

## OBSERVATIONS ON NESTING BARN SWALLOWS

By E. M. DAVIS

DURING the first years that my son and I were banding Barn Swallows I had hoped to be able to devote many hours to observing their nesting habits and home life. In May and June, 1935, the opportunity presented itself, and the following notes and observations are the result of a total of thirty-seven hours' observation spread over the period from May 24th to June 27th.

The observations were made from two points in my barn—one in the loft, where my eyes were on a level with nest A (see Fig. 1) and only forty-two inches from it as I looked through a crack between two boards. The other point was a chair on the barn scaffold where I had a good view of the activities of six pairs of birds and "Lonely" (see p. 69), and a fair opportunity to watch two other pairs. The drawing (Fig. 2) shows the arrangement of the six nests and the territories of the owners, as well as "Lonely's" territory. The

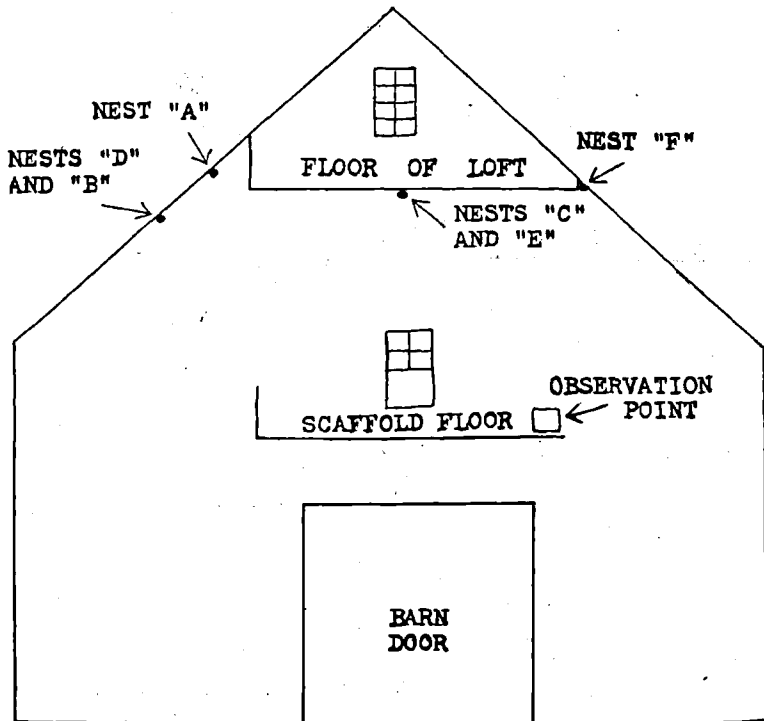


Figure 1. Skeleton view of the end of the barn. This drawing in conjunction with the sketch of the interior (Figure 2) shows the nest locations.

birds came in and out of the barn through the big door under the scaffold where I sat, and also through a window at my level and six feet to my left. From this chair, nest E, the nearest nest, was ten feet away.

On May 24th a complete set of five eggs was laid in nest A, and from then until June 27th, when the young birds left the nest, it was under observation from the loft a total of fifteen hours. From the scaffold I watched all six nests, including A, for a total of seventeen hours. One hour was also used in watching nest B alone, and one of my sons made supplementary notes on nest A for three and a half hours. I spent an hour or more at a time as often as

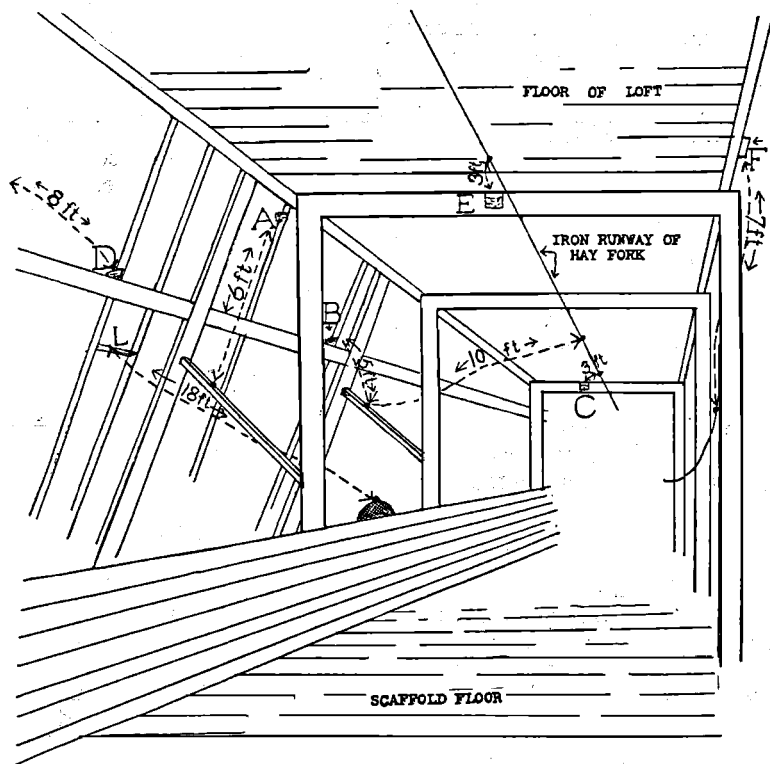


Figure 2. Interior of barn. The letters, A to E inclusive, show the positions of the nests as seen from the observation point on the scaffold floor (Figure 1). "L" is the perch which "Lonely," who was unmated, seemed to regard as home. The dotted lines lead from each nest to the perches used by the various pairs. Generally speaking, any bird interloper coming within three to five feet of the course of the dotted line would be attacked. Nests A, B, C, D, and E, all face the light end of the barn, while nest F is in as light a location as any other in that immediate area.

possible, which gave me a fairly satisfactory picture of the activities over the period, although I know that an equal time spent again would yield much additional information. The observation periods varied from 6:30 A.M. to various hours during the day until it was too dark to see in the evening.

One of the difficulties of keeping track of the birds is the habit of several birds entering the barn at once, which means a simultaneous burst of song, feeding young, swapping places on nests, and perhaps a fight or two. The greatest helps were a thorough familiarity with the different birds and their territories and the distinguishing letters chalked large near each nest.

Several years of observation indicate a strong tendency to use an old nest or foundation rather than to build a new one, but just why a bird chooses a particular place in a barn to build a nest or repair an old one is a mystery. There seems to be only one general rule (not always followed) that within the area where they decide to build they will place the nest so that it faces as much light as possible. However, with a tendency to have the nest face the light it is hard to understand why they quite frequently select an unnecessarily dark area. It is possible that the better-lighted places are taken first, but I have not had an opportunity to watch for an explanation.

Evidently two birds may lay in one nest at times, as indicated by finding nine eggs in one nest. Unfortunately, owing to repairs on the barn, this nest was abandoned.

Within my barn the birds had very definite territories, though quite variable in extent with the different pairs. These territories are indicated by dotted lines on the drawing of the barn. Fights always followed trespass on the territories, but different males varied as to what they considered trespass.

When Barn Swallows nesting elsewhere came into the barn, they naturally flew about without regard for established territories, and the result was a progressive series of fights, much singing, and general confusion most hard to follow.

With these birds "territory" seems to be an immediate area around the nest of two to five feet, extending in roughly cylindrical form to the perch, which may be ten or more feet away. Beams, however, make good boundaries, and it is possible for two nests on opposite sides of a rafter to be so effectively separated that both can be used during the same period. There is a definite lessening of territorial boundaries as the young grow up.

Brooding is a very sketchy affair. The birds change places often and leave the nest entirely at frequent intervals. Twenty-five minutes at a time is about as long as any one bird cares to sit, the average being twelve minutes. The average absence period is five minutes.

I have seen enough Barn Swallows to know that generalizations

from the actions of any pair are very unwise. The more I saw of them, the more I expected them to break any rule that seemed to be established. This did not prevent me from making some fragile rules to help in distinguishing males from females at sight. These are as follows: The male sings, and the female does not; the male elevates his head feathers, making a round "worsted-ball" head, and the female does not; the male starts the fights (the female occasionally joins in); the male does very little nest-building or gathering of material (one male caught a feather the female had dropped and put it in the nest); when a pair goes in or out of the barn together, the female is always in the lead; the male has longer and narrower outer tail-feathers (sometimes an unmistakable mark); and the female is lighter underneath (sometimes very evident and sometimes not). My feeling is that a combination of several of the above characteristics safely indicates a male bird, and all these rules have been checked by seeing birds copulate in the barn.

With regard to the songs of the swallows, there is a phrase, usually near the end of the song, which sounds like a very rapid snapping of the bill. From many observations made while the birds were singing, sometimes as near as six feet, I feel sure that this sound is made in some other way. The bill not only does not close but is definitely opened wider as the sound continues to be made.

My experience with the bird which I at once named "Lonely" shows that in at least one case a bird which I am sure was a male first found a territory and then sought a mate. On May 27, 1935, he had found a board on which he perched without interfering with other territories, and where he sat all day alone, occasionally singing, but mostly uttering a rather plaintive peep and watching intently the comings and goings of the rest of the birds in the barn. Once he tried unsuccessfully to make friends with one of the pair in A; he infringed on D's territory twice and was quickly driven out, and he flew over to nest E and was immediately driven squealing back to his perch. He was clearly a new bird in the barn and ignorant of the various territorial arrangements. The next morning, May 28th, at 7:45, Lonely was there with a companion. Records from my notes are as follows: 8:02, Lonely chattering and getting up close to his companion. 8:16, Lonely and friend come in to barn chattering and singing. 8:24, Lonely is ecstatic, singing and chirping. 8:28, the pair from D come in; one of the Lonelys starts a fight with the male. Lonely's territory is from the board three feet below nest D to the top of a long-handled net eighteen feet west. 6:56 p.m., the male from F goes out of his way to fight Lonely. 7:06, Lonely still making love. May 29th, 11:08 a.m., the Lonelys are squeaking and making love. 11:18, the female has hidden in the angle between board and roof to escape from constant love-making. 11:29, the pair continue their constant loving and

squawking. They have many fights with other birds as though not familiar yet with their own and other territories.

On May 30th both birds were together, though they spent much time outside, at which time the female disappeared. I really felt he drove her away with his attentions, for he was most persistent and she was constantly having to hide from him. During the remainder of the observation periods he occasionally sang, watched the activities in the barn, and quite evidently tried to beguile away some of the nesting females, which resulted in some furious battles. On June 12th he even brought in a billful of nest fibers but he never used them. On July 11th, the last day that I watched in the barn, he was still there trying to secure a mate.

As stated earlier, nest A was only forty-two inches away from my eyes, though the birds were unaware of my presence. The first egg was laid in it on May 20th. At 9:30 P.M. on the night of the 23d I looked at the nest with a flashlight; a bird was sitting on the edge but not brooding the eggs. At 10 A.M. on June 7th four eggs had hatched (the other hatching later). On June 14th one young bird was found dead on the boards below the nest. All the remaining young left the nest on June 27th. Brooding started on May 24th, and the male and female were so differently behaved when on the nest that I could tell them apart by their actions alone. The female never would stay long in one position; she turned and faced the other way every minute or two (in most Barn Swallow nests there are only two positions in which a bird can sit in the nest—parallel to the wall against which the nest is built, facing in either direction). When she sat quietly her head was quiet, but hardly a minute passed that she did not preen for a moment. The male seldom shifted his position, constantly watched things in the barn, moving his head with little jerks, and very rarely preened. During the brooding of the eggs both birds appeared to arrange the feathers around the brood-patch very often. In the male this patch is not well developed and it is a good way to distinguish the sexes when they are caught.

The preening which was so characteristic of the female when brooding stopped almost at once when the young hatched. About this time the male, for some reason, stopped his customary direct approach to the nest, and always circled two or three times in the barn before arriving at the edge. In place of the preening, work was undertaken in the bottom of the nest, and I was therefore unable to see what was happening. This was mostly done by the female, and frequently she hammered so hard that she shook to the tip of her tail. She did it so much that little time was left for brooding during her turns at the nest. I suppose that she was tidying up the bottom after the young rumbled it, but she struck so hard that her bill would have easily gone right through a nestling if she ever missed her aim. It was characteristic of this work for her to stand very erect, almost on the base of her tail, at the same time thrusting the

head almost straight down between the shoulders. All my observations indicate that this work is only done after the young have hatched.

At first the fecal sacs were eaten, but later they were carried away by the adults until the young were about twelve days old, at which time the young birds turn around and void the droppings over the edge.

The male usually called quietly upon arrival at the nest if the female was not there. The insects fed were almost always too small for me even to see them. I do know, however, that occasionally dragonflies are brought to the young, mostly of the genus *Tetragoneuria*. These, being medium-sized dragonflies, are much too large for the young to handle and are not eaten.

The first exercising that the young did was a sudden head-waving, for no reason that I could see. They also frequently trembled all over. When they were four days old, I was first able to hear them—just a tiny, high-pitched, batlike squeak. At this time the natal down was standing up on their heads, making them look like minute Crowned Cranes. When five days old the adults did not attempt to brood them, and their heads at this age were resting on the edge of the nest. Whether because of the parents' bringing food to the nest edge or for some other reason, such as positive phototropism, the young birds definitely get their heads resting on the edge before there is any crowding in the nest, and frequently stretch far forward without opening their mouths for food. It is this forward straining, which at times might be described as a lunge, that in my opinion accounts for their falling out of the nest so frequently when seven to ten days of age; they simply go too far and are unable to get back. I admit that I have never seen a bird fall, but at the same time I have not seen anything that would suggest that they fall from any other cause. Neither have I found birds older or younger killed by falling from the nest.

When one week old they were frequently moving about in the nest and using their wings to help. On the tenth day their eyes were opening. Frequent stretching of the mouth wide open, "gaping", was characteristic of both the young and the old birds. Feeding was irregular, sometimes at the rate of once a minute for fifteen or more minutes, then a pause of perhaps fifteen minutes.

As examples of the parents' behavior during the incubation period I give the following notes taken at nest A on May 26th, the third day of brooding: I arrived at 9:49 A.M. and the female was on the nest. 9:51, turns around, arranges eggs, and settles. 9:53, steady preening. 9:54, turns around. 9:55, preening; jabs at some invisible object. 9:59-10:00, other birds come close and twitter, she stands on edge watching, settles again, gets up and leaves. Male immediately arrives, sings two bars of song, steps in, and settles. 10:05, bird flies close and calls, he watches and makes a

snarling call, they change places. Female settles, turns around and preens. 10:06, arranging things underneath, resettles on eggs, preens wing-coverts, (a frequent habit of this bird), looks all around, preens, and tries to be quiet with head drawn down, but it doesn't last fifteen seconds before preening is repeated. 10:10, rises and preens, turns around, and settles. Watches birds near by. 10:12, stretches wing, rises, leaves. 10:15, male arrives and immediately settles. 10:16, hears noise below and looks quickly over edge. 10:20, rises slightly to fix something underneath and settles; repeats process. 10:21, bass and snare drum start beating loudly about half a mile away; bird at once looking all around. 10:23, rises, preens, settles. 10:24, rises, preens, settles. 10:25-26, bird flutters near by, male opens bill wide but makes no sound. Snatch of song near by (female singing?) and after half a minute birds change places. Female enters nest, turns around, settles. 10:27, starts to turn around but turns back. 10:28, preens underneath and settles. 10:29, standing and preening, settles. 10:30, rises slightly, settles, turns around. 10:31, turns around. 10:32, pays no attention to alarm calls below; after they stop rises to edge, looks down, returns and settles. 10:33, turns around, preens, settles. 10:35, bird or squirrel on roof outside, instant attention; turns around. 10:37, preens underneath, settles, looks down over edge without rising. 10:40, rises to edge, looks below, after half a minute settles on eggs. 10:41, turns around. 10:44, turns around, settles. 10:48, turns around, settles. 10:50, sitting very quietly, suddenly looks up, bird comes twittering near by and she leaves.

The following notes were made during the incubating at nest C, which was too far away for me to distinguish the sexes: May 29th, 11:10 A.M., bird returns to nest. 11:14, off and back again (presumably to fight). 11:20, leaves because I moved. 11:22, returns, leaves. 11:26, returns. 11:42, off a minute, on, off. 11:44, returns. 11:50, leaves. 11:54, returns. 11:57, returns. 12:09, leaves.

Activities at nest E during incubation: June 3d, 1:25 P.M., I arrive and female stays on nest. 1:41, male comes in, chatters and sings. 1:49, female goes out while male is circling; he sits on runway, chatters, looks around, flies a bit, and finally goes out. 1:50, both come in with a lot of other birds. Bird came and sat on E's perch and was promptly forced off. 1:53, male goes to nest edge. 1:54, he goes back to runner; she goes to eggs. 2:00, male chatters to female, leaves barn. 2:09, male comes in. 2:13, both leave, female leading. 2:18, both return; female goes directly to eggs and settles.