THE NESTING HABITS OF THE WHIP-POOR-WILL

By GILBERT S. RAYNOR

FOR several years, I have been studying the habits of the Whip-poor-will (*Antrostomus vociferus vociferus*) near my home at Manorville, Long Island but during only two years, 1937 and 1939, was I able to find a nest. Daily visits were made to these nests while observations at night were made from a portable umbrella blind placed about six feet from the nest. None but sudden movements alarmed the birds nor did they pay any attention to the flashlight which I used.

HABITAT

The area in which they nested is a strip about one hundred feet wide in an extensive second growth forest, mostly oak but with a few other hardwoods and some pitch pine mixed in. The rather dense undergrowth consists mainly of huckleberry bushes, sheep laurel and similar woodland shrubs. This area is bounded on the west by an old wood road and on the east by a bushy swamp running parallel with the road.

In 1937, two broods were raised by the same pair of birds. The second nest was about one hundred feet northeast of the first, somewhat nearer the swamp. The 1939 nest was placed between the two but nearer the second. All were approximately halfway between the road and the swamp.

EGGS

The eggs of all three clutches were similar, whitish, beautifully marked with brown and purple and quite conspicuous against the brown leaves. The eggs of the first set showed the following weights and measurements ten days before hatching: No. 1, 30 mm. by 23 mm. and 7.4 grams, and No. 2, 31 mm. by 23 mm. and 7.3 grams. The second set was smaller and less uniform. No. 1 weighed 7.5 grams and measured 29 mm. by 22 mm.; No. 2 weighed 6.9 grams and measured 29 mm. by 21 mm., eighteen days before hatching. The 1939 set measured as follows: No. 1, 31 mm. by 22 mm.; No. 2, 29 mm. by 22 mm. The weights given in Table 1 were taken with a triple beam balance. The few irregularities in the decrease in weights are probably due to the influence of the wind on the scales.

TABLE 1

	May													
Egg No.	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*
1	...	7.8	7.8	...	7.7	...	7.6	7.5	7.5	7.5	7.3	...	7.4	7.4	...
2	...	7.4	7.4	...	7.2	...	7.1	7.0	7.1	7.1	6.9	...	6.9	6.9	...

	June						
					6:00 A.M.	6:00 P.M.	
Egg No.	*1*	*2*	*3*	*4*	*5*	*6*	*6*
1	7.2	7.3	...	7.0	6.9	6.7	hatched
2	6.8	6.7	...	6.5	6.3	6.1	6.0

The record of No. 1 is continued after hatching in Table 2.

INCUBATION

Although all three sets were discovered with both eggs laid, no hollow was visible under the second 1937 or the 1939 set. The following day, a noticeable indentation had developed showing that incubation had just begun. These two sets hatched nineteen and twenty and twenty and twenty-one days after being found. L. McI. Terrill, writing in the 1938 Annual Report of the Provancher Society of Natural History of Canada found the incubation period to be "at least nineteen and possibly nearer twenty" days. He also found that eggs are deposited on alternate days.

The female covers the eggs during the day. The following extracts from my notes give a picture of their procedure during the night:

"May 31, 1939. 8:05 P.M., I entered the blind without scaring the female who is brooding. A female Chewink walked within one foot of her but she ignored it. 8:40, the male sang a few notes about one hundred feet to the south-east. 8:45, the male landed facing the female with his head two inches away, gave a low note *"cur cur cur"* and wagged his tail and body from side to side. The female left abruptly. The male walked to the eggs, stood over them, turned them with his bill and settled down. 8:47, the male left suddenly. He returned some time between 9:30 and 9:40. 9:48, the female took his place. 11:15, the male returned with several *"couks."* 11:25, the female is on again. 1:25 A.M., the female left giving a *"couk."* 1:35, the female is on again. 2:45, the female is still on. I left. June 5, 2:43 A.M., I arrived in the blind. The female is brooding. 4:29, the female left with two *"couks."* 4:44, the female returned to stay for the day."

Thus the male incubated three times totaling thirty or forty minutes, the eggs were left unattended for about sixty-eight minutes while the female brooded for over twenty-two hours with only four respites.

HATCHING

The first 1937 set found on May 22 was found hatched on June 9 in the early evening. The shell of one egg lay about three feet from the nest. On June 25 while searching for these young which had disappeared, I flushed the male from the two eggs of the second set. The female was probably still occupied with the young of the first brood for I never again found the male at the nest in the daytime. On July 14, at 7 P.M. one egg of this set was hatched and the young still slightly damp. The other egg was not yet pipped but at ten o'clock the next morning it was found hatched and the young still very wet. There was no sign of an egg shell.

In 1939, the eggs were found on May 17. On the evening of June 5, a slight roughness at one spot on the shell of each could be felt but not seen. The next moring both pips were larger but still very small. At 6.20 P.M., No. 1 egg had hatched. The larger part of the shell fell from the breast of the female as she flushed; the other could not be found. The following day the other young had emerged.

DESCRIPTION AND GROWTH OF YOUNG

The description of a newly hatched Whip-poor-will is as follows: Skin, dark flesh color; eyes, closed and covered with dark, bluish gray lids; bill, horn color; egg tooth, a tiny ivory spot near the tip of the bill; feet, light flesh color; mouth lining, a flesh pink with grayish streaks under the edges; down, dull colored, wet and matted and from one fourth to one half of an inch long. After drying the down fluffs out and covers the whole body. Its color is an orange buff darkest along the middle of the crown, between and on the base of the wings and lightest below. In a few days it fades to a uniform yellowish tan and pinfeathers begin to appear. The egg tooth is retained for five days. Table No. 2 illustrates the growth of No. 1 young in 1939 during the first ten days of his life.

TABLE 2

Date	Weight Gr.	Total Length In.	Length of Wing In.	Expanse In.	Length of Bill In.	Length of Dorsal Feathers In.	Length of Ventral Feathers In.	Length of Alar Feathers In.	Length of Caudal Feathers In.
June 6	5.8	2 4/32	16/32	2 24/32	2/32	...	...	...	...
June 7	6.8	...	...	...	...	...	...	...	...
June 8	9.2	2 24/32	24/32	3 8/32	3/32	...	...	1/16	...
June 9	12.2	...	...	...	...	1/16	1/16	4/16	...
June 10	15.2	3 12/32	1 3/32	4 28/32	3/32	...	...	6/16	1/16
June 11	...	...	...	...	...	...	...	...	...
June 12	20.0	3 16/32	1 16/32	6 1/2	4/32	5/16	5/16	25/32	4/16
June 13	...	...	...	...	...	...	...	...	...
June 14	23.0	3 24/32	1 24/32	7 3/4	6/32	7/16	5/16	1 1/32	5/16
June 15	22.8	3 25/32	2 8/32	8 1/2	5/32	8/16	5/16	1 6/32	11/32
June 16	23.9	4 4/32	2 12/32	9 1/4	5/32	9/16	5/16	1 13/32	7/16

At the age of twelve days the young are about the size of a robin, except for the tail which is very short, and fully feathered with the color pattern of an adult in a lighter shade, buff instead of brown. They are still unable to fly. I was unable to study any of the young beyond this age.

FEEDING OF YOUNG

The following extracts from my notes illustrate the nest life at night after the young are hatched:

"June 7, 1939, 8:26 P.M., I entered the blind after weighing the young. The female is flying about nearby uttering her protesting *"couk."* 8:29, the female returned to the young which have been uttering their plaintive *"kwees."* They stopped immediately but the female continued to call nervously for a minute or so after landing. 8:34, the male called *"couk,"* while flying and landed with his head touching that of the female. He called *"cur . . . rrr"* for about one half minute and then was silent for a similar period. The female flew. The male settled on the young, turning around and ruffling out his breast feathers to take them in. 8:40, the female landed by the nest and the male backed away from the young. The female fed them, apparently by regurgitation. Putting her bill in theirs, she arched her neck, moved her head and spread her wings. The young seek her bill with their mouths. She then turned facing the blind, spread her wings and tail and left. The male called the young under him with a low *"cru . . . uur."* 8:45, the female landed facing the male who left. The female fed and brooded the young. 8:50, the male returned, faced the female and both flew. In one half minute the male returned, fed the young and brooded them.

9:00, the female gave a few *"couks"* nearby, landed six inches from the male, walked to him and touched his bill with hers giving a low *"currr."* The male left, springing over her body. The female fed the young, calling *"cruuur"* all the while, and brooded them."

They were fed twice more, once by each adult before I left at ten o'clock.

On June 6, No. 1 young, still not dry, tried to swallow the six inch metal ruler with which I was measuring him. Nine days later as I moved my finger a few inches over his head, he raised up, opened his mouth wide and snapped at it.

WANDERINGS

The young are able to progress with a kangaroo-like hop soon after hatching. When the adult flushed, the young would usually hop several inches or a foot and "freeze", lying quietly on the leaves. At the age of three days, the young of the first brood were found under the female two feet from the nest. They moved twenty feet during each of the next two nights while a day later I was unable to find them. Three days later they were found twenty feet further and were surrounded by a wire fence but crawled under and disappeared for good two days later. The other two broods were surrounded by an eight inch wire fence about three feet in diameter but both eventually escaped thus preventing observations of them after the age of eleven days. The smaller young of the second 1937 brood which hatched a day later and was always smaller and weaker than its companion was too weak to escape with the other and was left behind to disappear in two days. The female entices the young by uttering a low, gutteral *"ca ruck"* soon sliding into a continuous *"cruuuuuur"* kept up indefinitely. Upon hearing this note the young immediately and eagerly hop to the female. The adults showed little fear of the fence but often sat outside coaxing the young to leave.

These wanderings which others have also noted to be a habit with this species, may be made to escape observation by enemies or they may be a sanitation measure as droppings are not removed from the nest which soon becomes covered with them. Although related species, the Chuck-will's-widow and an East African Caprigmulgus, are said to move their eggs or young in their mouth when disturbed, no evidence of this habit has been noted in this species.

HABITS OF THE ADULTS

During the incubation period the female flushed at distances gradually decreasing from ten to seven feet, flew twenty to thirty feet and dropped among the bushes near the edge of the swamp. She usually voided excrement in flight. At first she left silently but as incubation advanced, her alarm notes became more frequent. After the young hatched she flushed at from three to five feet and

showed her concern by repeated calls and by flying around in the vicinity. She often played the "wounded bird." Fluttering along the ground she would shiver her wings up and down and shake her body from side to side. She usually perched crosswise when in a tree or bush, sometimes on a limb as small as one fourth inch in diameter. When incubating, she habitually sat with her head sunk between her shoulders so that her body from crown to the tail tip formed nearly a straight line. The wing tips were placed beneath the tail. When on the alert, however, the head was raised, the eyes wide open and the wing tips were placed above the tail.

The birds were caught by means of a drop trap. In 1937, both birds were caught, the female on both nests. In 1939 only the male was caught. He proved to be the same one banded in 1937. All six young were banded. Sizes 1A and 2 bands are both suitable for these birds. The young can retain the former at two days, the latter at five.

Their actions after being trapped and released varied. The first time, the female sat with drooping head, then fluttered as if hurt and suddenly flew several hundred feet away. The next time she lay on the ground shaking, with wings extended, head and breast on the ground and tail elevated and spread but soon flew away. The male when trapped and released in 1937 at 10 P.M. flew away swiftly and quietly. In 1939 he did likewise but gave a deep noise *"ga rock, rock"* or *"ga ruck"*, much like a frog croaking while being handled. His bill measured 13/32, his wing 6 8/32 and his tail 5 inches. His weight was 54.3 grams. Both adults had a well developed incubation patch.

The birds seemed to become tamer as the night progressed. At midnight I once tried to flush the male by tossing small twigs at him from the blind but he would not move until I crawled to within two feet of him. He entered the trap while I was standing in full view only six feet away. The flashlight causes their eyes to reflect several beautiful shades of red from bright coral pink to dull fire red depending on the angle.

In 1939 the male spent the first five days of the incubation period from thirty to one hundred feet from the nest but after that I could not find him in the daytime.

One evening as I stood beside the nest, the male suddenly appeared and alighted nearby giving low, soft "coos." I turned to leave and had walked a few feet when he suddenly flew around in front of me and hung there, fluttering in the air for several seconds directly before my face. He then flew to a nearby log but almost immediately repeated the performance for a shorter length of time and returned to the ground. These actions were later repeated during the night and seemed to be an intimidation display.

NOTES

The Whip-poor-will has a rather complete vocabulary, each note having its own purpose. The most common, the regular song or *"whip-poor-will"* note is quite different when heard at close range and at a distance. The whole song is preceded by several sharp *"quits"*, and each whip-poor-will note is immediately preceded by a single, low, hollow *"cut"*. The whole sequence of the song is as follows: *"quit-quit-quit-cut-whip-poor-will, cut-whip-poor-will"*, and so on. This song is given from the time the birds appear in late April until they leave in late September although much less frequently after the young hatch. It is more frequent in September than during July and August and on a still night can be heard about a quarter of a mile away. When the bird is calling steadily this note is given from forty five to fifty five times per minute.

The usual alarm note given on the ground, in a tree or in the air is a weird *"couk"* which the bird usually accompanies by spreading and lowering its tail, half opening its wings and bowing at each note. A hoarser, more gutteral variation was sometimes heard. This *"couk"* note was once heard away from the nest when I scared a singing bird in my yard.

The note used to call the young has been described under Wanderings. When this call was continued for long periods without result as when the young were imprisoned by the wire, she occasionally broke into a single, loud, impatient *"cruck."*

One evening the female was sitting outside the wire, calling the young which were hopping up and down, trying to get to her. As a group of berry pickers approached on the road nearby she lowered her voice to an almost inaudible whisper but never stopped calling and raised it again as soon as they were some distance away.

The low *"curr"* used as a greeting between the adults is very similar to the above note. Another note rather infrequently heard was a low, soft *"coo."* It was never given except when both adults were present. The male occasionally gave a call which is probably a variation of this, a pretty, musical *"coo ell',"* and once or twice *"coo ell' ah."* The *"ga rock' "* note, already described, which he gave when captured is apparently a distress note.

Another note totally unlike any of the above was heard only twice, before daylight on May 22 and May 30, 1939, in my back yard as I lay in bed. A bird had been singing on a small shed and immediately upon the cessation of the song, a loud whirring, whistling sound was heard resembling nothing but the sound made by the wings of a flock of large birds such as swans flying directly overhead. The sound lasted about half a minute after which the bird was heard no more. I have no idea how or why this sound is produced.

The note of the young was a piping *"kwee kwee"* kept up con-

stantly when no adult was present, and changing to a more plaintive "*kwee-uh*" or "*kwee-a*" when answering the adult.

SUMMARY

The Whip-poor-will lays two eggs which are incubated during the day by the female and at night by both birds. The incubation period is about twenty days. The young are fed by both adults and move to new locations after a few days. The pair studied raised two broods in 1937 and the male returned to nest in the same location in 1939. A description is given of the development of the eggs and young, of the habits of the adults about the nest and of the various notes given by the birds.

Manorville, Long Island, New York.

HOMING INSTINCT IN THE BANK SWALLOW

By DAYTON STONER

THE rather remarkable development of "homing instinct" among birds is perhaps illustrated in no other family of Passeriformes better than in the Bank Swallow (*Riparia r. riparia:* Hirundinidae). Foundation for this statement is based upon our recoveries of individuals from one to five years after banding. To date we have recovered as returns 221 banded Bank Swallows. Of these, 152 or 68.7 per cent have been retaken in the same colony as banded and most of them from the same sector of the colony in which they had before nested or were reared. This situation appears to be more than mere coincidence.

For the purpose of this discussion every return for each individual, that is the first, second and third, if any, is counted as an entity. The records have been obtained from the Lake Okoboji, Iowa, region (1923–27) and the Oneida Lake (1928–40) and Albany (1933–40), New York regions. For the most part the period covered is about May 20 to June 20. This encompasses the height of the egg-laying and incubating activities in the localities mentioned. None of our banded Bank Swallows have been recovered elsewhere by other workers and all our return recoveries have been from our own bandings.

In my recent paper dealing with longevity in the Bank Swallow (BIRD-BANDING, 9 (4): 173–177, 1938) as well as in earlier papers, I have indicated that "At least eight months must have intervened between the time of banding and subsequent recovery or between two or more successive recoveries for a bird to be included in the present category of returns." That criterion obtains also in this