

A STUDY  
OF  
THE EASTERN NIGHTHAWK  
IN THE DOUGLAS LAKE, MICHIGAN REGION

JULY 16, to AUGUST 20, 1938

by

LINCOLN E. WILSON

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## INTRODUCTION

This study of the Nighthawk (Chordeiles minor minor) was made over a period of eight weeks during the summer of 1938 in the vicinity of Douglas Lake, Michigan. The observations were made mainly at the site of four nests, all located in the open aspen woods near the University of Michigan Biological Station. This species is a very common resident of this part of Michigan and of course there is afforded any one, who wishes to make a study of this bird, ample opportunity for observations. The time spent, however, in these observations was of necessity comparatively brief, only one nest being studied in an intensive fashion. Consequently, this is in no way an exhaustive study of this bird's nesting habits and behavior, but merely an organized compilation of those activities which I was able to observe during the time I was able to spend at this fascinating task.

## DESCRIPTION OF BREEDING HABITAT

The area around Douglas Lake, Michigan, because of its large population of the Eastern Nighthawk, furnishes an excellent opportunity for study of this species. The casual visitor walking through the open aspen woods during the nesting season would have no idea of the number of Nighthawks nesting in the area. It was therefore not until a systematic search of a limited area was made, that I found my first nest for observation and this was not until I had flushed an incubating bird. Merely flushing her once was not enough, as I was forced to allow her to return to the nest before I could locate the well concealed eggs. They were lying on top of the dried vegetation as it had fallen from the surrounding

*millin*

*Date of discovery?*

plants. There was absolutely no material which appeared to have been brought in, nor was there any indentation in the ground in which the eggs were placed. In fact to call this a nest, as we usually think of a nest, would hardly be correct. However, in referring to the site where the eggs are laid I will speak of it as such. The place was not unshaded as there was a small aspen tree not two feet away and the ferns, grown to a height of two feet, furnished shade during the morning and late afternoon. Otherwise, the general area would be called open as it was probably seventy five feet from trees of any size, which formed the deeper part of the woods. This open space was covered not only by ferns but some reindeer moss, which filled in between them. This nest, being the first one discovered, and the one which was most intensely studied will be subsequently referred to as nest #1.

The other nests observed rather casually were found in similar places. On July 21, I found one about 150 feet northeast from nest #1. It was under a medium sized pine tree on the fallen dried needles. Ferns were growing nearby, but not as close to the eggs as in nest #1. The area was much more shaded, not only by the pine tree but by several small aspens just a few feet away. The pine needles were very obviously thinner about the eggs, making a circular clearance about 8 cm. in diameter. There was no indentation in the ground. This nest I shall denote as #2.

On July 26 two other nests were reported to me which were about one eighth of a mile outside of the camp area. These two

were only about 75 yards apart and both only about 25 yards from the road. One of them had two eggs and it was a shallow circular depression in the sand about 9.5 cm. wide and .75 cm. in depth. No vegetation lined the depression. No doubt the depression was a result of the movements of the incubating bird, and not made intentionally. The area was very much shaded by several small aspen trees and nearby ferns. The fourth discovery was not eggs, but two young which appeared to be about three weeks old. The mother was brooding them when I approached. No doubt they were not far from the original nest, as egg shells were found not two feet away. There was, however, no sign of a depression in the sand. This area was also fairly well shaded although still in the typical open aspen woods.

#### EGGS

The nests observed all had the usual two eggs. Although the eggs were essentially the same color, they did vary somewhat in shades of dark and light. The ground color of all of them was from a dull white to a putty color. They were evenly speckled with fine greyish and brownish speckles. The brownish specklings seemed to be superimposed over the greyish marks. The size of the six eggs I measured varied somewhat. They were as follows:

Nest	egg #1	egg #2
1	31 mm. x 23 mm.	31.5 mm. x 22.5 mm.
2	28 mm. x 21.2 mm.	29 mm. x 21.5 mm.
3	30.5 mm. x 23 mm.	32 mm. x 22 mm.

It goes without saying that the eggs are remarkably well protected by their coloration. Whether placed on dried leaves or on sand, their broken contour and brownish color make them practically invisible and the lack of a nest structure seems to prove no handicap to the incubating bird, as far as predatory enemies are concerned. According to literature the incubation period is about sixteen days but I was not fortunate enough to make observations over the whole incubation period.

#### OBSERVATIONS DURING INCUBATION

In the afternoon of the day I discovered the first nest, two companions aided me in placing an improvised muslin blind 10 feet from the eggs. My two companions left the vicinity and in twenty minutes after entering the blind I observed the female bird flying quietly to a spot about  $1\frac{1}{2}$  feet from the eggs. She eyed the blind suspiciously for about five minutes and then walked awkwardly to the eggs which she covered. She faced away from the blind but turned her head so that she could watch it out of the corner of her eye. She apparently was very nervous about this change in her environment as her throat quivered noticeably during most of this observation period. Her motions were similar to that of a bird during extremely hot weather, but this was an unusually cool afternoon.

On the following morning I returned to the blind and the bird left at the sound of my approach when I was approximately 8 feet from her. In order to facilitate my observations, I replaced my muslin blind with a tent blind and placed it only 5 feet from the

eggs. I was accompanied by my wife who entered the blind with me. In the meantime the female had perched herself on top of a burned stub of a pine tree about 12 feet high and 40 feet from the nest. We watched her for about forty five minutes but she was apparently afraid to approach. My wife then left the blind but still after thirty minutes more the bird would not return but only flew several times over the tent and back to her perch. Concluding that the blind was too close, I moved it two feet back and left for camp. In the afternoon I returned and without flushing the bird observed her incubating the eggs again. It was sprinkling rain at the time.

During incubation I made visits at various intervals and at different hours of the day, although no continuous observations were made which lasted more than two and one half hours. If I approached with care, I could enter the blind without flushing the bird and once in, slight noises which I made would ordinarily not produce any more than a weak response in the incubating bird. She would merely open wide her usually half-closed eyes and after assuring herself that danger was not imminent she would apparently doze. The incubation was apparently carried on entirely by the female. At no time did I observe the male of any of the four nests taking part in this process. The female was a very conscientious and faithful incubator as there was never a time when I did not find her brooding the eggs. Probably early evening was the time of her feeding activity, although I was not able to verify this fact. One night about 10:30 P.M. I approached nest #2 while the female was brooding and when flushed she flew toward me and for a

short time hovered around my head flying at times directly toward my flashlight.

At nest #1 the female showed no signs of feigning injury until the day before the one egg hatched. She flew about ten feet from the nest and fluttered apparently helpless on the ground with her wings outstretched and uttered a hissing sound with her huge mouth wide open. On this same night I first saw the male. He appeared soon after the female began her feigning maneuvers, dropping apparently from high above the nest, and making his characteristic booming sound at the end of his rapid dive. He repeatedly climbed to a height of possibly 300 feet and with head pointed earthward and wings outstretched plummeted to a level below the tree tops. Just over my head he curved his primaries downward and described an arc upward again. The accompanying noise was tremendous and he easily convinced me of his anger. Whether he had been in the vicinity on my other visits to the nest, I do not know, but at least he had never made his presence known. It was interesting to note that subsequently the female would cease her feigning procedure and take to the air if the male were around. She too would then join in the diving maneuvers, but never climb to the heights that he would nor make his characteristic booming sound. If the male did not appear, she would usually continue for some time her injury feigning. At nest #2 the female from the outset made quite a display of feigning injury although it was one week before the eggs hatched. This was also true at nest #3, fully a week before the eggs hatched. At none of the nests, however, did



the male make himself known until just before the hatching and in nest #2 the male was never observed at any time. There was the possibility of course that he was among the males that were flying in the vicinity but not paying particular attention to his own nest.

#### DEVELOPMENT OF YOUNG

Sometime on July 16, the first egg in nest #1 hatched. My approach on this evening caused quite a commotion among the parents but strangely enough they did not put on as much a display of anger as on the previous evening. After feigning injury until satisfied that I was not to be attracted away from her newly hatched young, she flew to her favorite perch and sat rather quietly until the male appeared. This was a signal for renewed activity and for a few minutes both of them flew around the blind and nest, the female confining the evidence of her excitement to flying near my head and the male screaming loudly at close intervals.

The young nestling was a very attractive little ball of down. The down on the upper parts was a mottling of whitish, black and buff. The tips of the wings and under parts were white, while the chin was a rather dark buffy color. The typical mouth was enormous for the size of the bird, measuring about 1 cm. in width. It continually begged for food while in my hand, making a peep much like that of a baby chicken and opening wide its mouth. I could easily place the tip of my index finger between its mandibles into its pharynx. It was very active and when again placed on the ground

it made quite some progress away from the nest by supplementing its weak leg motion with its tiny wings.

The egg shell was found about a foot away from the nest site neatly cut in two pieces, the large end of the egg apparently having been cut off by the emerging bird. The remaining egg showed no signs of being pipped; and a few days later I brought back this egg which for some reason had failed to develop.

On the following day I placed a pen 5 feet square and 8 inches high around the day-old chick, as his activity plainly showed that he was capable of making quite a journey away from his place of nativity if he were not curbed in some way. In order to forestall any attempt which it might make to get under the rather weakly built pen, I made an inch thick wall of sand around the outer base, blocking this possible avenue of escape. It proved a very reliable enclosure for about one week, when it was replaced by a muslin pen  $1\frac{1}{2}$  feet in height. By August 3, when the young bird was 19 days old, the pen was raised to 3 feet and on August 7 to 6 feet. This proved to be inadequate when on that same day and on the two following days it succeeded in flying over. On both these occasions it was found and replaced in the enclosure, but on August 9 it made its escape so successfully that no trace of it could be found. So twenty four days proved long enough for the development of rather good flying ability.

On July 15, I was able to make my first careful feeding observations. Between 8:50 and 9:40 P.M. the young bird was fed four times by the male parent. During most of this time the female

brooded the young and only upon the approach of the male did it leave its mother. The feeding process is an interesting one. The male would fly over the enclosure, at the same time giving one or two of his characteristic "peents". He would then alight within, near the brooding female, and begin a sort of indescribable clucking sound which immediately caused a response in the young one, for it quickly went to his side with open mouth. The male would then place his bill deep in its throat and with two or three coughing motions, regurgitate food into the little ones throat. Sometimes the feeding process was completed with one contact, but on one occasion I saw him wait for a few seconds after the first regurgitation and then continue. He must have had a particularly full load of insects, as this process was repeated three times before he flew away in search of more food. These feeding observations were all the more interesting because of the necessity of watching the late feedings in the evening by flashlight. There apparently was no interruption in the feeding process when a light was turned directly on the male and young, for on each occasion that this was necessary, he continued his feeding. In checking the daily weight development of the young, however, I found that there was a smaller increase on days following an evening of observations. This may have been due to the fewer feedings of the male because of his being somewhat perturbed by my observing him with the flashlight.

When the bird was six days old I witnessed a very interesting behavior during the time that the feeding usually takes place.

From 8:00 P.M. until I left at 10:30 P.M. the female remained just outside the enclosure calling continually to the young bird inside the pen. It was by this time very active and it tried desperately to get through the cheese cloth pen. The main stimulus seemed to be hunger because during this time the male sat on a pine stub, not making any attempt to feed. The whole procedure seemed to be formulated to free the young one from his imprisonment. At about 10:30, however, the female entered the enclosure, and although the young one ran to her with open mouth she made no attempt to feed it. Finally she got the little fellow quiet and she was brooding it when I left the blind ten or fifteen minutes later.

The next afternoon when I returned I found the female at the same place outside of the enclosure still coaxing. The next night, however, the feeding routine was again resumed and the female seemed to be willing to accept the pen as a necessary part of her young one's surroundings. When the young was seven days old, I first observed the female feeding it, and this was the only occasion of her being observed aiding in that task, although the male fed a total of three times. There seemed to be no doubt that in this particular pair the male took most of the responsibility of providing food. The maximum feeding was observed between 8:00 P.M. and 9:45 P.M. and between 4:00 A.M. and 5:00 A.M. The earliest evening feeding was observed at 7:30 P.M. on a cloudy evening. On one occasion I weighed the bird before and after three feedings and found that the gain in weight was three grams, in-

dicating an average of one gram per feeding on that particular evening.

The development of the young of this species is rather slow compared with the passerine birds. This of course might be expected when it is considered that feeding takes place at only two periods during the day. At ten days of age the brownish tipped feathers began to supercede the down but it was not until the eighteenth day that the fifth and sixth primary began to show the typical white spots. When nineteen days old its first attempt to fly was observed and as mentioned previously when it was twenty three days old it flew easily over the six foot muslin fence. Although its general growth was comparatively small, it is interesting to note the rather rapid increase in extent. The extent at birth was 54 mm., at four days of age it was 115 mm., at eleven days it was 230 mm., and at eighteen days it was 360 mm. The tail did not grow proportionately as fast, as it was only 30 mm. long at eighteen days of age while in the adult it is about 117 mm.

Nest #2 was not studied intensively but as soon as the first egg hatched on July 28 a one foot pen was placed around the nest to prevent the young from leaving. The second egg hatched the next day. Weights were made at various intervals until August 4. These weights showed that the one which hatched first gained steadily but the younger <sup>9</sup> gained only for the first three days, then lost until on August 4 it was found dead. The pen was taken down on August 7 in order to add the material used here to my other pen and on August 9 when I returned to the site of this nest,

I found the female brooding her young in the middle of the area from which the pen had been removed. They apparently had an attachment to this territory so strong that even though they were free to move, there seemed to be no desire to do so. No subsequent observations were made of this bird. I noticed this same apparent attachment to territory at nest #3 and 4. They were disturbed but very little and they remained within an area of about 400 square feet even after the young were able to move readily about.

#### EXPERIMENTAL FEEDING OF YOUNG NIGHTHAWK IN LABORATORY

On July 26, I brought into the laboratory a young Nighthawk which appeared to be about three weeks old. It weighed 51.56 grams at that time. For seven days his mouth had to be forcefully opened in order to get him to eat. A mixture of pabulum, milk and hard boiled egg yolk with a few grasshoppers made up his diet for these seven days. At the end of that time he weighed 47.8 grams, a loss of 3.76 grams. On the evening of the ninth day he began to brighten up and offered to take grasshoppers from the hand, not being satisfied until he had consumed three grams of these insects. From that time feeding has been his chief concern, and at present his average consumption of grasshoppers is at least 20 grams and its weight has increased to 63 grams.

A much younger Nighthawk was brought in on August 6. Its age was estimated to be four days. Its reaction to food was quite different from the other one, as from the first it could easily be fed a mixture of pabulum, milk, and hard boiled egg. Neither, of course, were able to pick food from the cage but had to have

it offered to them. The weight of the smallest of the two increased from 11 grams to 20 grams over a period of five days. Water seems to be a much needed item in the diet of these captive birds as daily the larger one seems to relish as much as two medicine droppers of water during the feeding time. Feeding was usually carried on in the laboratory three times a day.

#### SUMMARY

Briefly I might sum up my observations under the following heads:

- 1 - The Nighthawk in this region seems to prefer a shaded rather than an open nesting habitat.
- 2 - There is no attempt at building any semblance of a nest structure.
- 3 - The female was the only one observed incubating.
- 4 - The males activity around the nest seemed to begin at or just before the time of hatching of the eggs.
- 5 - The feeding of the young is by regurgitation.
- 6 - The male apparently does most of the feeding of the young.
- 7 - The feeding of the young is done principally between 8:30 P.M. and 9:45 P.M. and between 4:00 A.M. and 5:00 A.M. No feeding during the day was observed.
- 8 - The development of the young is slow, the most rapid increase seemed to be in the wing development.
- 9 - The young are very active at an early age.
- 10 - They seem to have a rather close attachment to their territory and unless disturbed the young seem to remain within close range of the nesting site.

## TABLE SHOWING DAILY WEIGHTS OF YOUNG NIGHTHAWK IN NEST #1

7-16-38	-	5.5 grams	7-28-38	-	44.52 grams
7-18-38	-	9.24	7-30-38	-	41.33
7-19-38	-	12.20	7-31-38	-	50.63
7-20-38	-	14.97	8-1-38	-	47.24
7-21-38	-	18.00	8-2-38	-	56.18
7-22-38	-	21.51	8-3-38	-	56.53
7-23-38	-	23.69	8-4-38	-	52.35
7-24-38	-	29.10	8-5-38	-	60.25
7-25-38	-	30.70	8-6-38	-	56.89
7-26-38	-	35.42	8-7-38	-	54.95
7-27-38	-	37.13	8-8-38	-	57.53

## TABLE SHOWING DAILY WEIGHTS OF YOUNG NIGHTHAWK IN LABORATORY

7-26-38	-	51.56 grams	8-4-38	-	52.00 grams
7-27-38	-	43.61	8-5-38	-	52.90
7-28-38	-	43.14	8-6-38	-	56.73
7-29-38	-	45.00	8-7-38	-	53.20
7-30-38	-	46.20	8-8-38	-	55.00
7-31-38	-	46.69	8-9-38	-	59.51
8-1-38	-	47.80	8-10-38	-	56.00
8-2-38	-	48.34	8-11-38	-	62.40
8-3-38	-	49.50	8-12-38	-	63.00



PICTURES OF THE EASTERN NIGHTHAWK --- Taken by CHARLES BLAIR



Plate 1. Shows how well the Eastern Nighthawk blends into the Surroundings. This exemplifies unique protective coloration.

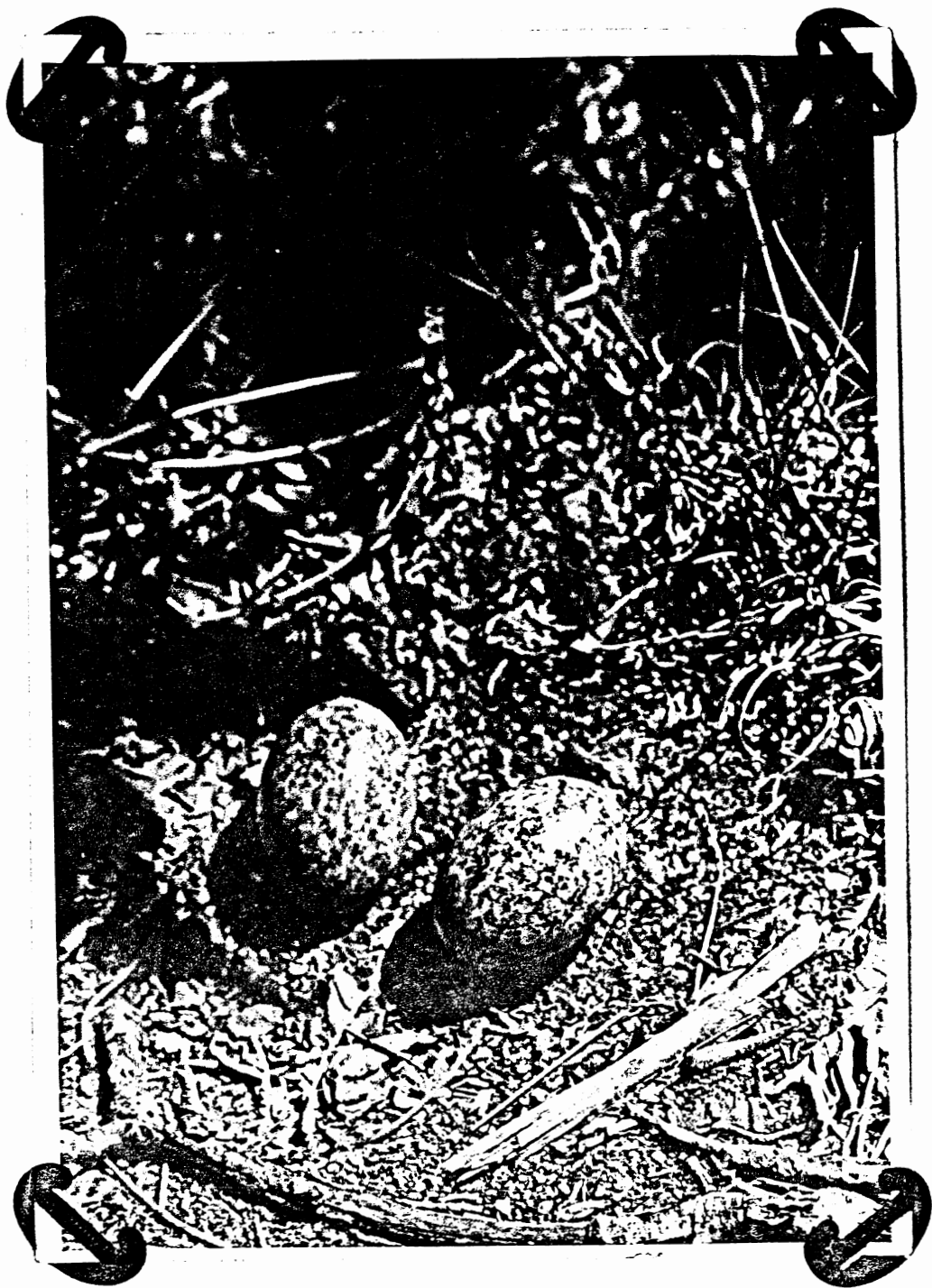


Plate 2. This shows the eggs. Notice the absence of nesting material. Notice the size and shape of the eggs. Notice, too, that the shaded area is to the left of the eggs. The blotching on the eggs is distinct.



Plate 4. This shows the blind, the cheese-cloth fence, and the young Nighthawk being held by the writer. The oak (Quercus borealis) although near the nest did not shade it.

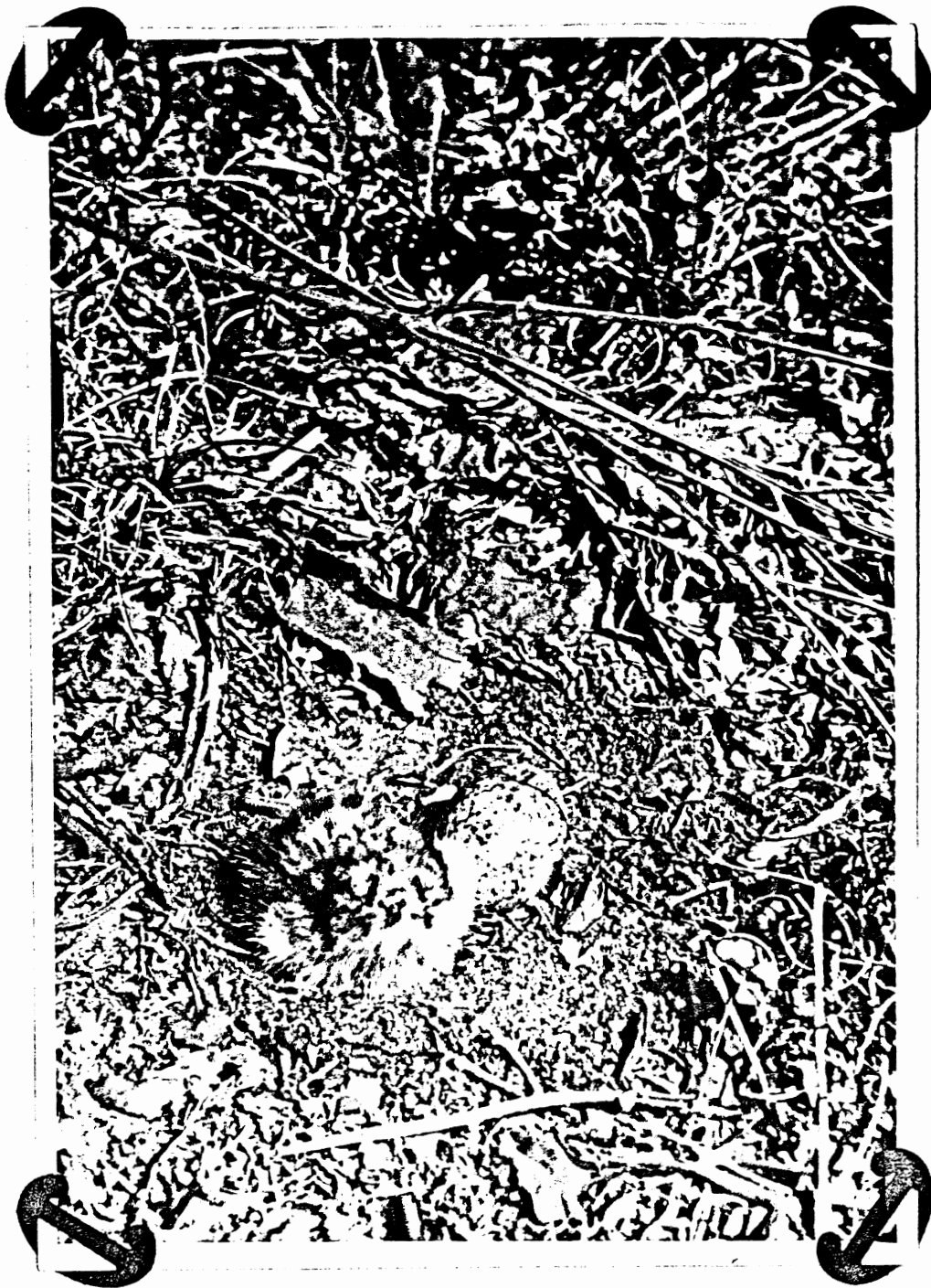


Plate 3. This shows the young Nighthawk soon after hatching. The body is noted to be covered with natal down. During the first day the young are able to move about. The eyes are open at hatching time.