LIFE HISTORY TOPICS

If you want some special help on how to undertake a life history or behavior study, I suggest you read A. A. Allen's Chapter XIX in his book of bird life entitled "Suggestions for the Intensive Study of a Species," or that you review Mrs. Nice's book, "Studies in the Life History of the Song Sparrow." Ralph Palmer's recent work on the "Behavior of the Common Tern" and Tinbergen's work on the "Behavior of the Snow Bunting" will give you many suggestions for similar studies. Eugene P. Odum has summarized many of these suggestions in a very helpful article in the "Oriole," Journal of the Georgia Ornithological Society of September, 1941, entitled, "Technics in Life History Study." He includes an excellent selection of references for each of the topics suggested. These topics include:

Pair-formation	Nest building
Territory	Egg laying
Incubation	Hatching
Development of young	Dispersal of young
Number of broods	Nesting success
Parasites	Molting
Seasonal movements	Voice
Roosting habits	Flocking and social behavior
(night roosting)	Population
Habitat selection	Predators and other Ecological
Food habits	relationships

I would like to conclude with this statement—that life history and behavior studies are not too difficult for the average bander, that they can be broken down into small parts so that a definite accomplishment can be made by most of us, and that banders generally have a very significant contribution to make in the field of ornithology if interested, and willing to engage in such challenging work.

Audubon Nature Center,
R. F. D. 4, Greenwich, Conn.

NOTES ON THE BEHAVIOR OF A NESTING NIGHTHAWK

BY G. HAPGOOD PARKS

During the dark, showery days of late May and early June, frequent glimpses of an Eastern Nighthawk *(Chordeiles minor minor* (Forster)) flying by the windows of the Physics laboratory at Weaver High School in Hartford, Connecticut, suggested that the bird might be nesting, or preparing to nest, nearby.

A visit to the extensive flat roof of the school was made on June 13, 1945, and there, near the most northerly edge, a female nighthawk was discovered. The bird allowed me to approach to within fifteen feet before she sprang into the air. After less than a half-dozen wing strokes she alighted again on the roof, scarcely farther from me than the point whence she had started, and there she lay quietly, eyes almost closed, apparently unafraid.

Two days later, June 15, a single egg was found, grayish in color, mottled with slate and brownish spots. The egg lay directly upon the round, pebble-like cinders which covered the asphalted surface of the roof. Many of the cinders were daubed with bits of dried black asphalt and were about the size of medium peas. The egg blended almost invisibly among them.

The nighthawk was not visited the next day, but on June 17 a second egg lay beside the first. Both were identical in appearance except that one was slightly larger than the other. The nest, if we may call two eggs a "nest," was located in a niche approximately two feet square formed by the cement blocks which protect and ornament the entire edge of the roof. This particular niche was at the northeast corner of the roof, and, as a result, the nesting bird was sheltered on all sides except the south. The protecting blocks rose about two feet above the level of the roof. Except for about three hours at midday the cement blocks shaded the nest from the direct rays of the sun, but there was no protection from directly overhead.

Upon the occasion of each succeeding visit the bird allowed me to approach to within about ten feet before springing off the nest. Usually there was a repetition of the tactics noted during the first visit. In one instance, however, the bird, after alighting from her short flight, moved along the roof with both wings spread. Then the right wing was folded and the left one was dragged as if broken. It was evidently an attempt to attract me away from the nest, but the bird showed neither nervousness nor fright and the display lasted less than a minute. During this time she moved not more than five feet along the roof.

On June 20 a flat trap was set over the eggs. Less than fifteen minutes later the bird entered the trap and was captured. She struggled considerably in the trap, but the eggs were not harmed. Her feathers were very loose and several of them, small body feathers as well as coverts from wings and tail, were left in the trap and in the gathering cage. She was very quiet in my hand, however, and submitted passively to banding. Band No. 44-201539 was used.

Never previously having handled a bird of this species, I was particularly impressed by the characteristically swallow-like appearance of her head and beak. In the bright sunlight her over-large eyes were kept blinkingly open only to the width of a mere slit. Her feet provided

the greatest surprise of all. They were so tiny and so weak for a bird of her size. After examining them I had no longer any reason to wonder why she rested her body snugly upon the ground the moment she alighted, or why her rare movements afoot, even over short distances, were usually assisted by her ample wings. The feet reminded me much more of those of a squirrel than of a bird.

Released from a window of the third-floor laboratory the banded nighthawk swerved almost immediately and flew back into the room through another open window. After fluttering against the ceiling for a moment she settled to the floor, where I picked her up. Upon being again released she disappeared into a mixed grove of maples and oaks.

Through June 27 daily visits provoked the same reactions on the part of the bird as have already been described: an upward spring from the nest, a couple of wing strokes, a quiet settling back upon the roof nearby, and not the least display of fright or annoyance.

On June 28, however, instead of settling back upon the roof the bird flew high into the air and soared around for about five minutes, twice giving voice to the typical cry of a nighthawk on the wing. Although I moved to the extreme opposite end of the large roof the bird alighted in a maple tree some hundred yards away instead of returning to the nest. There was no evident cause for this change in behavior so far as I was able to ascertain. The possibility that the female's mate may have been spelling her on the nest at the time of this visit was given consideration, but I was unable to detect any typical male markings on the flying bird. On this date it was first noticed that some of the cinders had been pushed aside, forming a slight depression in which the two eggs rested. Whether this hollowing had been deliberately done or whether it was the natural result of the presence of the brooding bird at this spot for so many days could not be determined.

The nest was not visited on June 29, but at eleven o'clock on the morning of June 30 the nighthawk's behavior showed a very distinct change. She left the nest as usual, alighted as usual upon the roof, but, instead of remaining quiet, she spread her wings wide apart, opened her beak to reveal a surprisingly cavernous pink mouth, and approached, more imploringly than menacingly, to within less than eight feet from where I was examining the eggs. Her wide-open eyes were unbelievably large. Pausing, she extended her wings as far as possible sideways and forward until the tips of their primaries touched the roof at points forward of her head. There, supporting her weight chiefly on her wing tips, she rocked her body and tail to and fro while the wings remained almost motionless. As she faced me thus she gave an almost perfect impersonation of a very mad (but very docile) snapping turtle. This impersonation became all the more

realistic when she uttered a hiss which differed from that of a snapping turtle only in that it was a bit more throaty, or guttural. Consistent with the bird's entire previous behavior this vocal contribution appeared also to be more like a new entreaty than like a challenge or a threat.

As I returned my attention to the nest I noticed for the first time that the shell of the larger egg seemed to be pecked. Closer examination proved, however, that some rounded object, probably one of the cinders upon which the egg was lying, had crushed a depression into the shell. The mutilation was about 4 mm. in diameter and only deep enough to break slightly through the membranous shell lining.

A second visit was made to the nest late in the afternoon of this same day. Upon this occasion the nighthawk left her nest in her customary manner and with only a slight display of the behavior which she had shown in the morning. I spent a longer time than usual at the nest checking the measurement of the eggs and weighing them. During the weighing process my attention was attracted by a slight "clucking" sound. The bird had approached to within four feet and there she lay observing my every movement with impatient curiosity punctuated, now and then, by a throaty "cluck" voiced with an upward inflection which seemed to interrogate my intent rather than to indicate distrust or fear.

The perfect egg measured 28.2 mm. in length by 21.8 mm. at its maximum width and weighed 6.77 grams. The egg with the crushed shell measured 29.2 mm. by 22.1 mm. but weighed only 5.32 grams. The reason for this reduced weight was determined a few days later.

Visits on July 3 and 4 brought out no new behavior except for the fact that I was able to approach to within a yard of the nest on both occasions before the bird flew off. Her flight took her not more than six feet away and her open-mouthed hissing was of short duration.

I very much regret that conditions beyond my control prevented a visit to the nest on July 5, for that is the probable date on which the perfect egg hatched. Anyhow, on July 6 I approached the nest in my usual manner and the nighthawk remained in her brooding position even as I advanced my hand cautiously and touched her. Then she sprang from the nest and alighted on a cement block less than a yard from my shoulder. There she faced me, hissing repeatedly with wide-open mouth and for the first time during my acquaintance with her the bird's attitude became menacing. This behavior subsided after a few seconds and she became quiet.

Then I noticed that of the two objects in the nest one was still an egg with a portion of its shell crushed, but the other was the downiest little speckled powder-puff of a chick one could ever imagine. The little bird was so generously covered with down that its tiny bill was scarcely visible and its eyes even less so. Irregularly spotted with gray which

ranged from light to dark slate and to brownish on dirty white, the youngster was even more invisible against the background of the cinder surface than was the almost indistinguishable egg beside which it lay.

As I cautiously handled the tiny chick it gave voice to several of the faintest of far off sounding "peeps." The first of these aroused the mother to a short series of hisses and a brief threatening advance to within arm's reach. Then she became calm and during the remainder of the several minutes I stayed at the nest she lay there on the cement block, wings folded naturally, eyes partly closed, a picture of supreme confidence. The little fellow, meantime, had shown surprising agility as he scrambled about for short distances over the rough surface of the roof.

Next day, July 7, my visit provided no noticeable variation in the adult bird's behavior nor any change in the nestling's condition. I took advantage of this visit to examine the damaged egg. Enlarging the depression in the shell I found a dead embryo which was more than half grown. Most of the liquids had dried away, thus diminishing the normal weight of the egg.

It was on the occasion of this visit of July 7 that I caught a glimpse of the possible mate of the nesting nighthawk. While the egg was being examined the cries of a second nighthawk attracted my attention skyward. Although I studied the flying bird as long as it remained visible, it was so far away that my unaided eyes were unable to detect the typical white tail band of the male. Neither the adult female on the roof beside me nor the youngster in the nest paid any attention to the bird in the air. I had, on two previous occasions, heard typical nighthawk cries from the direction of the thickly wooded park about one hundred yards away, but that bird had never before taken to the wing while I was visiting the nest.

I left Hartford on July 8 and it was August 9 before I was able to visit the roof again. On the latter date I found an adult nighthawk resting about twenty feet from the site of the deserted nest. As I approached cautiously this bird lay with eyes almost closed, but it was distinctly alert and uneasy. When I was still twenty-five feet away, the bird sprang into the air and instantly disappeared downward over the nearby edge of the roof. I ran to the spot at once, but the bird was nowhere to be seen. A careful examination of the entire roof gave no trace of any other bird, adult or immature.

On August 21 a final visit was made. The roof was deserted.

In summary: The nighthawk which was observed nested on a flat, cinder-covered roof. Two eggs were laid. Both eggs were fertile, but one was damaged during the incubation period and did not hatch. The egg which hatched was brooded for not more than twenty-one, nor less than eighteen, days. This bird was surprisingly calm through-

out the time she was being studied, and became especially tame as her nesting progressed toward completion. I regret the fact that repeated unsuccessful attempts to secure film defeated my desire to make a photographic record of these observations.

99 Warrenton Avenue, Hartford, Connecticut.

SOME INTERESTING NEST HABITS OF THE EASTERN BLUEBIRD *(SIALIA SIALIS SIALIS)*

BY T. E. MUSSELMAN, SC. D.

My first purpose in erecting Bluebird boxes in quantity was purely one of conservation. As boxes increased, however, I began to appreciate the possibilities of wholesale banding of mothers and nestling birds. Whether I banded several hundred or a thousand young birds was merely a matter of the time involved in running eight routes; one forty miles, one fifty, one seventy, and the remainder of lesser lengths. (An additional route of seventy boxes will be added between Quincy, Illinois, and Edina, Missouri, in 1946.)

Never has a year passed that some new and interesting information has not been gleaned. One year it was the effect of cold and rainy weather on nestlings; another year it was cowbird parasitism; again there were irregular types of eggs; then a cold snap killed several thousand eggs, advancing the incubation period three weeks. The bluebirds were thus thrown into direct competition with House Wrens for nest sites with the resultant increase in egg destruction by piercing. Most interesting were the occasional incidents which showed the bluebird's confidence in man, the love of its nest box, and its determination in spite of adversity to bring forth its little family of birds.

Years ago I erected a box on a sturdy white oak fence post. Termites and rot eventually ruined most of the other posts, making replacement necessary. The owner renewed the fence with wire and iron but left the one post on which the bluebird box was nailed. Termites worked on. Eventually the wood crumbled about the upper box nails. A bluebird had already taken possession, and built her nest. When the box finally swung, it hung by the lower nail, the entrance being an inch from the bottom. The female returned, reconstructed a shallow nest between the entrance and the reversed top and had layed four eggs when I discovered the accident.

I removed nest and eggs; returned the box to its former upright position; wired it safely to the post; then replaced the nest and eggs eight inches down in the box. Within five minutes the parent returned, she complained a bit; inspected the box carefully; then took possession. She layed a fifth egg and eventually matured a brood of five.