

arises, may be easily overcome, however, by the judicious use of a fine file on the edges of the offending bore.

These pliers have, at present, to be made to order, and may be procured from A. J. Wilkinson & Co., hardware merchants, at 184 Washington Street, Boston, Massachusetts, and if there should be a sufficient demand for them, should cost not over \$2.00 per pair.

Newton Centre, Massachusetts.

STUDIES OF A BARN SWALLOW COLONY

By HELEN J. ROBINSON

I AM sending in the results of two and a half seasons' study of my Barn Swallow colony at Brewer, Maine. The report is incomplete in many ways, due partly to the fact that no adult birds were banded until 1928.

This work was undertaken to ascertain (1) the degree of sociability possessed by this species at nesting time, as measured by the number and nearness of the contemporaneously occupied nests; (2) the causes of the concentration of the nests observed (see figure); (3) the make-up of the colony each season in terms of the young and mature birds of the previous year; and (4) the extent to which old nests are used.

To aid in visualizing the surroundings of the colony and to give the relative location of and the distance between nests, I have had a plan made of the barn roof timbers which shows, also, the length and width of the building drawn to scale. The distance between the rafters is three and one half feet. The nests are as they were at the close of the summer of 1928, and the legend below the plan tells which were occupied at that time, and which during the previous season. Some of the nests built and occupied in 1927 crumbled, were destroyed by the hay-fork, or were purposely destroyed because of occupation by House Sparrows, or because of a precarious location on the hay-fork pulley. These nests are not included in the drawing. It would appear from the drawing that only thirteen pairs of birds occupied nests in 1927. As a matter of fact, my notes, taken separately for each nest, record twenty-two nests and sixteen pairs of birds. In 1927 one pair was killed, evidently by a weasel, for the birds were found dead on the top beam, untouched except for throat wounds.

It is interesting to note that in 1927 every nest but one on

the cross-pieces was occupied. Little building was done; the majority of pairs preferred old nests, and the tide of occupation flowed to the east after all the cross-piece nests had been taken. Marked sociability prevailed, and not one nest was built outside the area of greatest light. The next year the distance between the nests increased; only two out of five available nests were occupied on the double cross-pieces, and these were at either extreme. One nest of the three on the single cross-piece was left empty, and building activities increased, the tide flowing this year to the west. Although most of the nests bordered the light area, one was built in a more shadowy location, and still another was on the extreme west rafter, well out of the light. It is probable that some birds prefer dim isolation, although the majority seem to favor light and sociability.

The accompanying summaries may be of assistance in determining the extent to which old nests were used.

FOR 1927

Nests built before 1927	11
Number of such nests occupied in 1927	9
New nests built in 1927	5
Number of such nests occupied in 1927	4
Nests crumbled or destroyed before 1928, not included in sketch	6
Number of such nests occupied in 1927	3
Total nests, old and new, in 1927	22
Number of such nests occupied in 1927	16

FOR 1928

Nests built before 1928	16
Number of such nests occupied in 1928	8
New nests built in 1928	7
Number of such nests occupied in 1928	7
Total nests, old and new, in 1928	23
Number of such nests occupied in 1928	15

The nests, as can be seen from the plan, are clustered most thickly in the lightest part of the barn (that is, nearest the open north door) and on the cross-pieces, which were greatly favored locations. There are no windows in the upper part of the barn, the light coming exclusively from two small lower windows on the north and east and the open north door. The supply of light seemed to be a more potent factor than anything else in determining nesting-sites, the question of mere proximity having little or no weight. Birds nested on either side of the same rafter quite peaceably six inches apart. If conflict arose, it was a battle between two females for possession of one nest, or between two jealous males, and only rarely

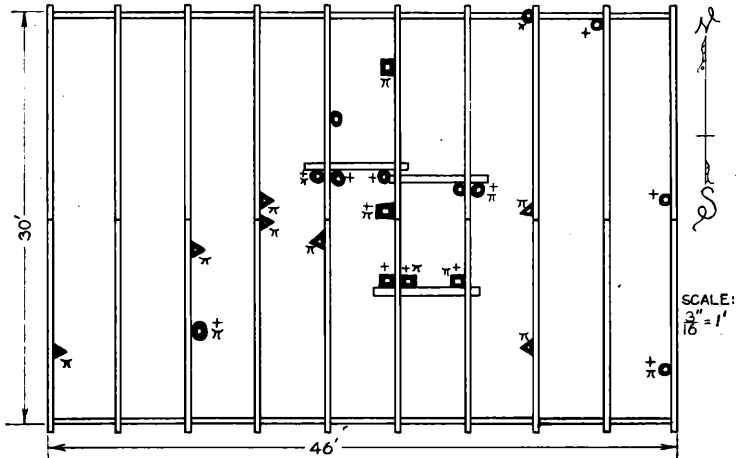
an affair of disgruntled neighbors. Seven new nests were built in 1928 as compared with five in 1927. Two of the "old" 1927 nests, however, were started and abandoned by a Robin before the Swallows arrived that spring. These nests contained much crinkled white string, which the Swallows promptly removed. After an interval they added mud to the walls, built them up a little higher, put in the usual feather lining, and began house-keeping.

Barn Swallows have been the most constant arrivals of any of my bird family. For six years, May first has marked the appearance of one or two advance scouts; the others have followed in detachments of a few pairs at a time, the latest comers not appearing until the third week in May. This year, however, 1929, the leaders broke their record and appeared, two of them, the night of April 28th. Nesting has never begun at once; the birds have paired off as if already mated when they arrived, and have been in and about the nests they favored most, especially during the morning, and at night just before dark. About mid-May the earliest arrivals usually begin to repair and feather the old nests or build new ones, and from that time until late July building is continued intermittently for first and second broods. In fair weather a nest was occasionally built in six days. The following notes taken on a "second-brood" nest may be of interest: "Birds building July 23rd, 24th, and 25th. Nest done but not dry July 26th. Bird sitting on edge of nest August 21st (meaning that young were hatching). Three sizable young September 2d. Flying September 5th and 6th. Last birds to remain. All here except male, night of September 10th. Female gone morning of September 15th. Two young gone September 16th. All gone September 17th."

In both 1927 and 1928 only a few pairs, apparently the first arrivals, reared a second brood. These birds, though arriving early, did not hatch the first brood any sooner than the later comers. Consequently early hatching could not have been the reason for a second nesting. The majority of the members of the colony migrated as soon as their young were able to get their own food, and by mid-August the barn was deserted except for the few pairs which had remained for the second nesting.

My notes give the following information on egg-laying in 1927: Three eggs were laid in each of the four nests, on June 5th, 6th, and 7th. In another nest one egg appeared on June 5th, but the second and third were not forthcoming until June 8th and 9th. In each of two more nests four eggs were laid, appearing punctually on June 8th, 9th, 10th, and 11th.

PLATE IV



- NEST BUILT BEFORE 1927
- NEST BUILT IN 1927
- ▲ NEST BUILT IN 1928
- + NEST OCCUPIED IN 1927
- π NEST OCCUPIED IN 1928

TOP-VIEW OF BARN - WITH COVER REMOVED - SHOWING LOCATION OF NESTS ON RAFTERS. NORTH DOORS OPEN - SOUTH DOORS CLOSED.



BANDING SWALLOWS IN TRAP

As to time of incubation, in second nest, which contained eggs laid June 5th, 8th and 9th, two young hatched on June 22d. Another nest has this record: "June 8th, three eggs. June 10th, brooding. June 22d. female sitting on edge of nest. June 23d, shells on floor beneath nest . . . July 5th, five young banded. One flew at once. A day or two later another was found sitting on front wheel of the car, under the fender." Still another record is as follows: "June 8th, four eggs. June 10th, female brooding. June 23d, all hatched but one. July 6th, four banded."

The average time of incubation was, therefore, from twelve to fourteen days, with perhaps an interval of one or two days between laying and incubating. Bluebirds that I have observed generally begin incubation before the whole clutch has been laid. The young Swallows remained in the nest about two weeks, or a few days more if the family were large. Sometimes after first flights the young returned to the nest for several nights. Others never returned to the nest, but perched in a row beside their parents on ropes or beams.

There was never any objection to nest inspection until after the eggs had been laid. The entire colony then went into an uproar at any visits to their homes, and their concern was even greater when the youngsters were banded. Toward the last of the season the colony came to regard me as a public menace, and heralded my appearance with war-cries and threatening swoops about my head.

In 1927 I banded twenty or thirty young, but if they returned I am not aware of it, as none of the fifteen adults I took in 1928 were banded, and it is difficult to see bands on Swallows at any distance. This season, on June 11th, I trapped fourteen adults. One was banded as an adult in 1928, and another was banded as a juvenile in 1928. A few days later I learned that a second juvenile, banded in the same nest, and a member of the same brood, had been retaken in Richmond, Maine, on May 19, 1928, by Mabel McFee.

The accompanying halftone shows my Barn Swallow trap in operation. The trap was made from plans and specifications furnished by Mr. A. W. Higgins, and was fairly efficient. I planned to close the barn tightly at night, and to take the Swallows at the door as they flew out in the morning, hungry and, perchance, unwary. The trap was mounted on horses and placed outside the barn doors, which were then opened to fit the trap entrance. The gaps above and below the trap were curtained with heavy blankets, and the operator then opened the pull-string trap doors and awaited results from a position inside the darkened barn. The Swallows, far from

rushing headlong into captivity, inspected the new device critically, hanging on beating wings in the door-way, and retreating many times before cautiously venturing inside. Not more than three or four entered the trap at once, and usually there was only one or two. After the pull-string doors were closed, the trap was entered by the operator through the "man-hole" (see picture). The prisoners clung to the sides or top of the trap, where they were easily taken. Fifteen birds were captured after an hour's work. The second attempt found the colony more wary, and gave me two repeats. It might be an excellent plan to trap once about May 20th, after all the adults have arrived, and again in August just before adults and young depart.

My total number of banded Swallows for 1928 was seventy-one, only fifteen of which were adults. Besides banding at my own station, I banded fifteen young in three smaller colonies a few miles away.

Brewer, Maine.
