26. They were not sufficiently close to enable us to determine whether they were the typical species or *B. b. harlani*.

22. **Buteo lineatus alleni**. FLORIDA RED-SHOULDERED HAWK: 'Hen Hawk'; 'Chicken Hawk.'—Very common. This is one of the most widely distributed birds, as its scream is one of the most characteristic sounds, of the Okefinokee.

23. **Falco sparverius sparverius**. SPARROW HAWK; 'Tilly Hawk.'—Not common within the swamp. One or two were noted on Honey Island, May 13-15; here on June 1 we saw a nesting hole which was said to have been occupied earlier in the season. Another bird was observed on Cowhouse Island on May 23, and three more (including young of the year) on the outskirts of the swamp near Mixon's Ferry on June 17.

24. **Pandion haliaëtus carolinensis**. FISH HAWK; 'Fish Eagle'; 'Eagle.'—About fifteen Fish Hawks were noted. Their aeries usually occupy high and exposed situations in the prairie 'heads,' where they command views over wide expanses, and serve as landmarks. Of the six nests found, three were in pines on Honey Island Prairie; the other three, in dead cypresses on Floyd's Island Prairie, at the foot of Minne's Lake, and on Chase Prairie. They were situated from fifty to one hundred feet or more above the water. The only nest in a living tree was placed in the branches of a pine just below its large green top. The nest on Chase Prairie capped a huge cypress stump, and contained a well-grown young bird on May 17.

25. **Strix varia alleni**. FLORIDA BARRED OWL; 'Deer Owl'; 'Hoot Owl.'—Very common. Its deep, booming cry is sure to be heard at night, and is so characteristic of the Okefinokee that the natives use it as one of their signals when they are in trouble or far from home. The Barred Owl by night and the Red-shouldered Hawk by day furnish a round of weird and startling calls that one cannot soon forget. The former is a typical bird of the gloom-haunted cypress bays, the river bottoms of the Suwannee, and the small cypress ponds on the islands. It begins its calls in the late afternoon and continues them well into the evening. In the forenoon they may be heard until 9 or 10 o'clock, and occasionally throughout the hottest day. Several times its notes were uttered at midday when light rains were falling or impending. Besides its well-known resonant call, we heard a subdued, querulous note. The 'Deer Owl,' exhibit considerable curiosity; they responded frequently to poor imitations of their cry, and sometimes to the 'squeak.'

26. **Coccyzus americanus americanus.** YELLOW-BILLED CUCKOO; 'Rain Crow.'—Common. These birds were observed or heard usually on the borders of the prairies, in the depths of the cypress bays, or on the river bottoms of the Suwannee, but were also found occasionally in the high pines on the islands. A pair was seen copulating on June 7 on Billy's Island, and the male was collected. Its stomach contained a larval giant silkworm. In a tupelo tree at the margin of the Suwannee, on June 17, we found a nest containing two eggs. It was placed in a cluster of mistletoe on a horizontal branch four feet above the water, and consisted of sticks interwoven with Spanish 'moss' (*Tillandsia usneoides*). It was the best example of a Cuckoo's nest we have ever seen.

27. **Coccyzus erythrophthalmus.** BLACK-BILLED CUCKOO; 'Rain Crow.'—A single bird, doubtless a migrant, was observed on May 8.

28. **Dryobates villosus auduboni.** SOUTHERN HAIRY WOODPECKER.—Not common in the swamp itself; more numerous along the Suwannee and in the pine lands on the outskirts of the swamp.

29. **Dryobates pubescens pubescens.** SOUTHERN DOWNY WOODPECKER.—Rather uncommon. They were seldom seen on the islands themselves, but usually in their cypress edges. Our records were made in the swampy woods along Minne Lake Narrows, Log River Narrows, and especially the Suwannee River.

30. **Dryobates borealis.** RED-COCKADED WOODPECKER; 'Sapsucker.'—Rather common in open pineries, both on the islands and outside of the swamp. On May 19 a bird was seen at its nest about thirty feet up in a pine on Billy's Island. On May 28, near Mixon's Ferry, we noticed another occupied nest some fifty feet from the ground.

31. **Phlœotomus pileatus pileatus.** PILEATED WOODPECKER; 'Kate'; 'Wood Kate'; 'Woodcock'; 'Good-God Woodpecker'; 'Lord-God Woodpecker.'—With the exception of the Red-bellied Woodpecker, this is the most abundant member of its family in the Okefinokee. In fact, we saw as many as four Pileated Woodpeckers in a single tree. In every part of the swamp—especially the cypress bays, but also the hammocks and the piny woods on the islands, and even the 'heads' on the prairies—these magnificent birds are at home. They are rather shy. On Billy's Island they usually left the open pine woods and sought refuge within the bordering cypresses, long ere we came within gun range. We frequently heard them giving their great and deliberate rolls in the thick bay surrounding Billy's Lake. Occasionally they flew across the lake from tree top to tree top, or disappeared at the other end of a 'bonnet' lagoon just as we rounded the corner. They were very common along the Suwannee, where we several times endeavored to surprise them at work, but the slightest noise caused them to slip away farther into the depths of the forest. An unsuspecting pair of 'Kates' in a swampy thicket is a glorious spectacle; with their scarlet crests erect, they are the very embodiment of all that is wild. The birds are noisiest at sunrise, but their high-pitched, Flicker-like notes resound through the swamp at all times of the day.

32. **Melanerpes erythrocephalus.** RED-HEADED WOODPECKER; 'White Shirt'; 'Jerry Coat'; 'Shirt-tail.'—Not common. It was recorded on Honey Island, May 13-14 and June 1; at the Minne Lake Narrows, June 25; and on Floyd's Island, June 25.

33. **Centurus carolinus.** RED-BELLIED WOODPECKER; 'Sham-shack'; 'Ram-shack'; 'Chad-cherries.'—Abundant throughout the wooded portions of the swamp, in both the pines and the cypresses. Of the two habitats, they were recorded more frequently in the pines. In the partially cut pine lands about the swamp they were in equal abundance. On May 11 a bird was observed at its nest, which was at a height of about 35 feet in a dead pine on Mixon's Hammock. A male taken on June 8 had been eating blueberries and buprestid beetles. The 'Sham-shack' has a variety of call-notes, which it utters frequently; the commonest one has doubtless given rise to the local names.

34. **Colaptes auratus auratus.** FLICKER; 'Yellow-hammer.'—Not very common on the islands. More numerous in the country surrounding the swamp.

35. **Antrostomus carolinensis.** CHUCK-WILL'S-WIDOW; 'Whip-poor-will.'—Uncommon in the swamp. Only one was recorded within the swamp during our stay; it was heard on Billy's Island on June 19. Earlier in the spring two or three were noted by the natives. Between Mixon's Ferry and Fargo the birds were found to be very common.

36. **Chordeiles virginianus virginianus.** NIGHTHAWK; 'Bull Bat.'—Several Nighthawks were reported on Honey Island Prairie on the evenings of May 30 and 31. Beyond the borders of the swamp the birds are very common. They were noted on the northern side on May 3, 6, 8, and 23, and along the western margin on June 17, 18, and 23.

37. **Chaëtura pelagica.** CHIMNEY SWIFT; 'Chimney Swallow'; 'Chimney Sweeper.'—Common. Most of our observations were made over the lakes or the prairies. The birds were frequently noticed skimming the lakes at midday in the hottest sun. They are found in the most remote parts of the swamp, many miles from any human habitation, and must make use of hollow trees as nesting sites. The Lees assert that the 'Chimney Swallows' do not use the chimneys of their cabins, and yet the Swifts course commonly enough over the near-by fields.

38. **Archilochus colubris.** RUBY-THROATED HUMMINGBIRD.—Not common. A few birds were observed about the dwellings on Billy's Island, especially at the crape myrtle ('lady's-streamer') bushes in one of the yards. Another was seen near the head of the Suwannee River on June 19.

39. **Tyrannus tyrannus.** KINGBIRD; 'Bee-bird'; 'Bee Martin.'—Very common on the prairies and islands, as well as on the outskirts of the swamp. On June 18 young were on the wing. On Honey Island we saw a 'Bee Martin' pursue a Sparrow Hawk and a Turkey Vulture, and on Floyd's Island, a Red-tailed Hawk.

40. **Myiarchus crinitus.** CRESTED FLYCATCHER; 'Yellow-tailed Bee-bird'; 'Yellow-tailed Bee Martin.'—Abundant. This bird is found

in every portion of the swamp and surrounding country. In fact, only the Red-bellied Woodpecker can compare with it in numbers and in wide-spread distribution. On May 28 we noted a nesting hole thirty feet up in a pine tree, whither the parents were carrying food.

41. **Myiochanes virens.** WOOD PEWEE.—Rather common. It seems to prefer the pines on the islands to any other environment within the swamp. In only a few instances was it observed among the cypresses.

42. **Empidonax virescens.** ACADIAN FLYCATCHER; 'Tick-bird.'—Common. This Flycatcher finds a congenial haunt in the gloom of the cypress 'bays,' where one often hears its note as he paddles along the narrow runs. It also frequents the hammocks and the cypress ponds. Within these shady retreats it appears unmindful of the summer temperature, and continues to utter its energetic call throughout the warmest and brightest days. A nest was discovered north of Billy's Lake on May 20; it was placed on a limb of a cypress sapling about ten feet above the water, and contained two eggs.

43. **Cyanocitta cristata florincola.** FLORIDA BLUE JAY; 'Jay-bird.'—Not very common. All of our records are restricted to the larger pine islands — Billy's, Honey, Floyd's, and Minne Lake Islands. A male and a female taken on June 7 had only blueberries and huckleberries in their stomachs.

44. **Corvus ossifragus.** FISH CROW.—Uncommon. A few were noted along the canal, May 17–18. The scarcity of Crows is a very noticeable and gratifying feature of Okefinokee bird life.

45. **Dolichonyx oryzivorus.** BOBOLINK.—Observed as a late migrant in May: a flock of 10, Billy's Island, May 9; a flock of 40 along the canal, May 17; and a male and a female on Floyd's Island Prairie, May 22.

46. **Agelaius phoeniceus floridanus.** FLORIDA RED-WING; 'Rice-bird.'—Common on the prairies in the northern portions of the swamp. On the prairies south of Honey Island they were not so common, only a few being seen on June 1 and 2. Along Billy's Lake and the Suwannee none were observed. The only place where we found them in wooded parts was the 'bay' beside Minne's Lake, which is not far from prairies on the east. On May 8 a nest with several eggs was found between Cowhouse Island and the Big Water. On May 21 two more nests with three eggs each were located on Floyd's Island Prairie.

47. **Sturnella magna argutula.** SOUTHERN MEADOWLARK; 'Field Lark'; 'Lark.'—Common in the pine barrens on the islands, and in the country surrounding the swamp. Open as the woods are, one can hardly become accustomed to the presence of the birds in a forested haunt. Some of their notes, too, have a quality that sounds strange to one familiar with the northern bird. On Honey Island we found young on the wing by June 1. The natives do not consider this a beneficial species.

48. **Icterus spurius.** ORCHARD ORIOLE.—A few were noted in the region beyond the northern border of the swamp: Hebardville, May 4, 5, and 24; Braganza, May 23.

49. **Quiscalus quiscula aglæus.** FLORIDA GRACKLE; 'Black-bird.'— Common. Within the swamp this species seems to show a decided preference for the cypress ponds on the larger islands and for the cypress heads on the prairies. It was also recorded frequently on the outskirts of the swamp. The birds were generally observed in small flocks, some of which numbered as many as fifteen individuals.

50. **Peuceea æstivalis æstivalis.** PINE-WOODS SPARROW.— Common in the pine barrens, both on the larger islands and in the environs of the swamp. It is apparently the only Sparrow that breeds in the Okefinokee. It is emphatically a bird of the forest floor, seeking cover in the undergrowth of blueberries and saw-palmettoes, whence it reluctantly flushes to take a perch in a near-by pine. At daybreak it is one of the first birds to begin singing.

51. **Pipilo erythrophthalmus alleni.** WHITE-EYED TOWHEE; 'Joe.'— Fairly common among the saw-palmettoes on the islands; here it was observed in several instances close to the borders of small cypress ponds. A nest was found in such a situation on Billy's Island on May 10; it contained three young and one egg. The birds are more numerous beyond the western border of the swamp.

52. **Cardinalis cardinalis cardinalis.** CARDINAL; 'Redbird (with black chin).'— Fairly common in the cypress 'bays' along the lakes and watercourses, in the hammocks, in the cypress heads on Honey Island Prairie, and in swampy spots on the outskirts of the swamp.

53. **Piranga rubra rubra.** SUMMER TANAGER; 'Redbird (without black chin).'— Fairly common in the pines on Billy's Island, but not found elsewhere in the swamp except on Floyd's Island, where one or two were recorded. Several were observed on the western border of the swamp. Its song is a rich, dignified effort, considerably sweeter than that of the Scarlet Tanager. The stomach contents of a male taken on June 8 consisted of insect remains, all apparently Hymenoptera.

54. **Progne subis subis.** PURPLE MARTIN; 'Martin.'— A number of Purple Martins were observed at their gourd nests at Hebardville, May 4 and 5; at Braganza, May 8 and 23; and on the western edge of the swamp, May 30. The family on Billy's Island also kept Martin gourds in former years, but none of the birds were found this season within the swamp.

55. **Lanius ludovicianus ludovicianus.** LOGGERHEAD SHRIKE.— One was observed on May 5 at Hebardville, and another on May 8 at Braganza. The first bird was seen to chase a Red-cockaded Woodpecker for a considerable distance, and the fresh remains of one young and one adult Bluebird on a near-by stump offered further evidence of the Loggerhead's rapacity.

56. **Vireosylva olivacea.** RED-EYED VIREO.— Uncommon. Noted several times in the hammock growth on Billy's Island and twice on the northern side of the swamp.

57. **Vireo griseus griseus.** WHITE-EYED VIREO.— Fairly common in the densest tangles of undergrowth in the cypress 'bays.' Though it sings

most frequently in the early morning, even the extreme heat of midday does not deter this most versatile of our Vireos.

58. **Protonotaria citrea.** PROTHONOTARY WARBLER.— Abundant throughout the cypress 'bays,' where it is one of the most characteristic forms. The birds were observed most frequently at the edges of the growth along the watercourses, such as Billy's Lake and the Suwannee River. They repeatedly fly back and forth across the lake, and the male occasionally gives a spirited and surprising flight song. The Prothonotary appeared more responsive to the 'squeak' than any other bird of the swamp.

Four nests were found: one with four eggs, May 10, in a low stump in a cypress pond on Billy's Island; another with four fledglings, May 16, in a cavity of a small tree, about three feet above the water, Billy Island Bay; a third with several eggs, May 18, in the broken top of a living black gum sapling, about five feet above the water, Billy Island Bay; and, finally, one with four eggs, June 8, about ten feet up in a cypress on Billy's Lake. In each case the nests were not in deep holes with narrow openings, but in open cavities where the eggs or young could be plainly seen.

Several hours were spent on May 19 in an umbrella blind beside the first-mentioned nest, which then contained young. For the first hour or so the parent birds did not venture to the stump, but remained in the vicinity, frequently uttering a nervous *chip*. The male also sang occasionally. Finally he showed himself the more courageous or unsuspecting of the two, for he fed the young several times before the female came.

59. **Helinaia swainsoni.** SWAINSON'S WARBLER.— To find that this famed and elusive Warbler is a not uncommon inhabitant of the deep Okefinokee thickets, was one of the rarest pleasures of our sojourn in the swamp. We recorded it in the 'bay' on both sides of Billy's Lake, in the tangled growth along the west fork of the canal, in Billy Island Bay, on the edge of Mixon's Hammock, in the canebrake of Floyd's Island Hammock, and finally in some of the wildest and densest cypress woods of the swamp, between Minne's Lake and the Minne Lake Islands. Here on June 13 and 14, while lost and camping 'on top of the swamp,' we had a good chance to make its acquaintance. The song began early in the morning, continuing frequently until about 7 A. M., and at longer intervals for another hour or so. Thereafter it was heard only occasionally until late afternoon, when it began again to be given more regularly.

Swainson's Warbler remains under the close cover of the thicket's interior, and in order to secure a glimpse of it, one must push his way through a tangled barrier of bushes, vines, and thorns. But stalking alone will scarcely suffice. After cautiously approaching the spot whence the song seemed to come, we generally resorted to the 'squeak,' and in this way succeeded more than once in luring the singer to within a very few yards of us. On one occasion, when the 'squeak' failed, an imitation of the song itself immediately brought the desired effect.

60. **Compothlypis americana americana.** PARULA WARBLER.— Abundant. Widely distributed in the swamp, but found in greatest num-

bers in the cypress 'bays,' where the luxuriant growth of *Tillandsia* provides the Parula with an ideal habitat. Young birds on the wing were seen at Minne's Lake on May 20.

61. ***Dendroica striata***. BLACK-POLL WARBLER.— One or two migrants were observed along the canal on May 18.

62. ***Dendroica dominica dominica***. YELLOW-THROATED WARBLER.— Rather common. We recorded it not only in the 'bays' and prairie 'heads,' but in the pine barrens as well. Although it usually remains high up in the tallest trees, it was also observed in the lower growth close to the water or the ground.

63. ***Dendroica vigrisi***. PINE WARBLER.— Fairly common in the pine barrens within and without the swamp. We were surprised to find these birds also in considerable numbers among the cypress 'heads' of Honey Island Prairie.

64. ***Geothlypis trichas ignota***. FLORIDA YELLOW-THROAT.— Quite common. Yellowthroats are found in and about the cypress ponds on the islands, in the 'heads' and along the borders of the prairies, and even far within the depths of the flooded cypress 'bays.' Along the run through the 'bay' between Billy's and Minne's Lakes several were brought into view by the 'squeak.'

65. ***Wilsonia citrina***. HOODED WARBLER.— Fairly common. It was found usually in thickets and swampy places along the borders of the islands. The haunts it affects in the Okefinokee are much like those of Swainson's Warbler, although the latter seems to keep more closely, as a rule, to the wetter situations. Both species were observed in the same canebrake on Floyd's Island Hammock, the Hooded Warbler on the inner edge, and the Swainson's on the outer edge bordering the swamp.

66. ***Setophaga ruticilla***. REDSTART.— A migrant was noted along the canal on May 18.

67. ***Mimus polyglottos polyglottos***. MOCKINGBIRD.— Uncommon within the swamp, but common in its environs. No Mockingbirds were found in the interior in the summer of 1912, although one or two pairs generally nest on Billy's Island. They are also said to have been observed in numbers along the Big Water.

68. ***Toxostoma rufum***. BROWN THRASHER.— A few are found on the islands in the swamp. On June 26 one was observed on Floyd's Island, and another was seen on Billy's Island. Several were recorded beyond the swamp borders.

69. ***Thryothorus ludovicianus ludovicianus***. CAROLINA WREN.— Very common in all wooded parts of the swamp — in the pine barrens, along the watercourses, in the deepest and thickest 'bays,' in the hammocks, and on the isolated prairie 'heads.' The Wrens were ever present and constantly heard, yet rarely seen. On May 30 we appropriated an old cabin in which a pair had a nest with four eggs, but seldom indeed did any of us actually secure a good view of either parent. On May 4 a nest with five eggs was found at Hebardville. The young birds of another



nest, which was built in a corner on Billy's Island, left it about May 19. Many a curious call which we heard in the swamp and traced to its source, proved to be simply another note of this accomplished Wren.

70. *Sitta carolinensis atkinsi*. FLORIDA WHITE-BREASTED NUTHATCH; 'Tomtit.'—Rather common in the pine barrens, and occasionally recorded in the 'bays' and hammocks. More common in the open border land on the west of the swamp.

71. *Sitta pusilla*. BROWN-HEADED NUTHATCH; 'Tomtit.'—Very common in the pine barrens, but not confined to this habitat, for, strangely enough, we found numbers of these Nuthatches among the cypress 'heads' of Honey Island Prairie. As they hasten about in small companies, flitting among the pine needles, they keep up an incessant conversation with their dainty notes. In habits and notes they resemble the Titmice as much as they do the other Nuthatches.

72. *Bæolophus bicolor*. TUFTED TITMOUSE.—Rather common. Within the Okefinokee the Tufted Tit seems to be confined pretty closely to the swampy thickets and 'bays,' such as those surrounding Billy's Lake and bordering the Suwannee River. The birds are much given to answering each other with their loud, clear whistles, and they sometimes utter a note that is Oriolelike in quality. We found a whole family giving their Chickadeelike note as they were feeding along the edge of Mixon's Hammock.

73. *Penthestes carolinensis carolinensis*. CAROLINA CHICKADEE.—Fairly common. A few Chickadees were found in the prairie 'heads'; some were recorded in the cypress ponds on the islands and in small wet areas on the outskirts of the swamp; but most of our observations on this species were made along the lakes and watercourses. Several times the birds were noticed in groups of three or four individuals.

74. *Hylocichla mustelina*. WOOD THRUSH.—On May 9, and again on May 16, a bird was heard singing in the border of the swamp at the north end of Billy's Island.

75. *Sialia sialis sialis*. BLUEBIRD.—One of the most pleasing features of the bird life of the pine barrens is the presence of the Bluebirds in considerable numbers. A nest with young was located in a stump just off Honey Island, in the edge of the prairie, on May 13, and by June 1 young were found on the wing on this island. As late as June 18, however, birds were still nesting at Mixon's Ferry.

#### SUPPLEMENTARY LIST.

In view of the impending destruction of primeval conditions in the Okefinokee and the uncertainty of our making future visits to the region, it seems desirable to give at the present time as complete an account as possible of the bird life of the swamp. For this

reason the following supplementary list has been prepared. It includes the species that did not come under our own notice, but concerning which we received definite information from persons living in and about the swamp, particularly the Lees of Billy's Island. The reliability and the accuracy of these people was so amply manifested on frequent occasions that we feel no hesitation in vouching for their observations.

1. **Podilymbus podiceps**. PIED-BILLED GREBE; 'Diedapper.'— Uncommon. It occurs mainly on Floyd's Island Prairie and on the Big Water in the winter time.

2. **Phalacrocorax auritus floridanus**. FLORIDA CORMORANT.— Seen occasionally in fall and winter.

3. **Lophodytes cucullatus**. HOODED MERGANSER; 'Frog Duck.'— Common winter visitant. Sometimes it is found with the Wood Ducks on the prairies.

4. **Anas platyrhynchos**. MALLARD; 'English Duck.'— Common fall and winter visitant. The natives pointed out the hard seeds of bladderwort (*Utricularia purpurea*) as a favorite food of the Mallards and other winter Ducks. They have a 'roosting place' in the most open part of Floyd's Island Prairie.

5. **Ajaia ajaja**. ROSEATE SPOONBILL; 'Pink Curlew.'— Col. A. B. Perram, of Waycross, informed us that some years ago a well-known hunter by the name of Craven brought to his office some 'Pink Curlew' feathers from the Okefinokee. The Lees have never met with this species in the swamp.

6. **Egretta candidissima candidissima**. SNOWY EGRET; 'Egret.'— A plume-bird, called the 'Egret,' was found in the swamp twenty years ago. It was 'smaller than a White Crane, about the size of a Blue Scoggin, or larger than an Indian Pullet. Its plumes were curved, and not so long as those of the White Crane.

7. **Nycticorax nycticorax nævius**. BLACK-CROWNED NIGHT HERON; 'Redeye.'— We were told of another Heron, called the 'Redeye,' which is found in the swamp. The general description of the bird tallied well with the appearance of the Black-crowned Night Heron, and the local name is certainly appropriate.

8. **Ionornis martinicus**. PURPLE GALLINULE.— Mr. John M. Hopkins, of Hebardville, reports taking one in the swamp some years ago. The Lees probably refer to this species when they speak of 'a long-legged bird, purplish blue in color, with a red spot on the front of the head.' It is found on the prairies in the fall.

9. **Fulica americana**. COOT; 'Blue Pete.'— In the fall and winter the Coot is found on the prairies, and also among the bonnets and other aquatic vegetation of Billy's Lake, where as many as a hundred have been seen at a time.

10. **Philohela minor.** WOODCOCK; 'Snipe.'— It is not very common, but probably breeds here.

11. **Chæmpelia passerina terrestris.** GROUND DOVE; 'Mourning Dove.'— Rare. One or two are usually noted each year on Billy's Island.

12. **Circus hudsonius.** MARSH HAWK; 'Goshawk.'— We were told of a large, white-rumped Hawk, which courses low over the prairies and islands, and feeds on snakes and frogs. It goes by the name of 'Goshawk.'

13. **Haliaeetus leucocephalus leucocephalus.** BALD EAGLE.— Occasional. It apparently does not breed here.

14. **Otus asio floridanus.** FLORIDA SCREECH OWL; 'Scrich Owl.'— Found in small numbers in the swamp.

15. **Bubo virginianus virginianus.** GREAT HORNED OWL; 'Horned Owl.'— This is the least common Owl in the Swamp. It is occasionally noted on the prairies south of Honey Island, where one was heard during the middle of the night of May 30. It is also reported on Floyd's Island. The last specimen taken on Billy's Island was caught in a trap some ten years ago, after it had been stealing chickens.

16. **Ceryle alcyon alcyon.** KINGFISHER.— Not common in summer; more numerous in winter. On June 16 one was seen on the Suwannee River below Mixon's Ferry. Several others were recorded on Billy's Lake during June.

17. **Campephilus principalis.** IVORY-BILLED WOODPECKER.— Rare, but still existent in small numbers in the northwestern part of the swamp. The center of their distribution seems to be the group of Minne Lake Islands, which occupy an almost inaccessible position within the depths of the immense cypress 'bay' west of Minne's Lake. The natives seldom visit these islands without hearing or seeing the Ivorybills. We made three distinct efforts to reach the locality, but only on the last trip did we succeed. Then we were shown three former nesting sites of this species: the first nest, which was found occupied some six years previously, was high up in a dead cypress standing in a pondlike area near the south end of Long Island; the second was discovered about ten years ago in a large red bay in the midst of a dense cypress tangle some distance from the edge of Camp Island (upon which the Jackson Survey party camped, and hence the name); the third site was in a dead cypress in a little 'alligator lake' near the north end of Camp Island, and was occupied three or four years ago. Our guide heard an Ivorybill within the swamp beyond the last site, but the rest of our party on this short trip were not fortunate in either seeing or hearing it. The feeding range of the Ivorybills appears to be very restricted, for only on rare occasions have they been recorded as far away as Minne's Lake and Billy's Lake.

18. **Dumetella carolinensis.** CATBIRD.— This species is sometimes found in the swamp.

19. **Planesticus migratorius migratorius.** ROBIN.— Numbers come here during the winter, and occasionally a bird is seen in the summer.

We were disappointed in our hope of hearing something of old records of the Carolina Paroquet. Among the present inhabitants there seems to be not even a tradition of its occurrence in the swamp, which lies well within its former range.

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## NOTES ON OFFSHORE BIRDS.<sup>1</sup>

BY JOHN TREADWELL NICHOLS.

DURING a number of years past, the writer has had opportunity to make observations from time to time on sea birds off our coast from Cape Cod southward, which, though fragmentary, yet seem worth recording in view of the scant opportunity of ornithologists to make such observations, and the consequent paucity of our knowledge of these birds.

On December 22, 1900, he sailed east-southeast from New York on a merchant sailing ship. As the coast was left behind, a few Kittiwake Gulls (*Rissa tridactyla tridactyla*) still were seen daily in varying numbers, the last being recorded January 5, 1901, 25° 57' North 37° 43' West, 2360 sea miles<sup>2</sup> east of Miami, Florida, 1350 west of the African coast, 660 further south than the species occurs on our Atlantic coast.<sup>3</sup>

On January 1, 1905, the writer was on a freight steamer off Cape Cod, making the trip from New York to Boston. A single Gannet (*Sula bassana*) seen flying close to the water off the back side of the cape is a far northern winter record for this species, which very rarely occurs as far north as New York in winter. Dovekies (*Alle alle*) were numerous, sitting on the water. As the steamer's bow approached, they would sometimes flutter along the surface, then dive below it and swim off rapidly, using their short wings as

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<sup>1</sup> The first part of this paper was read before the Nuttall Ornithological Club.

<sup>2</sup> Distances throughout this paper are approximate, in sea miles.

<sup>3</sup> See Bennett, *Bird-Lore*, VIII, 1906, p. 90.

The theory that the same individual sea birds, Gulls, Albatrosses, or Petrels, follow a ship day after day, is in the writer's opinion fallacious.