

No 'courtship feeding' was noted during nest building or before. The nest building is done entirely by the female. The male follows, singing frequently from perches close to her work. At intervals both of the birds search for food in the vicinity.

Whatever the explanation devised for this pattern of feeding during incubation, the pattern itself seems to be a useful one. The female can give more attention to incubation, since some of her food is brought to her, and the male begins his 'training' early in providing the family with food.—ANDERS H. ANDERSON AND ANNE ANDERSON, *Route 5, Box 488, Tucson, Arizona.*

Observations on the courtship of four woodland birds.—During the winter and spring of 1939–40 and 1940–41, I studied the birds of a forested area along the Sangamon River in central Illinois, forty miles west of Champaign. This work was done for a graduate thesis in zoology at the University of Illinois, under the direction of Dr. S. Charles Kendeigh. I express sincere appreciation to Dr. Kendeigh and to Miss Betty Buttry, my faithful companion and aide in the field. In the course of this two-year study, I made a number of interesting observations on the courtship of four species common to the region which are discussed below.

BLACK-CAPPED CHICKADEE, *Penthestes atricapillus.*—Courtship began in late February or early March in both years. In 1940, the Chickadees did not move about in pairs pronouncedly until March 17 but were observed in pairs frequently after the first week in March; in 1941, pairs were in evidence as early as February 16. These early pairs, however, seemed more or less temporary; the birds moved in flocks of five or six part of the time, sometimes separating into pairs and later joining the flock again. After March 1, 1941, they appeared to be paired all of the time.

The earliest date on which I heard the Chickadee's *phoe-be* song was January 12, 1941, a warm and sunshiny day on which the song was heard five or six times. Throughout February, *phoe-be* was heard on four different dates, always sparingly. After March 1, it became very common and was heard numerous times during March and the first three weeks in April.

On March 8, 1941, I observed a Chickadee calling *phoe-be* steadily from a perch in the top of a shrub. Answering *phoe-be* calls were soon heard coming closer and a second Chickadee flew in and perched on a shrub five feet from the first bird. The first bird stopped calling upon this arrival, but the newcomer continued calling *phoe-be* for two minutes. Then both birds moved together into the forest-edge where I followed them. Within five minutes, two more joined them and the four birds fed in the same hawthorn for several minutes. I imitated the *phoe-be* call and one Chickadee flew over near me. I called again, and it flew closer. Just then one of the other Chickadees flew at this bird and chased it back to the trees where the others were feeding.

On March 16, 1941, three Chickadees were observed feeding near each other, one by itself, the other two close together. The solitary bird was twice chased by one of the others when it flew too close to the third. It kept its distance thereafter, though feeding in the same tree.

On March 23, 1941, I observed two Chickadees twenty feet up in a tree on the bluff. One of them perched five feet from the other, fluttered its wings, half-hovering in the air and uttering a high squeak, and in this manner it moved to within a foot of the bird that sat quietly. At this time a third Chickadee flew into

the tree and perched near the other two. The intruder was promptly and ferociously chased by the bird which had been fluttering. The birds did not return to their former perch.

TUFTED TITMOUSE, *Baeolophus bicolor*.—In both years, Titmice began singing early in the spring—February in 1940 and January in 1941. The loudest singing and most conspicuous courtship actions were observed in April, 1940, and March, 1941; the milder temperature of 1941 may have affected the courtship dates. However, the same cycle of behavior was passed through in both years, and mating behavior was observed most frequently in the last week of April in both years.

Titmice were not spectacular in their courtship, but seemed to find mates by the calling and answering method. During the first three weeks in April, 1940, Titmice called and answered constantly and were seen often in pairs. Then they began to quiet down, singing only infrequently in late April and May. At this time, actions which resembled mating behavior were observed several times in both years but only once were the birds seen to copulate. This was on April 30, 1941, when my companion reported the following occurrence. Two Titmice sat about one foot apart, fifteen feet up in a tree. The male, identified by his actions, began to utter a high, shrill buzz and to flutter his wings very rapidly at the same time. The female sat motionless. The male kept up his performance for about three minutes until finally the female began to give the same high buzz and to flutter her wings. The male then hopped onto her back and copulation took place. These same actions, except for the actual copulation, were observed on several dates, early and late in the spring of both years. On March 9, 1940, a Titmouse perched ten feet above me and fluttered and buzzed in this same manner when I imitated its call. However, this behavior occurred most often and most conspicuously during the latter part of April in both years. Titmice gave no evidence of having territories. Throughout the spring they were scattered over the entire area and were not seen or heard near their nest until it was discovered. They seemed to feed over the whole area during incubation.

CARDINAL, *Richmondia cardinalis*.—Courtship behavior was shown at much earlier dates in 1941 than in 1940. In 1940, males were first observed chasing females on March 2, an action not recorded again until middle April. Males began singing in the middle of March and sang through April. Not until middle April were pairs in evidence. Loud singing in the first two weeks of May was conspicuous, followed by a silent period of ten days. I discovered two nests containing eggs on May 22 and May 24, respectively.

In 1941, chasing was noticed first on February 16. Throughout February and March, chasing and loud singing, first from low and later from high perches, were very evident. By March 20, Cardinals had set up territories. The first three weeks in April were quiet, with songs heard infrequently. Then on April 20 and 27, respectively, I discovered two Cardinal nests. Thus, two Cardinal nests of 1941 were built one month earlier than two of 1940. The warmer January temperatures of 1941 may have had an influence on this by promoting an earlier courtship and consequently an earlier nesting when the warmer temperatures of April arrived and the birds were already advanced in the breeding cycle.

I recorded several observations on the courtship actions of the Cardinal. On March 2, 1940, two male Cardinals chased one female up and down and around trees for twenty minutes, the female always in the lead. The two males flew at each other several times, pecking and ruffling their feathers and uttering an angry

buzzing note when in combat. Several times the males dashed headlong from the top branches of a tree toward the ground, only to swoop up again when within six feet of it. When the female stopped and perched in a tree, usually high up, the two males perched close by and took turns singing, flying at each other and diving toward the ground while the female watched them.

On March 15, 1941, a male Cardinal chased another male and drove him away; then he returned to his high perch and sang lustily for several minutes. On March 29, 1941, a male Cardinal perched one foot from a female, fluttered his wings rapidly, and moved toward her. At the same time a male from near by flew in and fluttered his wings within a few feet of the same female. The first male chased the intruder away. This appeared to be territorial behavior.

DOWNY WOODPECKER, *Dryobates pubescens*.—My few observations of courtship behavior in the Downy Woodpecker were made during the last two weeks of February and the first two weeks of March in 1941. On February 22 and 23, a male and female were observed feeding together each day. On March 2, a female drummed for half a minute, and males and females were commonly near each other. On March 8, two pairs of Downies were observed behaving in an unusual manner. The male and female of each pair took turns chasing each other, dashing in and out between trees and in circles, swooping crazily, and all the time giving a loud, rattling call. They would stop high in a tree, sit quietly near each other for half a minute, then off they would go again. Once when they landed between flights, they moved jerkily up and down the tree, the male on one side of the trunk, the female on the other, always on opposite sides. On March 9, a male and female were feeding together on the river bluff when another Downy flew in. The intruder was promptly chased by the male, which then returned to its original perch and the two birds continued feeding.—VERNA R. JOHNSTON, *Thornton Township High School, Harvey, Illinois*.

Corrections to the ornithological writings of W. L. McAtee.—The undersigned has accomplished his three-score years and, as he may not add the ten, it seems desirable to confess and correct errors (minor typographical slips excepted) in his published works. Certainly he has no desire to be grouped with those who ignore such slips or brazen them out to the bitter end—futile actions both.

1904. An interesting variation in *Seiurus*. Auk, 21: 489.

The writer desires to repudiate absolutely the childish faith in natural selection expressed in the penultimate paragraph.

1904. Warblers and grapes. Auk, 21: 489–491.

“Northward” (p. 489, line 13) should read “southward.” *Notoxus* (p. 490, 11th line from bottom) is referred to as a weevil. This is an exhibition of ignorance that could have been avoided by reference to a manual which, apparently, the writer was too confident to seek. “Hymenapteron” (3 lines below) should be “hymenopteron,” and the term “another weevil,” dependent upon the preceding erroneous language, should read “a weevil.” Following both this article and the preceding, the middle initial of the author is given as F; it is L.

1911. Economic ornithology in recent entomological publications. Auk, 28: 141.

“*Carolinensis*,” next to the bottom line, obviously should be *vociferus*.

1911. Woodpeckers in relation to trees and wood products. U. S. Biol. Survey Bull. 39: 21.

The acknowledgment to Dr. A. D. Hopkins of the U. S. Bureau of Entomology,