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A STUDY OF THE HOME LIFE OF THE EASTERN BELTED KINGFISHER¹

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The present study of the Eastern Belted Kingfisher (*Megasceryle alcyon alcyon*) was made on the same ground as that of the Black Duck (*Anas rubripes tristis*)² in 1935, except that the position of the nest was to the north of the two large meadows mentioned, instead of to the south, as in the case of the Black Duck. In addition, the obstacles now encountered were far greater than those described in 1935, to say nothing of the length of time involved in watching, rather over ten weeks instead of four. To commence with, the birds had selected for their home the north bank of the most evil smelling stream it has ever been my misfortune to sit near, my hiding place behind a large tree being only thirty-five yards from the nest, and much nearer to the stream which made a bend at this point. In addition two large dumps, in the making, lay to the north and east of the nest, which was approached by several footpaths across the meadows. Two of these paths unfortunately passed in close proximity to the nest, and were used by men, women, and children whilst carrying old iron and other scrap materials from the dumps to their homes on the west side of the meadows. The boys, as might be expected, proved the greatest menace, since they persisted in loitering near the stream with their loads, climbing trees, lighting fires, shouting, and making things generally disagreeable, not only for myself, but for the birds as well, which fortunately were afraid to enter their nesting hole whilst they were about. Add to all this the fact that the nest had to be opened up at various times for the inspection of the young, and it is little short of a miracle how it escaped detection for over ten weeks.

The nesting site already mentioned was on the north bank of the stream, the entrance hole, Fig. 1, being three feet above the water level, and one foot below the top of the bank, which at this point was

¹Read by title at the Annual Meeting of the American Ornithologists' Union, Charleston, S. C., November 17, 1937.

²Birth of a Black Duck Family, *Auk*, Vol. LIII, No. 4, 1936, pp. 377-80, 2 pls.

overshadowed by a belt of large trees on each side of the stream, Fig. 2. There were no cock-burrows as are sometimes made by the male. I first discovered the hole on May 11 (1937), the day on which boring operations were commenced, the hole on that day being excavated for about ten inches, which length had been increased to three and a half feet by May 16. This became the total length of the burrow which was determined, possibly, by a large stone on the right-hand side—as I found out later on. At this date I had some difficulty in pushing a thin stick to the end of the burrow, the birds not having as yet bored out the hole to its full diameter of four inches, or cleaned out the soil they had loosened. This, as near as I could tell, was completed by May 23, and the six eggs laid between that date and May 31, the day on which I judged incubation to have commenced, and which lasted until June 23, a period of twenty-four days, before the young hatched. On that day I was only able to spend about an hour at the nest, during which time the young were fed on an average of once in every nine minutes, and this by the male alone. Meanwhile the female brooded the young, and left the nest only after the last visit of her partner. The day following, however, I spent seven hours at the nest, during which time the young were fed twenty times, or on an average of once in every twenty-one minutes.

On one occasion the male remained five minutes in the nest after feeding the young, and on another, the female lingered for seven minutes, during which times it is possible the young were brooded by each parent. On one occasion, they were both absent from the nest for sixty-one minutes. During the next two days I spent eleven hours with the birds, five on the 25th, and six on the 26th. The young were then fed thirty-three times, or on an average of once in every twenty minutes. On both these dates the parents were never in the nest for more than two minutes at a time, brooding apparently being practically abandoned. Twice on June 26, both parents together were absent from the nest for ninety-seven minutes at a time. Up to this point it had struck me that the male was the most attentive as regards feeding his offspring, and I had ample proof of this on the 26th and again on July 4—referred to later on. On the former date, the feeding grounds of the male lay to the left, and those of the female to the right of the nest, and no deviation of this rule was made during my six hours of watching, the male feeding on thirteen occasions, and the female on five only, out of a total of eighteen.

It was on this date also that an amusing incident took place, when three cows came and stood up at the edge of the bank right over



FIG. 2. General view of Kingfisher Environment.



FIG. 1. Nesting Hole of the Belted Kingfisher.

the nesting hole, whilst two others contented themselves by lying down also right across the tunnel and nesting chamber. At first I thought of driving them off, but luckily decided to leave them alone and see what would happen on the return of the parents, both of which came back together. What happened then I shall not readily forget, as they made the grove ring with their united rattlings, so much so, that I was afraid the noise would attract some of the boys. First one and then the other would fly directly almost to the mouth of the hole, but instead of entering it, would rise up suddenly and fly over almost touching the backs of the three standing cows, in an endeavor to frighten them away, whilst rattling all the time to show their displeasure at this intrusion of their home ground. Thinking the noise might attract undesirable visitors, and seeing the birds would not enter the hole, I drove off the cows, when peace reigned once more and feeding operations were resumed. Later on, one of the cows decided to return and lie down right across the nesting chamber, and I let it remain to see what would happen. The birds on their return paid no attention to it whatever; so it must have been the three standing cows at the very edge of the bank and right above the entrance hole that annoyed the birds, and caused all the commotion in the first instance.

Regarding the approach to the nest, the birds would always give notice of their coming by a series of the well known rattling notes—which could be heard a long way off—before alighting on one of four perches in the grove of trees, prior to entering the nesting hole. Unfortunately, the favorite perch was not visible from my “hide out”, so I lost many opportunities of exact sex determination, the birds entering and leaving the hole, always head first, so quickly that it was perfectly impossible to make sure of their sex, notwithstanding the fact that the female in this species, contrary to the general rule, is brighter colored than the male, having a second band (rufous) across the breast. The approach to the hole was always direct from whichever perch they happened to be on, except on one or two occasions which will be referred to later. But the exit, without exception, was always in the same direction, to the left flying low, just above the water, and round the bend of the stream (Fig. 2) out of my sight, after which they would rise up giving vent to their rattle as they left for the fishing grounds. When alighting on the perches and suspicious, the birds went through a nervous form of motion, best described as a slowly heaving up and down of the body with crest erected, not a rapid bobbing up and down motion like that of the Spotted Sandpipers.

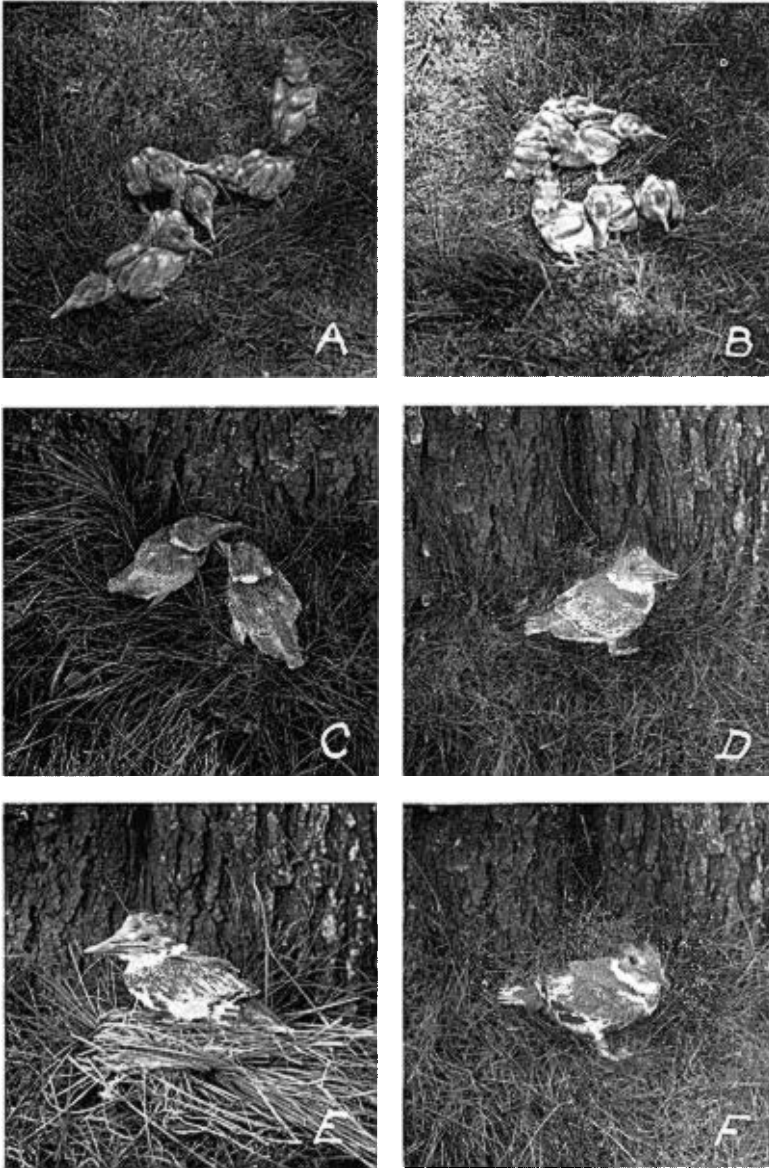


FIG. 3. Belted Kingfisher Nestlings. A and B, seven days old; C, 13 days old; D, 17 days old; E, 20 days old; F, 23 days old.

On June 28 I decided to see how late they were feeding the young, so remained at the nest from 6:15 to 8:30 P. M. (standard time). During this time the young were fed on nine occasions, or on an average of once every nine minutes. It was on this date towards the end of the sitting, when it was so dark I could hardly see the hole, that one of the birds—I think it was the male—flew low and directly up stream round the bend and subsequently perched on a large stone in the stream nearly opposite the nest, and from there entered the hole. This procedure was reverted to only on one other date, July 4, when the male instead of coming directly up stream and alighting on the stone, first flew to one of the four perches in the trees, and from there to the stone, and then into the nesting hole. This was in the morning, however, and not at night.

On June 29 I spent a little over three hours at the nest, two in the morning, and sixty-seven minutes in the afternoon, during which time the young were fed seventeen times, or at an average rate of once in every eleven minutes. Up to this point, I had spent nearly twenty-five hours at the nest, and had seen the young fed ninety-one times, or at an average rate of once in every sixteen minutes. The male had been definitely identified as feeding the young on twenty-one occasions, and the female on twelve. It was on this date, June 29, that with the help of Mr. J. D. Cleghorn, we opened up the nest for the inspection of the young, a somewhat hazardous undertaking, and one that had to be done as quickly as possible, in view of all that has been said regarding the risk of detection.

In view of the length of the hole (three and a half feet), we decided to cut out a sod about twelve inches square and six inches deep, one foot from the face of the bank, and then dig down to the hole. Arriving at this, we were able to push our arm to the end of the nesting chamber, which was roughly nine inches in diameter, the top being only six inches below the surface of the ground, and in which were found six young. Before replacing the sod, two pieces of sheet iron had to be placed over the top of the hole, the one nearest the nest bent upwards for half its width to prevent the soil which then had to be placed on top, from getting into the nesting chamber, the roof of which was five inches higher than the burrow. The sod could then be replaced at its proper level and easily removed again at any time we wished to examine the young. This device worked well and was never discovered by anyone although the nest was opened up some ten times. Moreover, it stood the full weight of cows both standing up and lying down—as will be seen later. As mentioned, the nest

retained six young, which as near as I could judge were seven days old. They were banded by my friend, a proceeding which, considering their somewhat tender age at this date, may, or may not, have been responsible for the dire disaster which came to light the next time the nest was examined.

At the present juncture, the state of the young reminded me very much of my experience when photographing the young of the Black-billed Cuckoo (*Coccyzus erythrophthalmus*)³ in August of 1930. They were naked, lacking even the natal down so characteristic of most young birds, and like young cuckoos they omit the juvenile plumage, the first feathers being those of the adult birds which, however, do not appear nearly as early as in the case of young cuckoos. The feather sheaths also do not break open until the feathers have nearly matured (about seven days in the case of young cuckoos) and their bodies in consequence seem to be incased in what has been described as coats of mail, (Fig. 3, A and B) referred to by some as the porcupine stage. They seemed to object to the light and shivered a good deal as they crawled about when placed on the grass. After taking their pictures, which show the feather-tubes and tracts, they were replaced in the nest and were not disturbed again for five days, or until July 5. I visited the site, however, the day previous, staying nearly two hours, during which time the young were fed five times, entirely by the male as already intimated, or at an average rate of once in every twenty-one minutes. I might here mention that from June 28 to the present date, and in fact to the end of the study, the exits and entrances of the parents to the nest were so rapid that it would have required a stop watch in order to have recorded them accurately, as they rarely exceeded fractions of a minute. We will now revert to July 5, the day on which the nest was opened up for the second time—a sad event. Four of the six young were found to be dead, with one of the remaining two not in very good condition. The nesting chamber naturally was in a dreadful condition, the smell from the dead birds and the unconsumed food being almost unbearable, and it is a wonder the remaining two were still alive. But they had grown out of the porcupine stage into one more resembling a feathered bird (Fig. 3, C). Apparently the four dead ones had not survived very long after their last replacement in the nest, there being no signs of any development in their case. After thoroughly ventilating and cleaning out the nesting chamber and tunnel, the two remaining young were replaced in their home,

³Reminiscences of the Home Life of the Black-billed Cuckoo, Canadian Field Naturalist, Vol. XLV, No. 4, April, 1931.

with grave fears as to one of them, at least, being able to pull through. These fears were well grounded, as on again visiting the nest four days later, July 9, we noticed one dead bird at the edge of the stream. Either it had come to the mouth of the tunnel and fallen out, or else the parents had removed it. On opening up the nest, however, we were glad to find the other youngster, now seventeen days old, in fine condition, having developed considerably, and with every prospect of eventually reaching maturity. Most of the feather shafts had partially split (Fig. 3, D), the plumage now being comparable with that of the Black-billed Cuckoo at seven days old.

Three days later, July 12, things were still going well (Fig. 3, E), and this was the case on July 15, the day on which we first heard this youngster, now twenty-three days old, give vent to its rattling call; up to then no sound had been made upon its removal from the nest. Several of the sheaths to the primaries had split for at least half of their length, and the tail was also developing nicely (Fig. 3, F). From now onward to the end of the study I had to do without the help of Mr. Cleghorn when photographing—no small matter when a lively young kingfisher was concerned. Four days later, July 19, when twenty-seven days old, it was almost fully fledged, with the exception that the center portion of the sheaths to the tail feathers had not as yet split, as well as the bases of three of the primaries (Fig. 4, G). It could flutter along the ground but could not yet fly. It rattled the whole time and bit my fingers vigorously. This biting habit is acquired early. I noticed it several times. One of my pictures at the seven-day period shows them biting one another as they huddled together when placed on the grass. The following day it was able to fly a few feet, the centers of the sheaths to the tail feathers, however, were still partly closed; but those of the three primaries had split open (Fig. 4, H and I). It was again very noisy and difficult to pose even for an instant, the instinct of fear having by now become well established. On the day after, July 21, it was still unable to fly far, but had improved a little, and was much quieter, allowing me to get a somewhat uncommon picture (Fig. 4, J). This picture shows one of the wings fully expanded, with all the white pattern clearly defined. Two days later, July 23, was the last time I handled it at the age of thirty-one days, when it made a flight of twenty-five feet or thereabouts. The male parent was on the ground when I arrived, and made a great fuss, flying about and rattling vigorously all the time, to which the young responded. After taking its picture on the ground (Fig. 4, K), showing its syndactylous foot as well as the band, No. 37-404052, on

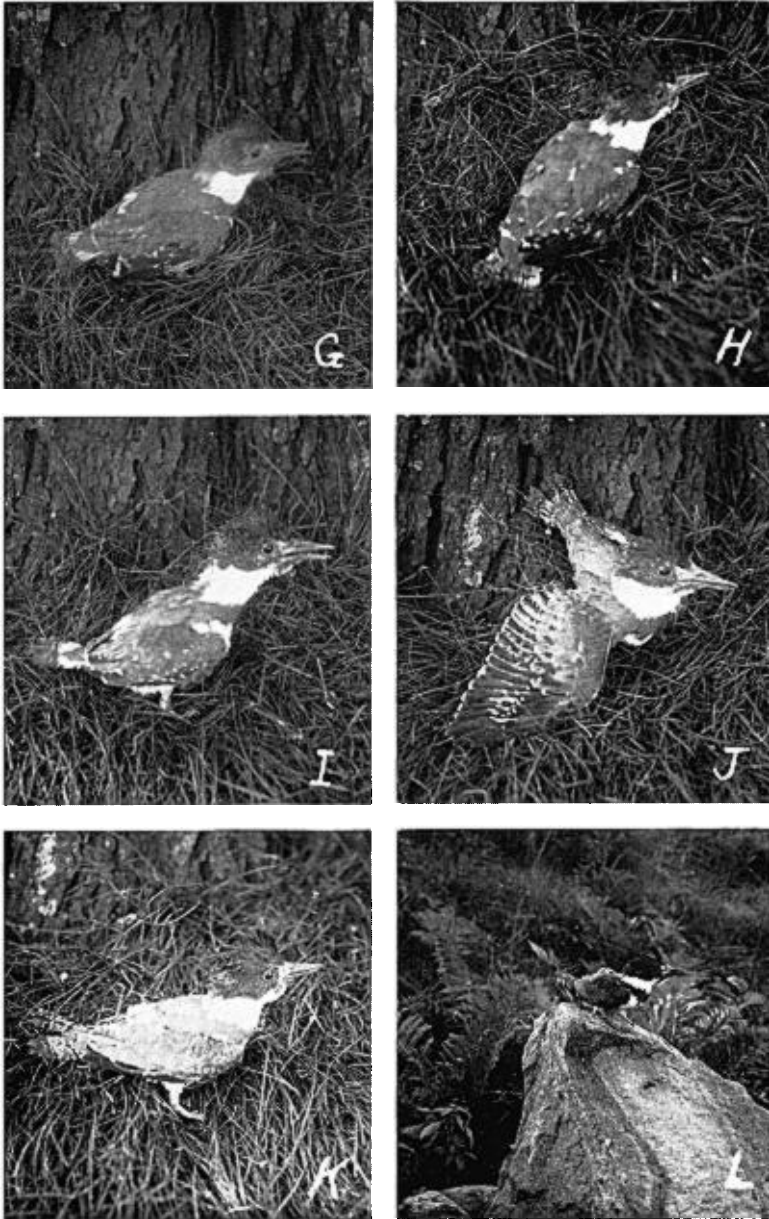


FIG. 4. Belted Kingfisher Nestlings. G, 27 days old; H and I, 28 days old; J, 29 days old; K and L, 31 days old.

the tibio-tarsus, and another after its flight, when it landed on a large stone (Fig. 4, L), I replaced it in the nest and watched the male come and feed it once. After that the parent perched in a tree for a long time whilst preening its feathers before flying away. The day following the nest was empty, so the parent no doubt had enticed the young out of the nest either after my departure or on the following day, July 24, when it would be either thirty-one or thirty-two days old, as the case might be.

In conclusion, on summing up I find forty-two hours were spent with the birds (May 11-July 24), during which time the young were fed one hundred times, or at an average rate of once in every 25.2 minutes. Of course there were periods when the feeding was much faster, as for instance, once in every 8, 9, 13, 20, and 21 minutes respectively. Sometimes the parents were absent from the nest for long periods of time, such as, 150, 120, 105, 97, 93, 90, 85, 75, 70, and 60 minutes at a time, when of course the young were without food. It was after these long spells that the more rapid feedings generally took place. As already remarked, the male seemed to pay the most attention to this part of the business, for I find of those times when I was perfectly sure of the sex of the parent, the male fed twenty-eight times to his partner's fourteen, or just double. It was the male parent which was the last seen at the nest previous to the departure of the one surviving young—a male. The food for the most part consisted of small fish, crawfish, minnows, tadpoles, and probably beetles. I may say that after the finding of the four dead young, the remains of the uneaten food suggested that some of it was too large, and such a thing as injudicious feeding may after all have contributed to, if it did not actually cause, the early demise of these four youngsters. After the first few days the time the parents remained in the nest after feeding the young could only have been decided by means of a stop watch—so rapid were the exits and entrances of the parents.

And so ended my longest study, lasting as it did from May 11 to July 24, a matter of seventy-four days. And between now and next May I am left wondering whether the birds will come back and occupy the same nesting hole again. Should they do so they will find it all in order, as I cleaned it out thoroughly before replacing the sod and closing it up for the last time. Certainly, for their own sakes, as well as for mine, they will be wise in returning, since so much preliminary burrowing and digging will be spared for both parties concerned.

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