

NESTING OF THE WATER-TURKEY IN EASTERN ARKANSAS

BY BROOKE MEANLEY

DURING the nesting seasons of 1951, 1952, and 1953 I had opportunity to obtain certain information relative to the nesting of the Water-Turkey (*Anhinga anhinga leucogaster*), or anhinga, in eastern Arkansas. This was made possible at a nesting colony located on April 10, 1951 while I was driving along the base of the Arkansas River levee at Swan Lake with Robert E. Stewart who spotted several anhingas circling over the brushy end of a small lake. The village of Swan Lake is about fifteen airline miles east of Pine Bluff and is surrounded by the cotton fields of Jefferson County.

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STATUS AS A BREEDING BIRD IN ARKANSAS

The breeding range of the anhinga in Arkansas lies largely in the eastern third of the State. Favorite nesting places are about the margins of old river-bed or ox-bow lakes along the lower Arkansas River, lower White River and Mississippi River. Arthur H. Howell (1911:15) has written the following about the occurrence of the anhinga in Arkansas in the early 1900s: "The water turkey or 'snake bird' is fairly common locally in the swamps of eastern Arkansas. It breeds at Helena [on the Mississippi River], Wilmot [southeastern part of state near Louisiana line], and Walker Lake [an ox-bow of the Mississippi in northeastern Arkansas] and has been recorded from Osceola and Newport (northeastern Arkansas) . . ." Baerg (1951:28) lists additional breeding localities as Grassy Lake, Hempstead County, and the White River Heronry, Arkansas County. Nesting localities observed by the writer, in addition to Swan Lake, are Cypress Bayou near Tichnor, and in several rice field reservoirs near Stuttgart.

THE SWAN LAKE COLONY

The Swan Lake colony is located at the south end of an old river-bed lake in a large heronry. This lake was a section of the main channel of the Arkansas River over one hundred years ago, and the river in its ever changing course is now three miles away. The heronry is only about 200 yards from the center of the village of Swan Lake. It occupies an area of about 20 acres of button-bush (*Cephalanthus occidentalis*) and swamp privet (*Forestiera acuminata*).

The several species of herons and egrets nesting in this heronry and their estimated numbers (pairs) in 1952 were as follows: Little Blue Heron (*Flori-*



FIG. 1. Nest and eggs of aninga at Swan Lake, Arkansas, photographed May 3, 1952. This nest was appropriated from a pair of American Egrets.



FIG. 2. Young aninga in nest, photographed at Swan Lake, Arkansas, July 4, 1953. Nests constructed by aningas are usually more compact and of greater depth than those of herons or egrets.

da caerulea) 200, Snowy Egret (*Leucophoyx thula*) 100, American Egret (*Casmerodius albus*) 70, Green Heron (*Butorides virescens*) 15. Passerine birds nesting in the heronry, in order of abundance, were Bronzed Grackle (*Quiscalus quiscula*), Red-winged Blackbird (*Agelaius phoeniceus*), Prothonotary Warbler (*Protonotaria citrea*), and Baltimore Oriole (*Icterus galbula*). During the latter part of May, 1953 a flock of 40 White Ibises (*Guara alba*) came to the heronry at about 5:30 p.m. each evening to roost.

The number of nesting pairs of anhingas ranged between 20 and 25 during the three years of my observations.

ARRIVAL OF MIGRANTS

Anhingas usually arrived at Swan Lake during the first or second week in April. Seventy-five miles south, at Wilmot, Arkansas, I have seen them as early as March 21 (1953). In 1952 the first anhinga, a male, was observed at Swan Lake on April 5. By the 15th of the month most of the females had returned and many of the anhingas were paired.

In 1953, probably because of a cold spell beginning in mid-March and lasting through early April, the first arrivals were not observed until April 19, when two pairs were seen. Two days later there were 26 birds (20 males and 6 females) at the heronry.

Heron and egrets usually arrived about two weeks ahead of the anhingas and a few pairs had eggs before the first anhinga put in an appearance.

COURTSHIP AND PAIRING

In 1952 male anhingas were observed in courtship display on the first day of arrival at the nesting colony. While possibly on their territories they would lift their folded wings alternately up and down above their backs in a sort of flapping motion for several minutes and sometimes point their partly spread tails upwards, nearly vertically, usually ending the performance in a crouch as if molding a nest. As the displaying bird crouched the neck was usually curved in an "S" shape with the bill pointing downward and the feathers on the neck and head extended outward. As the climax of the performance was reached during the crouch a guttural sound that somewhat resembled the low rolling notes of a screech owl (*Otus asio*) was uttered.

Following this exhibition the head and neck were usually extended straight out from the body and sometimes held motionless for several seconds. The outstretched neck and head were then shifted about in several directions.

When in courtship display the males were not always on their territories. I noticed one male that followed a female from one end of the heronry to the other while performing. I also observed another male displaying in various widely scattered locations throughout the heronry. On one occasion I ob-

served two males perched about three feet apart going through courtship display at the same time and almost in unison.

It appears that in some cases pairing may have occurred before the birds reached the heronry as several pairs had started to build nests two days after arrival in 1953.

SELECTION OF NESTS AND NEST BUILDING

In the Swan Lake heronry anhingas either appropriated occupied nests of American Egrets, Snowies, and Little Blues or constructed their own. Of 20 nests under observation in 1953 at least 6 were originally nests of egrets or herons. Additional nest-lining material was added to nests taken from egrets and herons.

On April 21, 1953 I saw a mated pair of anhingas perched about two feet away from an incubating American Egret. When I returned on the 23rd they had taken over the nest and the egret was then standing by. The egret and its mate attempted to retake the nest when the anhingas left to copulate several feet away; however, the male anhinga flew at the egrets and they backed off. On no occasion did I see anhingas forcibly eject an American Egret from its nest. They wait for the laying bird to leave and then move in. Also on April 21, 1953 while I was hidden in a blind about 20 feet from an American Egret's nest I noted that when the incubating or laying bird left for a few minutes an anhinga quickly moved in and stood on the rim of the nest. In three minutes the egret returned and alighted about four feet away. It did not attempt to dislodge the anhinga, although it made threatening gestures by pointing its out-stretched neck and head with bill open, emitting guttural sounds in the direction of the anhinga. The anhinga in turn did the same. As the egret looked on, the anhinga picked up the three eggs one by one from the nest and dropped them over the side into the water.

On May 30, 1953 I observed a pair of anhingas nest hunting. They moved from one occupied Little Blue nest to the next forcing out the incubating or brooding herons as they made their inspection.

On the other side of the picture was the fact that, whenever the opportunity availed itself, egrets and Little Blue Herons removed sticks from anhinga nests for use in the construction of their own. I have seen the entire nest of an anhinga destroyed during the bird's absence by egrets and herons. In many cases as soon as the young anhingas had left their nest it was torn apart by the egrets or herons which used the sticks in constructing or mending their own.

When egret nests are taken over by anhingas, willow (*Salix*) twigs are usually added and the nest becomes a much better constructed affair. Most of the egret nests are made of buttonbush twigs. When the anhinga builds its own nest at Swan Lake, willow branches with foliage are nearly always used.

Such nests are usually smaller and more compact than those of the American Egret.

Apparently the male gathers most if not all of the nest material. On April 25, 1953 I arrived at the heronry at 3:15 p.m., and saw a male anhinga breaking off leafy twigs or small branches from a willow and carrying them to the female which was sitting on the nest platform. The female would then work the twigs into the nest. During the next hour the male made five trips, four to the same branch of the same tree and one to another tree, in both cases about one hundred feet from the nest. Throughout the time the male was gathering nest material the female remained on the nest. A nest is often started and completed in a single day.

All nests, whether built completely by the aningas or taken from the egrets, were lined with the leaves and staminate and/or pistillate catkins of willow, a mark that distinguished them from the heron and egret nests. Other distinguishing features were the brown willow twigs, abundance of excreta during the incubation period, particularly on the rim of the nest, and as already mentioned, the compactness of the structure.

In 1952, 16 of 18 nests were in buttonbush, the other two in swamp privet. The ratio was about the same in 1953. In 1952 the average depth of water in the nesting area was three feet. The distance from the surface of the lake to the nests ranged from 3 feet, 7 inches to 10 feet, 7 inches, with an average for 12 nests of approximately 8 feet.

There were several small nesting groups within the heronry. In 1953 the group in the east side was composed of 4 nests. The largest group was in the center of the heronry where there were 11 nests. The nests were fairly close together in each group, in some cases only 6 or 8 feet apart. They were sometimes separated by a heron or egret nest.

EGG LAYING AND CLUTCH SIZE

In 1952 the first eggs were found on April 24, nineteen days after the first male arrived at the heronry, and nine days after arrival of the females. In 1953 egg laying began on April 25, seven days after arrival of the first migrant. In 1952 twelve pairs had complete sets of eggs by April 30.

Bent (1922:232) says that "The eggs are often laid at irregular intervals, as the young in a nest are frequently of widely different ages." In most nests at Swan Lake the young were only two or three days apart in age. In 1953, two nests under observation contained one egg each on May 21. On May 24 both contained only two eggs. On my next visit to the heronry on May 28, one of the nests contained 3 eggs. In 1952 one nest under observation during the egg-laying period contained three eggs on April 30 and five eggs on May 3. In 1953 another nest contained three eggs on May 24, three on May 30, and four on June 6.

Clutch size ranged from two to five eggs. Of 29 nests under observation in 1952 and 1953, 6 contained five eggs, 13 four eggs, 9 three eggs, and 1 two eggs.

INCUBATION

Both sexes incubate. On April 30, 1952 the female was incubating at a certain nest when I arrived at the colony at 2:30 p.m. When I left at 5:30 p.m. the male was incubating. On May 3 of the same year males were incubating at seven nests and females at four when I arrived at the heronry.

At a certain nest under observation throughout most of the day on three successive Saturdays the female was always incubating. The male was usually perched about eight feet away. On one occasion when the male left its territorial perch and dropped below into the water another male that had been perched 75 feet away from the nest flew over and mounted the female on the nest. The incubating female made no attempt to, or perhaps could not, leave the nest. In a matter of seconds the mated male returned and chased off the intruder.

At two nests, in 1953, the females left for good after the eggs were laid, leaving the males to incubate and care for the young.

Sprunt and Chamberlain (1950:75) give the incubation period as 25 to 28 days. My observations on length of incubation period are not complete. I found this information sometimes difficult to obtain as I could not always determine just when the birds began to incubate. At Nest no. 8 the incubation period for the first of three eggs was probably between 25 and 28 days. The first egg was laid on May 21. By May 24 there were two eggs in the nest and on May 26 there was a full set of three. The first egg hatched on June 20. Nest no. 7 contained two eggs on May 28, three eggs on May 30. There were two newly hatched young in the nest on June 24.

CARE AND FOOD OF YOUNG

Both sexes brood, feed, and otherwise care for, the young. The young feed by thrusting the bill down the throat of the parent. An interesting photograph by A. M. Bailey and F. R. Dickinson in "The Birdlife of Louisiana" (Oberholser, 1938:pl. 6) illustrates this procedure. Fish appeared to form the principal diet of the Swan Lake young. When I was standing beneath anhinga nests young birds often regurgitated whole fish which fell near me into the water. Several of these fish collected were identified at the Arkansas Game and Fish Commission Hatchery at Lonoke, Arkansas, as small sunfish (*Lepomis* spp.). Stomachs of two approximately week-old young contained mostly fish, a few aquatic beetle (*Dytiscid*) fragments, and rootlets of an aquatic plant.

The adult birds did some fishing in the water beneath the nests, but mostly in nearby bayous, river-bed lakes and in the Arkansas River.

One young bird remained in or near its nest for approximately three weeks after hatching. I arrived at Nest no. 20 at the time of hatching of the first egg on May 30 (the two remaining eggs in the nest were infertile). The young bird began wandering away from the nest after June 20. On June 24 it was observed about 60 feet from the nest climbing about the tops of buttonbushes. It would sometimes flutter several feet from a higher to a lower limb.

After about two weeks of age some of the young would jump out of their nests into the water as I walked beneath them. I observed this action closely to find out if the birds actually dived, but was disappointed to see that they made a perfect "bellyflop." Mr. P. J. Van Huisen, Manager of the White River National Wildlife Refuge, also observed this characteristic flop into the water by the young at Swan Lake when disturbed. After hitting the water the older young would usually swim beneath the surface for several yards and occasionally for a considerable distance before emerging. It seemed remarkable to me that one young bird (and no doubt others a little over two weeks old) was able to return to its nest after jumping into the water from a height of 12 feet. This young bird, one of three in a nest, jumped into the water on a Wednesday and by Saturday had returned, as there were then three birds in the nest.

NESTING SUCCESS

Of 20 nests under observation in 1952, only 8 were successful in hatching one or more young, and only 13 young were produced from these nests. The low nesting success was due partially to curious boys and bird photographers, including the writer. Whenever someone entered the heronry the anhingas, egrets, and herons usually left the immediate area of the intrusion with the anhingas the last to return. During their absence the egrets and herons pilfered some nests, carrying the sticks to their own. Many of the eggs "cooked" from the heat of the sun during the anhingas' enforced absence. I picked up several eggs that were almost too hot to handle. The fact that a well travelled farm road was less than fifty yards from several nests may have hindered success in these nests. In 1953 seven of ten nests marked to determine nesting success produced one or more young on the wing, with a total production of 14 young.

POST-NESTING ACTIVITY

In 1952 the last anhinga left the Swan Lake heronry on about July 14, but some egrets and herons were still feeding young after that date.

After nesting is concluded, the anhingas move into the bayous, river-bed lakes, "borrow" pits below the river levees, rice field reservoirs, and large

ponds. At a goldfish pond near Swan Lake an anhinga was observed feeding on goldfish for about a week before it was shot. Examination of its stomach revealed six undigested goldfish measuring from three to four inches in length, and some aquatic plant fragments.

Most of the summer resident aningas leave Arkansas by early October. The latest date of departure noted by the writer was October 17, 1950, when six aningas were seen with a small flock of White Pelicans (*Pelecanus erythrorhynchos*) soaring and gradually drifting downstream toward the mouth of the Arkansas.

SUMMARY

Information relative to the nesting of the anhinga in eastern Arkansas was obtained by the writer in 1951, 1952, and 1953 when nesting aningas were studied in a large heronry of mixed species at Swan Lake, Jefferson County.

The breeding range of the anhinga lies largely in the eastern third of the state, and favorite nesting places are about the margins of old river-bed lakes along the lower Arkansas River, Lower White River, and the Mississippi River.

Aningas arrive at Swan Lake usually during the first or second week in April, and courtship begins almost immediately.

Nests were either constructed by the aningas or appropriated from herons and egrets, and most were placed in buttonbushes at a height averaging about eight feet from the surface of the water. The male gathered most if not all of the material and the nest was sometimes completed in a single day.

Egg laying began during the last week in April. Of 29 nests, 6 contained five eggs, 13 four eggs, 9 three eggs, and 1 two eggs. Incubation, in which both sexes participate, was probably between 25 and 28 days. The sexes also join in brooding and feeding the young.

Fish was the principal diet of the young, but aquatic plants were also found in two stomachs.

One young bird left its nest about three weeks from time of hatching, but remained nearby (within 20 yards) during the next two weeks. Two week-old young that jumped from their nests when disturbed by the writer were eventually able to return, presumably under their own power.

Nesting success was below normal largely because of interference by human beings. In 1952 eight out of twenty nests produced one or more young. In 1953 seven of ten nests produced one or more young on the wing.

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NEW LIFE MEMBER



E. Alexander Bergstrom is an insurance underwriter by trade and a bird-bander by avocation. His station in West Hartford, Connecticut, bands about 2000 individuals a year; special interests include trap design, plantings appropriate for a banding station, and a nearby Bank Swallow banding project (now in its tenth year). Since the fall of 1950, Bergstrom has been editor of *Bird-Banding*, succeeding the late James Lee Peters. He is a member of some two dozen groups interested in birds in particular or natural history in general, including the British Ornithologists' Union, the Hartford Bird Study Club (president), the Linnean Society of New York, the

Massachusetts Audubon Society (vice-president), the Northeastern Bird-Banding Association (member of the council), and the Nuttall Ornithological Club. He was born in 1919, graduated from Harvard ('39), and (in 1943) married Elizabeth Wasson, who shares his interest in birds. They have four children.