

NOTES ON THE DEVELOPMENT OF THE NIGHTHAWK

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Plate 6

IN the course of field studies conducted during the summer of 1943 at Campbell River, Vancouver Island, British Columbia, a series of observations was made at two nests of the Eastern Nighthawk, *Chordeiles minor minor* (Forster). Both nests were found on an extensively logged and severely burned area characterized by an almost entire absence of tree cover. Ground cover consisted mainly of bracken fern (*Pteris aquilina* var. *lanuginosa* Bong.), trailing blackberry (*Rubus macropetalus* Dougl.) and other plant species characteristic of the early successional stages.

The nests were placed on small patches of sandy gravel surrounded by a scattered debris of dry vegetation and decaying wood in the shade of sparse stands of bracken. Nest 1 was found on July 1, at which time it contained two eggs, the smooth glossy surface and pale color of which indicated that they were in a fairly advanced stage of incubation. When the site was revisited on July 17, two chicks, judged to be about five days old, were found two feet from the egg shells.

The remainder of the observations were made at Nest 2 which was found on July 12. At this time it contained only one egg, but by July 14 the parent bird was brooding two darkly pigmented and dull-surfaced eggs. By the 26th, however, the eggs presented a more 'washed-out' appearance and their surfaces had become glazed.

A visit to this nest at 7:30 a. m. on July 30 revealed that one egg had hatched. The shell was broken around the short circumference into two almost equal halves which were found lying together beside the chick (Plate 6). A small portion of the shell remained clinging to the nestling's back. The second egg hatched the next morning at 7:30 when the young bird was found still moist and struggling to free itself from the shell. Again the egg was broken neatly into two halves.

Here it will be seen that the incubation period was eighteen days. The one-day lag between the hatching of the first and second chicks suggests that the former probably developed from the first egg laid.

On July 31, the older chick was marked with indelible ink to distinguish it from its nest-mate.

The nestlings were sparingly covered with soft down. The mid-dorsal and latero-lumbar areas were bare and very darkly pigmented. This general area was bounded by scapular and caudal pterygiae of dark gray down. The flanks, however, were somewhat paler and

faded into the creamy pigmentation of the ventral down. The younger chick was paler than the older.

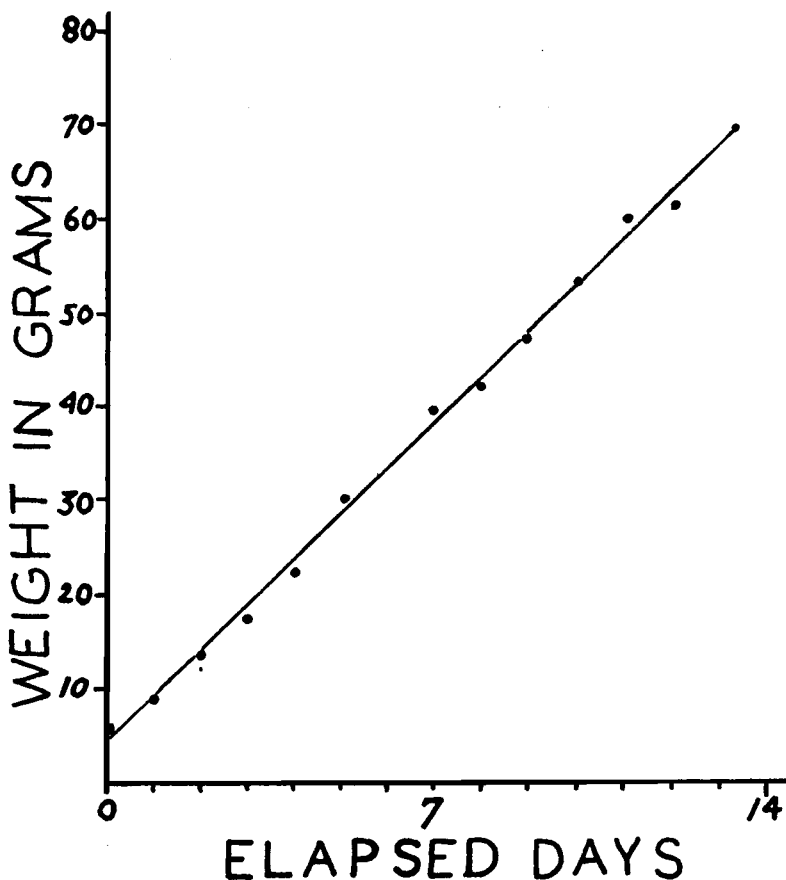
Unfortunately, on August 3 the younger nestling died when it became entangled in a runner of trailing blackberry. The remaining chick continued to develop rapidly.

By August 4, pin feathers were beginning to appear along the wing and scapular tracts. By August 6, distinct pterylae were visible on the crown and shoulder, on the rump, and along each side of the breast and abdomen. The following day a few of the feather sheaths on the shoulders and the crown opened to reveal the tawny tips of the developing feathers. By August 10, feathers were showing on the wings and the sheaths of the scapular tracts were nearly all open so that the feather tips almost covered the bare mid-dorsal region. The caudal sheaths started to open on August 11, and the darker primaries were partially unshathed by the 13th. Feathers appeared on the throat by August 11 but the breast and abdomen remained clothed in down.

Throughout the period of observation the birds were weighed almost every morning. The growth of the older chick (Bird 1) is represented graphically in Text-figure 1. It weighed 6.1 grams at hatching and by the time it was two days old it had doubled its weight. At the end of thirteen days it was eleven times as heavy as at time of hatching. The younger nestling (Bird 2) weighed less when hatched—only 5.8 grams. Moreover, it gained weight more slowly than Bird 1. By the morning of its third day it had gained only 2.7 grams as compared to its nest-mate's 8.4 grams. This discrepancy in growth may have been due to the greater vigor of Bird 1 and its superior ability to obtain food from its parents.

It is of interest to note that during a period of severe wet weather extending from the night of August 4 through the 5th and 6th, when insect food was probably scarce, there seems to have been no decrease in the rate of growth of Bird 1.

Immediately after hatching, both chicks were active and capable of holding up their heads and moving them from side to side. Occasionally they would utter a soft *peep* when handled, but more frequently they remained silent. When about forty-eight hours old they were able to move about quite actively. They usually made some effort to escape while being weighed and frequently managed to move from six to twelve inches before they were recaptured. When on the ground or when handled, Bird 1 usually kept its eyes partially closed. After the third day it frequently opened its eyes, raised its wings, and squeaked if handled at all roughly. When left by the adults, both nestlings remained motionless with their necks extended and pressed to the ground. This was the characteristic behavior of



TEXT-FIGURE 1. Growth curve of young Eastern Nighthawk.

Bird 1 until it was ten days old, after which time it usually maintained a more alert position with the head raised. However, if suddenly disturbed, it would lower its head and remain motionless.

Throughout the fourteen-day observation period, Bird 1 wandered considerably. Some idea of the chick's activity may be obtained from Table 1. Here the distances traversed between the times of observation are set down. It will be noted that the nestling moved almost every day after it was two days old, with the exception of August 4, 5, and 6, when severe weather prevailed.

At no time while observations were being made was Bird 1 seen to move more than one to two feet at a time. Whether the more extensive excursions were made in a series of small steps similar to these or whether they were accomplished in one effort is not known.

It might be expected that the wanderings of the nestling might in

TABLE 1

WANDERINGS OF NESTLING NIGHTHAWK (BIRD 1)
(Movements recorded up to August 4 include those of Bird 2)

<i>Date</i>	<i>Time of observation</i>	<i>Distance traversed since previous observation</i>
July 30	7:30 a.m.	Bird 1 hatched
July 31	7:30 a.m.	Bird 2 hatched
Aug. 1	9:15 a.m.	No change
Aug. 2	7:30 a.m.	7 feet
	7:30 p.m.	6 feet
Aug. 3	7:30 a.m.	1.5 feet
Aug. 4	7:30 a.m.	No change
Aug. 5		No visit
Aug. 6		No change
Aug. 7	7:30 a.m.	70 feet
	7:00 p.m.	6 feet
Aug. 8	8:00 a.m.	6 feet
	2:00 p.m.	No change
Aug. 9	7:30 a.m.	90 feet
Aug. 10	7:30 a.m.	6 feet
Aug. 11	7:00 a.m.	50 feet
Aug. 12		No visit
Aug. 13	7:15 a.m.	20 feet

Total distance traversed 262.5 feet.

some way be correlated with its shelter requirements. However, observations made during this study indicated that the wanderings were somewhat at random, although at times there seemed to be some correlation. Throughout the wet period, August 4-6, the chick remained in an open space, although plenty of protection was available under a thick growth of bracken and alder saplings (*Alnus* sp.) only a few feet away. During this time a parent bird must have brooded the chick almost constantly since it and a small area around it were found to be perfectly dry while the surrounding soil and litter were saturated by the heavy rains. On hot days when the temperature was above 80° F., the nestling was usually but not always found in the shade of the bracken.

After August 13, the nestling could not be found in spite of an extensive search. Whether it fell prey to a predator or wandered into such dense cover that it could not be found is not known. In any case, it is unlikely that it could have taken wing owing to the underdeveloped state of the plumage at this time.

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