

A STUDY OF THE NORTHERN BLUE JAY
(Cyanocitta cristata cristata)

by
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INTRODUCTION

This study was carried out as a field problem for Advanced Ornithology (Zoology 119) at the University of Michigan Biological Station which is located on Douglas Lake, about thirteen miles southwest of Cheboygan. The observations of the nest were made from a twelve foot tower erected about four feet south of the nest. On July 15th the three young were removed from the nest in order to find out how adaptable they were in captivity and for experiments in training them.

Dr. Olin Sewall Pettingill Jr., assisted by Dr. Theodora Nelson, guided my studies and made many suggestions which aided me in a more thorough understanding of my problem. Robert Lea, a fellow student, took several photographs that illustrate this paper. I also want to thank Dwain Warner for discovering the site of the nest.

NORTHERN BLUE JAY (CYANOCITTA CRISTATA CRISTATA)

Range

The Northern Blue Jay (*Cyanocitta cristata cristata*) according to the A.O.U. Check-list of North American Birds (Fourth edition 1931; 221) breeds from southern Alberta, northern Manitoba, Quebec, New Brunswick, Nova Scotia and Newfoundland south to central Illinois, Tennessee and Virginia and west to western Nebraska, eastern Colorado and central Texas. In the winter the range extends further south covering eastern United States with the exception of Florida.

Migration

Very little accurate information has been gathered on the migrational tendencies of the blue jay. Todd (1940; 380) states that in several years of observation he has noted a distinct influx of individuals in September and October followed by a decrease in November. Very few individuals remained through-out the winter. Barrows (1912; 413) in Michigan has observed a well marked migration in September and October with the return migration in May. The only actual banding records are reported by Roberts (1932; 2; 62) for the region of Minneapolis. Of a total of 27 birds banded, 23 were recaptured in the same region. Banding was carried on through-out the year and recaptures were made at various times. This would seem to show that at least some of the individuals were resident, but a great deal more banding is necessary before any well founded conclusions can be made.

Habitat

The blue jay is found in widely divergent ecological areas. Generally it seems to prefer dense conifers or, if they are not available, thickets of deciduous trees for its nesting site, and later moves into the more open deciduous woods. Ornithologists dispute whether the blue jay prefers areas close to habitations or wilderness areas removed from the disturbance man creates. Barrows (1912; 413) thinks that in the vicinity of Ann Arbor jays seem to choose nesting sites in orchards or right in towns and villages. Roberts (1932; 2; 63) bears this out basing his opinion on the fact that food is more available near human habitations since the jay is somewhat a scavenger. Forbush (1927; 2; 376) says that they build most commonly in coniferous woods but often in shade trees or vines in villages.

The only nest I located was built in a rather dense thicket of aspen (Populus grandidentata), birch (Betula alba), maple (Acer saccharum and Acer rubrum) and beech (Fagus grandifolia). When the nest was built few people were in the camp so it was fairly well isolated even though it was only about twenty feet from one of the camp roads. Coniferous trees were available within a radius of two miles but this bird chose a deciduous woods; however, two pairs were reported from Reeses' Bog, a coniferous swamp. Compton (1915; 89; 178) found that in the vicinity of Douglas Lake jays were most commonly seen in coniferous swamps.

Food

The only extensive study of the food of the blue jay was

carried out by F. E. L. Beal, biologist for the United States Department of Agriculture in 1896. His findings from 292 stomachs showed that 75.7% of the food was vegetable and only 24.3% animal.

The vegetable portion of the diet consisted mainly of mast (i.e. large seeds of trees and shrubs, acorns, chestnuts and beechnuts). This made up 42% of the total food for the year. The remaining 33.5% was made up of corn, wheat, mushrooms and fruits according to the season. Generally speaking the grains and cultivated fruits eaten are taken during the fall and winter and are really waste left after harvesting. He found no traces of poison ivy (Rhus toxicodendron) or poison sumac berries (Rhus vernix) in the stomachs of jays.

The animal diet which forms the remaining 24.3% was over 90% insects and spiders. In June, beetles (Carabids and Scarabaeids) were most commonly eaten. In July, beetles and grasshoppers, and in August the jays move down to the ground to catch grasshoppers and crickets. Vertebrate remains were exceedingly rare. In only two stomachs were any remains of other birds. Three contained shells of eggs of smaller birds and eleven of birds the size of domestic fowl. The latter, however, were probably obtained from refuse heaps. This rather definitely weakens the idea that blue jays are harmful and economically undesirable because of predation on eggs and young of other birds. Remains of other vertebrates were found in twelve stomachs including five mice, salamanders, frogs, and small fish.

The Nest

The nest was located eleven and one-half feet up in the fork

of a shrub-like beech tree (Fagus grandifolia). Surrounding the nest tree was a dense thicket of young birch (Betula alba), maple (Acer rubrum, Acer saccharum, and Acer pennsylvanicum) and basswood (Tilia americana). The thicket was bounded on three sides by camp roads forming a triangle with the nest located near one apex. The upper drive passes within fifteen feet of the base of the nest-tree just before it intersects the main camp drive, but the nest itself is well concealed from view of passersby by the leaves of the beech tree. Roberts (1932; 2; 63) says that the nests are usually built in the fork of a tree ten to twenty-five feet up. Trautman (1940; 308) found a nest thirty-five feet up in a willow. Bendire (1895; 359) found that while jays will nest in deciduous woods they prefer coniferous forests. He further states that the nests are built within a range of five to fifty feet above the ground but commonly below twenty.

The nest was constructed of twigs under one-half a centimeter in diameter and up to forty centimeters in length. No grass or mud was used in binding the nest together. The sticks were wedged into a branched and rebranched fork of the shrub-like beech. At first glance the nest appeared to be a flimsy structure but touching the nest revealed that it was firm and could withstand considerable abuse. The cup of the nest was shallow relative to the total depth of the structure. It was lined entirely with thin rootlets probably gathered along the beach where they are exposed or washed up. Bendire (1895; 360) writes that bark, moss, string, cloth, and sometimes mud is used in the construction of the nest but that the lining is always rootlets. My nest, however, had

only two types of material, twigs and rootlets. The dimensions of the nest were:

Outside depth	-	30 cm
Inside depth	-	6 cm
Outside diameter	-	42 cm
Inside diameter	-	10 cm

Nest Building

The nest was already constructed when found by us so I can give nothing on the construction from my own observations. Forbush (1927; 2; 378) describes the construction of the nest as follows: "When the stick-carrying begins, every stick that goes into the nest is tested with care. The jay does not pick up dry sticks from the ground for the structure that is to hold its young, but breaks twigs and small branches from the trees; strong dead twigs are used and they even attempt to break green twigs which they seize with their bills in the tree tops". He further states that both adults assist in the construction.

Eggs

The nest when discovered contained three young and one egg. This egg failed to hatch and was later removed from the nest. The background color was a very light olive green with irregular buffy splotches. This egg measured 22 x 30 mm. Bendire (1895; 360) lists the average dimension of one hundred and thirty eggs in the collection of the United States National Museum as 28.02 x 20.44 mm. The number of eggs varies from three to six with four being common.

Incubation

The incubation period of the blue jay (*Cyanocitta cristata cristata*) as given in Bergtold (1917; 100) is fifteen to seventeen days (Burns) and seventeen (Lemmon). Both sexes assist in incubation according to Bendire (1895; 360).

The Young

The age of the three young in the nest when the first observations were taken on July 3 is not known exactly. Their eyes were closed, their bodies were completely naked and they were unable to stand up in the nest. They probably were not hatched before July 1. Thus they were in their third day when first observed. Their skins were pinkish with purplish areas showing through. On July 5 the young still had no feathers and the eyes were closed. When I removed them from the nest for weighing they clutched my finger tightly with their feet which seemed to be the most developed feature of their external anatomy. They still were unable to stand or sit upright. The following day was very warm and the female bird stood over the nest with out spread wings to shade it during a portion of the day when the sun shone directly on it. The young birds were very active, continually pushing their heads out from under her protecting wing. Their eyes were still not open but apparently the bright sun was partially visible to them. The first traces of the primaries appeared on this day. By July 10 feathers were showing in all of the feather tracts, the eyes were open and they could sit upright in the nest without difficulty. Two days later the general pattern of the plumage was becoming evident. The tail was still short containing two dark-tipped feathers in the center.

Behavior of the Adults

When the canvas on the tower blind was erected July 3, the female remained on the nest only four feet away even after we climbed up to the platform with the canvas. Not until we began to drive nails to fasten the canvas did she fly away and then only to a nearby tree. All this time she was very quiet, never uttering an alarm call.

On July 5 I observed for about three and one half hours. Again the female sat quietly on the nest while I ascended into the blind and settled myself inside. Noises in the blind would often cause her to raise her crest and cock her head but I never saw her leave the nest because of them. On one occasion a truck passing noisily along the upper drive caused her to hop down from the edge of the nest, where she had been sitting, onto the nest apparently to cover the young and protect them. Twenty minutes after I entered the blind the male appeared for the first time and fed the young by regurgitation. The material was orange in color but it was of course impossible to distinguish the constituents. When the male fed the young he remained on the edge of the nest for only about thirty to sixty seconds. Never did I see him get down into the nest and usually he did not remain in sight of the nest long. However, on several days when waxwings and a small hawk were in the vicinity of the nest he was never far away. The males approach to the nest was always very quiet and only when the waxwings bothered him could I tell when he was coming before he got directly below the nest. His approach to the nest was usually from below and apparently he hopped for

some distance along low in the bushes. On one occasion I saw him cross the road to the southwest of the nest by a short quick glide from a low bush on the south side to another on the north side.

The female sitting on the nest or in a nearby tree was equally silent but usually detected his approach before I could hear him. If she was on the nest she would hop up on the edge or if she was in a tree she would come down to the nest. She would stand there often with an open bill while he fed the young. Sometimes he would feed her also. Although she thrust her bill into the open mouths of the young several times she never seemed to regurgitate anything. Just why she did this I could not determine. The feeding interval during the three and one half hour period on the morning of July 5 averaged 35 minutes. On the afternoon of July 6 the feeding interval increased to 54 minutes. When the next observations were taken on the afternoon of July 10 a group of six or eight waxwings so disturbed the male that he didn't feed the young during the one and one quarter hours I was there. On July 12 the waxwings were still there but the male did not seem to be so bothered by them and fed the young once while I was there.

Both birds took part in the sanitation of the nest and usually both ate the material. Occasionally the male would carry the sac away with him.

Songs and Call notes

As I have already mentioned both birds were very quiet in sharp contrast to their usual noisy behavior during the remainder of the year. The loud "jay" "jay" alarm note was used only when

a hawk attacked the nest and once or twice when I crashed through the underbrush around the nest. Once I heard the female give a single low soft note followed by a clear bell-like note which was much higher. Forebush (1927;2; 381-82) writes that blue jays often mimic other birds especially red-shouldered hawks and can often be heard "talking" back and forth in soft, gentle calls. When he spots an enemy, human or otherwise he makes the woods ring with his alarm call.

The Relation of the Blue Jay to Other Birds in the Vicinity of His Nest

This is not really a discussion of territory since I had no opportunity to observe the contact of this pair of jays with any other. The nearest pair is approximately a mile away. Nor did I have an opportunity to hear the male bird do any singing since the courtship performance was already completed. However, I did have an opportunity to observe the reaction of the adult jays to several birds in the vicinity of the nest.

On July 12 I was fortunate enough to be in the blind when a small hawk (probably sharp-shinned) swooped down on the nest. As it happened both adults were close to the nest. Immediately the two birds screamed out their alarm call and dived at the hawk driving it away before any damage was done. For some ten minutes afterwards the male was gone and the female remained excitedly by the nest.

Several times a group of six or eight waxwings fluttered close by the nest and clicked their bills. The female made no attempt to drive them away but when the male returned he darted at them several times.

On July 5 a robin approached too closely to the nest and was driven away by flying at it but not by calling. The crested fly-catcher was also seen and heard close by the nest.

Behavior of the Young in Captivity

On the evening of July 15th three young were removed from the nest in order to raise them. They were well feathered and one managed to flutter a short distance from the nest. The first night they were quite frightened and refused food. The next day hunger overcame fear and Dwain Warner, who fed them that day, reports that they took food without forcing. One had to place the food well down in their throat before they would swallow. The first food consisted of egg, bread, lettuce and cheese ground together. When this was gone I fed them some peas which they seemed to eat with great relish. The next change in the diet was to grasshoppers. At first it was necessary to stick the grasshoppers down their throats but within about three to four days one of them would occasionally hop down to the bottom of the cage and pick them up himself. Soon afterwards they were all picking them from my hand or the sides and bottom of the cage. Since they were now becoming fairly proficient on the wing we moved them into a large flight cage where we could let them fly about part of the day. They showed no fear of me and often lit on my head or shoulders to get food. Normally nuts form a large part of their diet so I obtained some peanuts and ground them up. These they took when fed but seemed to prefer grasshoppers. Several fruits were tried: blueberries (Vaccinium pennsylvanicum), juneberries (Amelanchier canadensis) and pincherries (Prunus pennsylvanica). The last

mentioned were refused. In addition watermelon was given to them several times. At first they did not seem to pay any attention to it but when I returned in the morning only the very outside of the rind was left. As an experiment I gave them several small bird carcasses which one of them attempted to swallow whole. I took it away and fed it to him in small pieces. Two of them ate the meat but the third could not be induced to do so. Several times since then they have picked up scraps of meat left by a pair of screech owls kept in the same cage.

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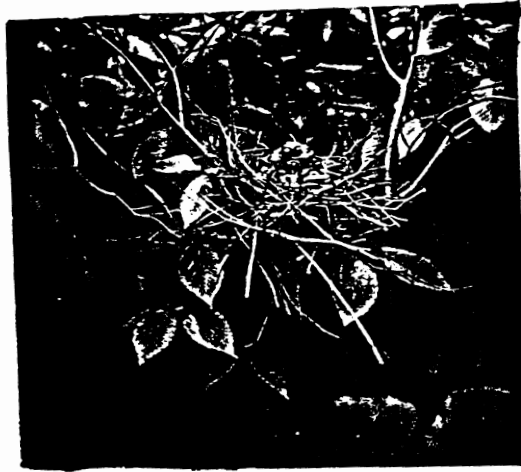
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Nest in Beech



Young

by

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