

## FEEDING OF NESTLING BANK SWALLOWS

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In a recent paper entitled 'Observations on Sand-martins at the Nest' (*British Birds*, 33: 95-97, 1939) R. E. and W. M. Moreau record the number of feedings brought to nests carrying young of this species, *Riparia r. riparia*, at Farnham, Surrey, England. The appearance of these data prompts us to set forth the results of our own similar observations on this bird near Albany, New York, in the summer of 1933.

The Bank Swallow colony which we investigated was located in a roadside sandy cut with an eastern exposure about seven miles west of Albany. A well-traveled paved highway lay at a distance of about one hundred feet from the bank. The section of bank occupied by the nesting swallows was about twelve feet high and fifteen feet in length. Twenty-one burrows had been excavated by the birds but of these four had been deserted or at least were unoccupied at the time of our first visit on June 11. On this and subsequent visits twenty-two adults from thirteen burrows were banded. The feeding records here reported upon were obtained from the adults carrying food to young in eight of the burrows which we marked with small white tags to facilitate their ready identification. Our view of the proceedings was had both with the unaided eye and with binoculars from an enclosed motor car parked at the edge of the highway not more than ninety feet from the burrow entrances. During the observation periods we remained as motionless as possible and after the first few moments following our arrival, the swallows apparently gave no heed to the parked car and its occupants, so intent were they on their domestic activities.

Our first counts of the birds' food-carrying trips were made on the evening of June 29. Upon our arrival at 8.20 p. m. we noted that the adults were still feeding young. At the nest indicated as 'No. 1' in the accompanying table which carries our records for the following day, eight feedings occurred between 8.27 and 9.27 p. m. As a matter of fact all the feedings were administered before 9 p. m. By this time it was almost dark and activity in the colony had practically ceased. Examination of the interior of the burrows by flashlight between 9 and 9.30 p. m. indicated that brooding by the adults occurred only in those nests containing very small young.

At 8.45 a. m. on June 30, we returned to the Bank Swallow colony and parked our car at the side of the highway opposite the cut. Al-

though we actually began our watching at 9 a. m., we permitted a little time for the birds to become accustomed to the presence of the automobile before recording the formal counts which include the periods 9.35 a. m. to 12.35 p. m., 2 p. m. to 5 p. m., and 6.25 p. m. to 7.25 p. m. (Eastern Daylight-saving Time). These represent a total of seven hours for the day. The weather was clear and calm; maximum temperature 89 degrees, Fahr., minimum 72 degrees.

A condensed summary of our observations is presented in the accompanying table which shows the principal data obtained with the exception of the length of the feeding intervals. In order to permit of more ready analysis the observation time has been divided into hourly periods. Of special interest are the figures showing the way in which the 958 feeding visits of the parent birds were distributed among the seven hours of watching.

COUNTS OF FEEDINGS BROUGHT TO BANK SWALLOW NESTS IN  
COLONY AT ALBANY, NEW YORK. JUNE 30, 1933

Nest No.	No. young in nest	Estimated age of young in days	A. M.			P. M.				Totals
			9.35- 10.35	10.35- 11.35	11.35- 12.35	2.00- 3.00	3.00- 4.00	4.00- 5.00	6.25- 7.25	
1	3	10-12	17	15	18	22	25	18	13	128
2	?	5-9	24	32	28	20	23	30	13	170
3	?	5-9	12	9	10	10	13	8	3	65
4	4	5-9	28	33	21	17	18	25	11	153
5	3	5-9	12	21	28	29	27	30	12	159
6	2+	2-4	13	15	12	18	16	10	15	99
7	5	2-4	8	8	10	9	8	7	6	56
8	4	5-9	15	17	14	25	24	16	17	128
<i>Totals</i>			129	150	141	150	154	144	90	958

It will be noted that in the fifty-six separate observation hours distributed among the eight nests, the number of feedings was usually between ten and twenty-five. In nine of the one-hour periods the number exceeded twenty-five while in a like number of periods these visits occurred less than ten times. For the entire observation period on the eight nests the number of feedings administered to the young averaged 17.1 per nest per hour. This rate is considerably less than that indicated by the Moreaus who report (*loc. cit.*, p. 96) that "in 24 separate hours, distributed between the four nests, the number of feeds brought was nearly always between 25 and 43." On the other hand, our figures are considerably higher than those given by Beyer

(Wilson Bull., 50: 122-137, 1938) in the Sodus Bay, New York, region where in a single fifteen-hour period for two thirteen-day-old birds, food was delivered on an average of a little more than eight times an hour.

For the swallows that came under our observation at Albany the feeding rate was fairly regular throughout the day although it was highest between 10.30 a. m. and 5 p. m. As the afternoon waned and evening came on, a rather marked slackening of effort on the part of the adults occurred. This was particularly noticeable from 6.30 p. m. However, a few visits by the adults with food were noted as late as 9 p. m. Although the Moreaus' observations on this point are well in line with our own, those of Beyer are somewhat at variance with those cited, for he reports (*loc. cit.*, p. 133) that "during the period from 5:00 p. m. to 7:00 p. m. feeding occurred more often. . . . But after 7:00 p. m. no more visits were made by the parents that day."

In connection with the discussion of feeding rate a brief analysis of the correlated data which we obtained on the intervals between feedings will be appropriate. Our figures show that for the 958 feedings, 335 of the between-feeding intervals lasted less than two minutes and of these 136 lasted less than one minute; on the other hand, 320 intervals lasted more than three minutes and of these 146 lasted more than five minutes. The remaining intervals fell in the 2- to 3-minute group. It is evident from this that the feeding visits exhibited some departure from the frequency and regularity noted by the Moreaus who report that for the 726 feedings which they recorded "more than half of the intervals lasted less than two minutes." However, it should be borne in mind that one one-hour set of our records was obtained between 6.25 p. m. and 7.25 p. m. while the Moreaus' recordings ceased at 6 p. m. In view of the slackening of late-afternoon feeding effort noted by them and by ourselves, some allowance should be credited for this circumstance in our figures.

All the available evidence seems to indicate that the number and rate of delivery of feedings by adult Bank Swallows to their young as well as the lateness of the hour at which they are delivered are subject to considerable variation. Perhaps these factors are associated, in some degree at least, with local conditions and circumstances.

A few relevant notes setting forth certain supplementary items associated with our records on the feeding activities of this bird are appended.

Both parent birds sometimes entered the burrow with food at approximately the same time. Under such circumstances one of the

adults left within a few seconds; the other followed after a longer interval and usually carried a pellet of excrement.

The adult swallows coursed about over the nearby fields and woodlots in search of food and, so far as we could determine, their feeding territory did not, for the most part, extend over one-half mile from the nesting site. This parallels our earlier Oneida Lake observations (Stoner, *Roosevelt Wild Life Annals*, 4: 126-233, 1936).

Several of the adult swallows had their own individual methods of approach to the nests. Certain birds on returning from a food-gathering sortie habitually flew directly into the burrow without any preliminary circling or other aerial maneuvers; others hovered before the burrow a moment before delivering food to the young within. At no time, so far as we could tell, did the adults enter the burrows save to deliver food or carry away excrement; and, seldom did they enter the burrows exclusively for the latter purpose for removal of fecal sacs usually was accomplished on the same visit that food was delivered.

On the day of our observations a marked lull in the feeding activities of the adults occurred between 12.15 p. m. and 12.40 p. m. During this interval the swallows hovered and glided slowly about the burrow entrances but few actually entered the burrows. Indeed, between 12.15 and 12.21 no birds entered any of the burrows. There were no evidences of fright or excitement among them as the swallows continued to mill about in the air before the burrow entrances. Sometimes they alighted on the sand at the base of the bank and fluttered in it briefly; often they appeared to pick up sand grains in the bill.

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