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### CHIMNEY SWIFTS ROOSTING AT ARDMORE, PENNSYLVANIA

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*Plates 16, 17*

THE recent discovery of the winter home of the Chimney Swift, *Chaetura pelagica*, in northeastern Peru, South America, has centered attention on the particular routes travelled by the bird in its spring and autumn migrations. Lincoln (1944) states: "Data now available will make possible a detailed study of the migration routes of the swifts in North America."

During the past several years, about 375,000 swifts have been banded, mostly in the southern part of this country, and while these banding records, including the returns and recoveries resulting from them, are of the highest importance in the study of the swift's migrations, observations of large congregations of swifts roosting in chimneys during their migrations in other sections of North America would also add important information of value in determining the exact routes travelled. It would, therefore, appear to be of interest to record a very great flock of swifts roosting in a chimney in the northeastern part of the United States.

During the late summer and autumn of 1944, continued series of observations were made of an unusually large concentration of Chimney Swifts at a chimney standing in a suburb of Philadelphia, at Ardmore, Montgomery County, Pennsylvania. This chimney is a part of a modern department-store building erected in 1929, and is, in fact, a double chimney, divided by a brick wall in the center, one half being used as a fire chimney, and the other half as a ventilator flue. The swifts used the ventilator flue for roosting. The height of the chimney is eighty-three feet, sixty-eight feet above the surface of the ground and fifteen feet below ground to a basement. It is brick-lined through-

TABLE 1  
CHIMNEY SWIFTS ENTERING CHIMNEY BETWEEN  
AUGUST 21 AND OCTOBER 11, 1944

Date 1944	Number of Swifts	Entrance period	Weather	Temperature F.°
E. W. T.				
<i>August</i>				
21	1,000	7:55-8:05 P. M.	clear	80
22	2,100	7:45-8:00 P. M.	clear	75
23	1,300	7:50-8:05 P. M.	clear	80
25	3,300	7:50-8:05 P. M.	clear	69
27	5,800	7:55-8:08 P. M.	clear	68
29	6,100	7:40-7:59 P. M.	clear	68
30	5,350	7:40-7:57 P. M.	clear	72
31	7,160	7:30-7:55 P. M.	overcast	76
<i>September</i>				
2	6,700	7:40-8:00 P. M.	clear	82
3	6,600	7:45-8:00 P. M.	clear	82
4	9,120	7:25-7:47 P. M.	overcast	76
5	10,350	7:20-7:45 P. M.	clear	79
8	4,980	7:15-7:40 P. M.	clear	68
19	6,250	7:02-7:20 P. M.	heavy overcast	72
20	8,110	6:57-7:22 P. M.	heavy overcast	70
21	11,150	6:50-7:25 P. M.	clear	78
22	11,750	7:00-7:25 P. M.	clear	66
23	10,820	6:40-7:35 P. M.	clear	53
24	12,620	6:35-7:17 P. M.	clear	58
25	8,540	6:30-7:13 P. M.	clear	60
26	11,290	6:35-7:21 P. M.	clear	68
27	12,100	6:45-7:15 P. M.	clear	72
<i>October</i>				
2	6,530	6:35-7:07 P. M.	clear	66
3	estimate—300	4:10-4:25 P. M.	heavy overcast	48
4	estimate—200	4:10-4:20 P. M.	heavy overcast	56
5	8,020	6:15-6:50 P. M.	overcast	66
6	7,485	6:35-7:06 P. M.	clear	68
7	3,960	6:40-7:00 P. M.	clear	74
9	1,155	6:35-6:52 P. M.	clear	58
10	170	6:35-6:50 P. M.	clear	60
11	4	6:25-6:40 P. M.	clear	58

out. The inside dimensions of the ventilator flue are three by four feet. The mouth of the chimney is about six feet above the roof of the building. Since the chimney is situated within ten minutes walk from my residence, it afforded me an unusual opportunity to make frequent observations without difficulty.

My attention was first attracted to this chimney on August 23, 1943, when I discovered about 300 swifts circling it at dusk, and while

observations were continued frequently until October 28, 1943, I made no special notes. During the season of 1944, observations began on August 21 and ended October 11. I was informed, however, that the swifts had started roosting in this chimney during the first week of August, at a time when I was absent from home. During the period of August 21 to October 11, thirty-one observations were made in late afternoon to dusk and twelve were made in the morning, to note the manner in which the swifts departed from the chimney.

The swifts were counted each evening as they entered the chimney. The method used in making the count was to take a position on the ground within fifty feet of the chimney, where three sides of its mouth were in full view, and as the swifts began entering it rapidly and in numbers, the count started, based on an estimate of ten swifts per second entering the chimney. When the swifts stopped entering, at intervals, the count was suspended, and when they started again, the count was resumed. To be sure, this method of counting is not absolutely accurate, but it does give an approximate number that is much closer to the actual figure than the usual estimates. Counting at the rate of ten per second is considered conservative by other observers. Linton (1924) observed and counted a large flock of swifts entering a chimney at Augusta, Georgia, and states: "They were entering at the rate of fifteen or more per second." However, since the birds are continuously changing their rate of speed, from time to time, as they enter the chimney, I believe ten per second gives a more conservative and a better average. It will be noted, by reference to Table 1, that more than 5,000 swifts entered the chimney each evening during twenty evening observations and more than 10,000 dropped into the chimney each evening on seven observations.

The largest number of birds entering the chimney in one evening was 12,620 on September 24. The peak of abundance occurred between September 21 and September 27, when more than 10,000 swifts roosted there each evening except September 25, when the number dropped to 8,540. After the peak had been reached during the latter part of September, the number of birds going into the chimney decreased rapidly. On October 2, 6,530 entered it and by October 11 the last four swifts for the season entered it. After this date observations were continued until October 22, and while small flocks of swifts were seen in the air close to the chimney on October 12, 14, 15 and 16, no swifts entered it after October 11.

The time consumed for flocks of more than 10,000 birds to enter the chimney in one evening varied from twenty-five to fifty-five minutes, or an average of thirty-seven minutes.

It may also be noted, by reference to Table 1, that there was a considerable variation in the number of birds going into the chimney on different evenings. This probably indicates an exchange in the roosting flock of which a certain percentage may have moved southward, while other birds from the north arrived to take the vacant place. Lowery (1939), who banded many thousands of Chimney Swifts at Baton Rouge, Louisiana, states that: "Banding records indicate that flocks are continuously changing in individual composition. When an interval of about ten days is allowed to elapse between trapping dates at any one chimney, the composition of the flock is observed to have changed almost entirely."

During several evenings, while the swifts were entering the chimney at Ardmore, photographs of them were taken by flashlight, and they were also photographed inside the chimney while clinging to the walls. They began clinging to the inside walls about six feet below the mouth of the chimney and, when the top rows were occupied, the birds that followed took a position on the walls immediately below those above. The photographs of the swifts inside the chimney (Plate 16) show how closely massed they are when roosting, and show how such large numbers of them are able to roost in a single large chimney.

There appears to be a difference of opinion about the exact position of the swifts when roosting. E. K. and D. Campbell (1926) observed more than 100 swifts roosting on the bark of an oak tree at Cold Spring, New York. They state: "The birds seemed two or three deep. They snuggled together seemingly to keep warm and the heads all concealed beneath the wings of those above." Audubon (1840) observed a great flock of swifts at Louisville, Kentucky, roosting in a large hollow sycamore tree. After the birds had retired for the night, he examined the inside of the tree with a lantern, and he writes: "In no instance did I see one above another." It is assumed he meant that the swifts were not on top of each other. An examination of the photographs of the swifts inside the chimney at Ardmore (Plate 16) will show that these swifts are not clinging to the walls two or three deep and that their heads are not precisely concealed beneath the wings of the birds above. Audubon's statement that the birds are not one above another is substantially correct. However, the photographs do show the birds overlapping to some extent. It will be noted that the bird below rests its head at the base of the tail of the bird above it, while the tips of the primaries of the upper bird rest on the upper back of the bird below. This overlap may be seen clearly in the upper part of the lower photograph, slightly to the right of the center, where two swifts are a little distance away from the mass of birds and are clinging to the wall one above the other.

Many observers have described the manner in which the swifts circle and enter the chimney in the evening, but there are comparatively few published observations of how they depart from the chimney in the morning. It is apparently the general impression that they arise at daybreak and pour out of the roosting chimney or tree. Audubon (1840), observing a large flock of swifts leaving a hollow tree at daybreak, writes: "The 'swallows' are now pouring out in a black continued stream." Winsor Marrett Tyler, who contributed the study of the Chimney Swift in Bent (1940), makes the statement: "At daybreak, as the birds pour out of the chimney where they have roosted during their autumnal migration . . ." Pickens (1935) had a different experience, after having made four morning observations at a chimney in Columbia, South Carolina, and states: "Their irregular rising is quite as intriguing a habit as their evening drill."

During the twelve morning observations at the Ardmore chimney, it was noted that the swifts came out of the chimney at different times in the morning, from daybreak to as late as 11:40 A.M. In none of the morning observations did they start pouring out of the chimney at daybreak. Usually, when they started leaving the chimney, they came out two or three at a time, and at short intervals the departing flocks increased to three and four individuals; then at intervals of a few minutes, increased to six or eight. Soon thereafter there would be a stream of birds coming out for a few minutes at the rate of three to five per second. After reaching stream proportions, there would be a reduction to small flocks of three to five birds leaving at a time, and this would gradually work up again to a stream of birds. Also, at short intervals, the swifts often stopped coming out altogether for several minutes, and then started again in small flocks of three to five at a time.

It was interesting to note that when some of the birds reached the top of the chimney, with their wings fully spread, they appeared to spring up about a foot or two out of its mouth, and then drop down one or two feet along its side before rising again above the chimney and flying away. The reason for dropping down along the side of the chimney was probably to take advantage of an upward current that was there, caused by the air striking the sides of the chimney. Some of the swifts, however, came out without springing into the air, merely dropping over the edge and down the side a foot or two, whereupon, as the strong upward current would get underneath their fully spread wings, they would take off.

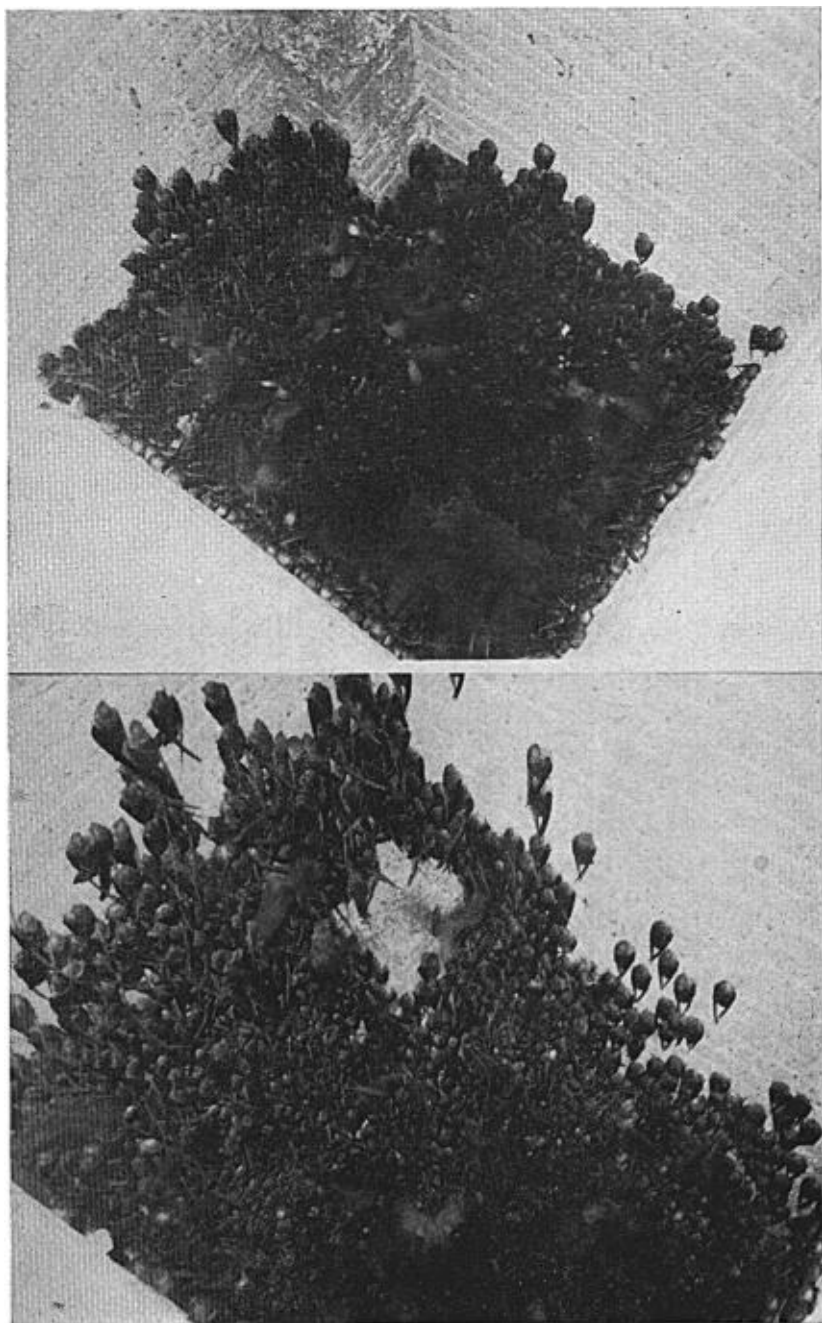
It is stated in the literature that Chimney Swifts make a very loud noise inside the chimney or tree when they depart in the morning.

Forbush (1925) quotes C. J. Maynard, who states that "when ascending, the wings are vibrated rapidly, causing a noise which resembles distant thunder." Audubon (1840), while observing swifts leaving a hollow tree in the morning, writes: "I listened in amazement to the noise within, which I could compare to nothing else than the sound of a large wheel revolving under a powerful stream." Howell (1932) states: "The noise produced as they enter or leave the chimney resembles a rumbling of distant thunder."

During several of the early morning observations, when everything was very quiet and none of the usual activities of the day had yet started, I took a position on the ground beside the chimney, just below an open ten-inch-square vent that was covered with wire mesh, and listened for the noise that is said to be made by the birds when leaving. Although I listened for periods of fifteen to twenty minutes while the birds were departing, I failed to hear any loud noise coming from inside the chimney, and could hear only the twittering notes of the birds as they left. Charles E. Mohr, Educational Director of the Academy of Natural Sciences of Philadelphia, was on the roof of the building at the mouth of the chimney on five evenings, taking flashlight photographs during the peak of the roosting period, when the birds were entering the chimney in large numbers, and he informs me that he heard no very loud sounds of any kind; the only audible sounds were the twittering notes of the birds and a low noise of vibrating wings as the birds settled in the chimney.

It is difficult to understand how a very loud noise, such as the "rumbling of distant thunder," could possibly be made with the vibrating wings of the comparatively small number of birds that would be able to ascend in the limited inside flying space of even a large chimney or tree. This flying space is often still further reduced by the many swifts still clinging to the walls while the others are leaving.

Another point to be considered in connection with the number of birds that could ascend at the same time in the chimney is the size and position of the swift's wings. Sutton (1928), after having made a very careful study of the flight of this bird, states: "The Chimney Swift's wing has no intermediate half spread position. . . . It has but two normal positions; one, folded at rest, the other, open for flight, whether that flight be rapid forward flapping, soaring, coasting, or even sudden descent." Therefore, it is necessary to keep in mind that when the swifts are ascending to the mouth of the chimney, their wings are fully spread, and since this swift's wing-spread averages over twelve inches, each ascending bird requires a considerable amount of flying space which limits the number of birds that may ascend at the same time.



CHIMNEY SWIFTS INSIDE ROOSTING CHIMNEY AT ARDMORE, PENNSYLVANIA.  
(Photographs by Charles E. Mohr.)

This limitation makes it highly improbable that they could produce a very loud noise with their vibrating wings.

In view of the limited amount of published information, regarding the departure of Chimney Swifts in the morning from their roosting places, it would seem to be of interest to give a detailed account of three morning observations, together with several other brief ones.

August 28, 1944

Observation 6:45-7:35 A. M., E. W. T. Sky clear, temperature 52° F.  
(5,800 swifts entered chimney the previous evening)

At 6:45 A. M., when observation started, the swifts were already leaving the chimney. They were coming out in small numbers, two, three and four at a time. Most of these remained in the air close to the chimney and when the flock reached twenty or more, they circled a number of times and flew off in a northwesterly direction. Often, while circling, several swifts would drop back into the chimney. After the sun came up, the swifts coming out would fly off directly without circling. William E. Somers, Jr., informed me that he saw the swifts still coming out at 9:30 A. M. At 10 A. M. I saw a flock of thirty circling the chimney a few times and then flying off in a westerly direction.

September 1, 1944

Observation 5:40-7:35 A. M., E. W. T. Sky partly overcast.  
Temperature 74° F.

(7,160 swifts entered chimney the previous evening)

Arrived at the chimney at 5:40 A. M., moonlight. No swifts were leaving the chimney. At 6:02 A. M. one swift left the chimney. At 6:08 four swifts left chimney. At 6:09-6:12 small flocks of three to ten were leaving the chimney and flying off immediately. At 6:13-6:15 more than 100 birds came out, circled the chimney several times, and then flew off. At 6:16-6:20 swifts were coming out rapidly at the rate of 200 per minute, timed by my watch. At 6:21-6:25, a very heavy mist in the air, and dozens of birds were returning and circling the chimney and dropping back into it. At 6:26-6:30 about 50 swifts left the chimney and flew off without circling. At 6:31-6:35 several hundred came out, circled several times, and all flew off except about a dozen birds that went back into the chimney. At 6:36-7:35 still a heavy mist in the air; my clothes were damp. No swifts came out of the chimney for almost an hour. In the meantime, several hundreds of birds returned, circled the chimney and went back into it. They dropped in at the rate of five to ten per second. Made another observation 8:15-10:10 A. M. No swifts were seen in the air or leaving chimney.

September 3, 1944

Observations 5:40-8:30 A. M. and 9:30-10:20 A. M., E. W. T.

Sky clear. Temperature 66° F. at 5:40 A. M.

(6,700 swifts entered chimney previous evening)

Arrived at chimney at 5:40 A. M., full moon. No swifts were leaving the chimney. At 6:14 A. M., daybreak, the swifts started leaving chimney. They came out two and three at a time every few seconds. At 6:16-6:20 they came out two to eight at a time, flying off without circling. At 6:21-6:25 swifts came out more rapidly at the rate of about 100 per minute, soon increased to 200 per minute. Up to this time, all



swifts leaving the chimney flew off immediately without circling. At 6:26-6:35 swifts were still leaving in considerable numbers. Many then started circling and about 20 birds left the circle and dropped back into the chimney. At 6:35-6:45 large numbers of swifts were returning and joining the circle, and about 250 birds from the circle went back into the chimney. At 6:46-6:51 the sun was shining on the upper part of the chimney, and more than 200 swifts were still circling. No swifts came up out of the chimney since 6:35. At 6:52-7:30 several hundred additional swifts arrived and joined the others circling the chimney, and about 50 birds from the circle dropped back into the chimney. At 7:31-7:46 all swifts in the circle flew off in a westerly direction. At 7:47-8:30 the temperature was 72° F. Sky clear. During this period no swifts came out of the chimney, and none returned, nor were in the air. At 9:30 still no swifts came out of the chimney, or were in the air. At 10:20 the swifts again left the chimney at the rate of two to three per second.

Short morning observations were as follows:

September 4, 1944—At 9:15 A. M. Wartime. Sky clear. Temperature 72° F. Small flocks of swifts were leaving chimney, with several dropping back into the chimney.

September 5, 1944—11:40 A. M. Sky clear. Temperature 72° F. Swifts coming out of chimney in a steady stream at the rate of about five per second.

September 18, 1944—9:15-9:26 A. M. Sky heavily overcast with intermittent rain. Temperature 66° F. Several hundred birds circling the chimney with a few dropping back into the chimney. At 9:57-10:20 swifts leaving the chimney at the rate of ten per second. At 10:22-10:45 counted more than 1,000 swifts that dropped back into the chimney during this period. Late in the afternoon, I was informed that the swifts continued to circle and re-enter the chimney at different times throughout the entire day.

September 20, 1944—9:10 A. M. Sky overcast. Temperature 70° F. Swifts leaving chimney.

September 26, 1944—10:10 A. M. Sky clear. Temperature 56° F. Swifts leaving chimney at the rate of two per second.

September 29, 1944—10:15 A. M. Sky clear. Temperature 60° F. Swifts leaving chimney at the rate of five per second.

October 3, 1944—10:15-10:45 A. M. Heavy rain. Temperature 42° F. Estimated about 2,000 swifts circling chimney and a considerable number entered the chimney in the usual manner, at the rate of five to ten per second. Small flocks continuously arriving and joining the circle around the chimney.

October 4, 1944—10:30-10:45 A. M. Sky heavily overcast. Temperature 50° F. Several hundred swifts in the air close to the mouth of the chimney. Many birds entered the chimney at the rate of five to ten per second.

October 5, 1944—10:25-10:45 A. M. Sky lightly overcast. Temperature 56° F. At intervals of one to two minutes, the swifts left the chimney at the rate of two per second. They did not circle or re-enter the chimney.

From the morning observations at the Ardmore chimney, it is evident the swifts return to it soon after leaving it when the weather is unfavorable. Musselman (1926), observing Chimney Swifts at a chimney in Quincy, Illinois, states: "I discovered that on days when the thermometer indicated an approach to the freezing point, the birds

remained in the chimney until about nine o'clock in the morning. During the daytime, the birds quickly returned from their feeding over the river, circled but a time or two and dropped into the chimney until warm." The swifts at the Ardmore chimney, however, not only returned to their chimney when the weather was unfavorable, but, surprisingly, they also came back to their chimney when the weather was fair and warm.

It will be noted in the morning observation of September 3 (a clear day, temperature about 70° F.), the swifts started leaving the chimney at 6:14 in the morning and continued to do so for about twenty minutes; then they began returning and within a short time about 250 of them reentered the chimney, notwithstanding the fact that the weather was excellent and the opportunity for securing their normal food was good.

The reason for such returns of the swifts to their chimney, soon after leaving it, is unknown. Possibly such returns may be due to a group-behavior pattern, similar to the group movement we see when the birds circle the chimney in the evening before entering. I have often noted, during morning observations, that when the swifts came out of the chimney in little flocks of two and three at a time, they often remained in its immediate vicinity until a flock of 20 or more birds had gathered. Then they started circling the chimney for a number of times before flying off. These birds were acting in unison and appeared to be following a group-behavior pattern, which the birds may also be doing when they return to a chimney soon after leaving it in fair weather.

During several evening observations at Ardmore, while Charles E. Mohr was taking flashlight photographs close to the mouth of the chimney, it was noted that neither the presence of the photographer nor the sudden flashes of light produced by the bulbs interrupted the flow of swifts entering the chimney. It is said that the Chimney Swift, spending most of its daylight hours in the air and seldom, if ever, coming in contact with man, does not fear the human being. Banders who have handled these birds report them as being unusually tame. Constance and E. A. Everett (1927), who have banded swifts, state: "When removed from the cage, these swifts were very quiet and apparently comfortable at all stages of the game. When held in the hands, they would snuggle between the fingers confidently; and when held against the clothes, they would wriggle under the folds of the garments and contentedly go to sleep."

One evening, while the swifts were entering the chimney at Ardmore, one of the birds was captured and banded without displaying the

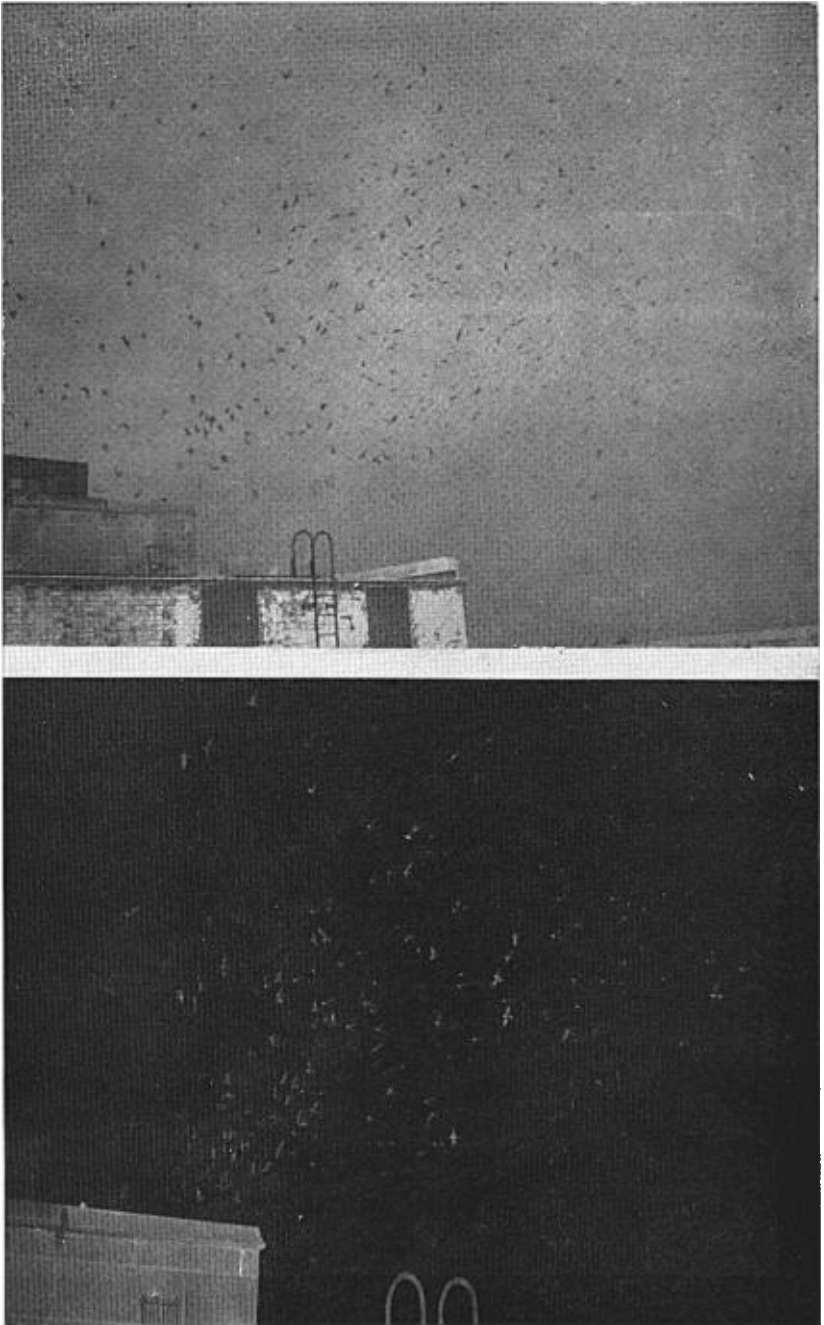
slightest fear or disturbance, and as an experiment to check the tameness of the bird, it was placed on the lapel of my coat where it remained while a flashlight photograph was taken of it. Even the sudden flash of light within two feet did not alarm the bird in the least. The swift continued to cling to the coat for twenty minutes, and it seemed so contented that it was necessary to pull the bird off to get it back into the air. During the entire performance, the swift showed no evidence of fright or excitement by any utterance or behavior.

I am indebted to Charles E. Mohr for taking the photographs and for the use of the same; to the Academy of Natural Sciences of Philadelphia for the use of its library; and to William E. Somers, Jr., and Mrs. Quintin Kramer for assistance in making the observations and counts.

## LITERATURE CITED

- AUDUBON, JOHN JAMES  
1840. *The Birds of America*, 1.
- BENT, ARTHUR CLEVELAND  
1940. Life Histories of North American cuckoos, goatsuckers, hummingbirds and their allies. *U. S. Nat. Mus., Bull.* 176: 279.
- CAMPBELL, E. K. AND D.  
1926. Roosting swifts. *Bird-Lore*, 28: 395-396.
- EVERETT, CONSTANCE AND E. A.  
1927. The fun of banding Chimney Swifts. *Wilson Bull.*, 39: 111-112.
- FORBUSH, EDWARD HOWE  
1925. *Birds of Massachusetts and other New England states*, 2: 314.
- HOWELL, ARTHUR H.  
1932. Florida bird life: 301.
- LINCOLN, FREDERICK C.  
1944. Chimney Swift's winter home discovered. *Auk*, 61: 604-609.
- LINTON, EDWIN  
1924. Chimney Swift at bedtime. *Bird-Lore*, 26: 252-253.
- LOWERY, GEORGE H., JR.  
1939. Vaux Swift in Louisiana. *Wilson Bull.*, 51: 200.
- MUSSELMAN, THOMAS EDGAR  
1926. Chimney Swift banding. *Wilson Bull.*, 38: 120-121.
- PICKENS, ANDREW LEE  
1935. Evening drill of Chimney Swift during the late summer. *Auk*, 52: 149-153.
- SUTTON, GEORGE MIKSCH  
1928. Chimney Swift. *Cardinal*, 2: 85-92.

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CHIMNEY SWIFTS AT ARDMORE, PENNSYLVANIA.  
(Photographs by Charles E. Mohr.)