ences made, but I am now handicapped by the inability to work as steadily as I formerly could—in fact have reached an age (79 years on my next birthday) when it would be better for me if work of this kind should be dropped altogether.

My own part in the completion of the last two volumes will, necessarily, consist in the treatment of the higher groups (down to families only in Part 10 but to genera in Part 9, with compilation of full synonymies down to subspecies in both); in other words, the real labor, indeed the drudgery, leaving for others the interesting work of describing the species and subspecies. Naturally, I wish that it were possible for me to do the latter myself, but, obviously, I cannot.

Very truly yours,

ROBERT RIDGWAY.

CHIMNEY SWIFT BANDING OPERATIONS AT CHATTANOOGA

BY WYMAN R. GREEN

We have confined our bird banding operations at Chattanooga almost wholly to Chimney Swifts (*Chaetura pelagica*) for the reason that these birds visit our city in tens of thousands. It seems to be a favorite stopover place for them. Especially in September and October they come in enormous numbers, on their way south. Most of our operations so far have been during these two months. Not so many are observed as they pass on their way north in the month of May. Possibly their north and south migrations are not over the same route.

There are many chimneys available in Chattanooga and a large number are used. It is a veritable paradise for anyone interested in the banding of Chimney Swifts. We first began our operations in October, 1928, when the birds were moving south. We banded a few again in May as they passed through going north, and in September and October of 1929 we again set our traps and banded on a more extensive scale, as the swifts were returning southward.

The accompanying tabulation summarizes the banding operations to date so far as our local work is concerned.

It will be noted that a total of 3,737 swifts were banded during the period from October 16, 1928, to October 19, 1929. During this time we captured seventeen swifts that had been already banded by other operators. Throughout the whole of our banding work we have had fifty-four returns. It is significant that on October 8, 1929, we had at least one return from each of our three previous catches. Also

on October 19, 1929, we had at least one return from each of our four previous catches. That we had no returns on May 25, 1929, when we banded only ninety-one birds is not specially significant, since the number of birds examined was so small, while at each succeeding catch we examined from about 1,000 to 5,000 birds.

Unfortunately we were obliged to set free nearly 9,000 swifts, as our tabulation shows, without banding them, because we were not able to get sufficient bands. We hope that this handicap can be removed before resuming the work again.

Perhaps the most interesting aspect of this work emerges when we consider the birds taken which have been banded by other workers. Of these we have taken seventeen. Three of our birds have been taken elsewhere. Of the 1,000 swifts banded October 16, 1928, two have been reported as taken in Canada. Bird No. B72,601 was captured by Mr. E. J. Pifher, at Trout Lake, North Bay, Ontario, June 21, 1929, (See Fig. 8). This is about half way between the eastern end of Lake Erie and the south point of Hudson Bay. Bird No. B72,496 was taken three days later at Markstay, Ontario, by Mr. A. Chevrier. It is rather remarkable that these two birds banded at Chattanooga at the same time, should be taken eight months later within three days of the same date, in Ontario. The only other one of our birds that we have heard from so far was another one banded at the same time as these two, but which was taken only five months later at Decatur, Tenn., by Mr. Noah Bales.

Of the seventeen banded birds we have taken during our operations thirteen were banded at Charleston, W. Va., by Mr. I. H. Johnston. Two of these we took in October, 1928. One had been banded in 1926 and the other in 1927.

Among the 7,000 swifts trapped in September, 1929, were eight others which had been banded by Mr. Johnston in the years 1927 and 1928. There was also one that had been banded at Kingston, Ontario, in June, 1929, by Mr. R. O. Merriman, another banded at Thomasville, Ga., in October, 1926, by Mr. H. L. Stoddard, and another banded at George School, Pa., in May, 1927, by Mr. John Bartram.

Among the 2,700 trapped in October, 1929, were three more birds banded at Charleston, W. Va., by Mr. Johnston, in 1926 and 1927, and one which is of special interest, was banded at Lafayette, Ind., in September, 1929, by Mr. S. E. Perkins.

Only eleven days later we set our traps for the last time this season and captured 955 swifts, but none of these wore bands that had been placed on by other workers. There were, however, thirty

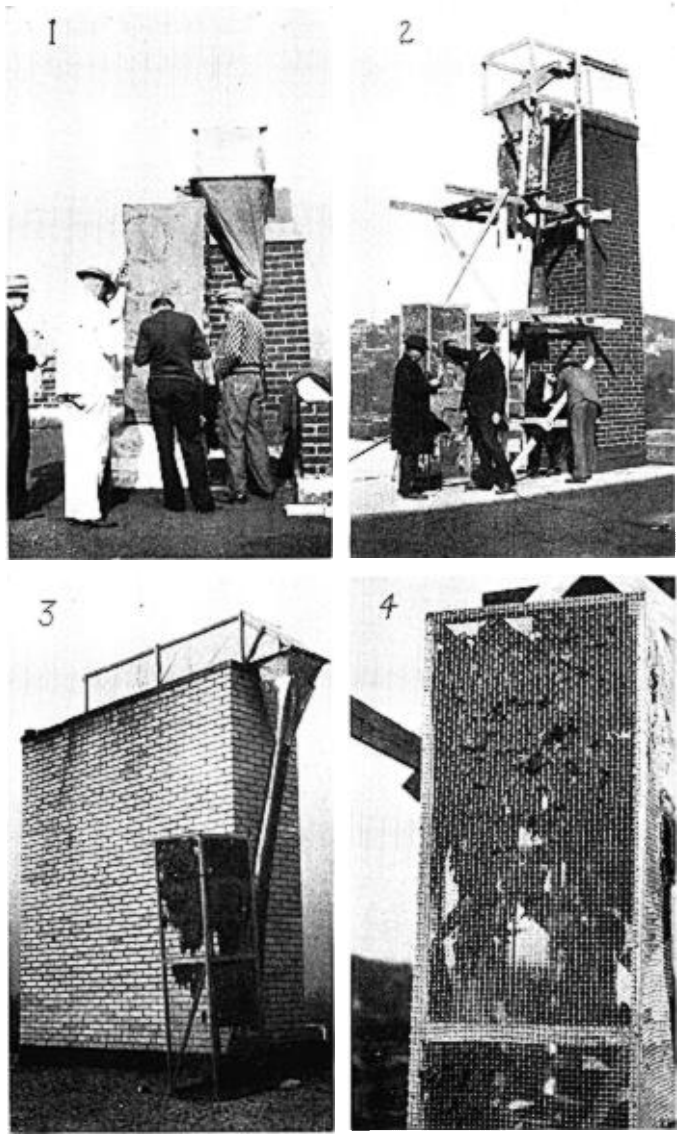

FIG. 7. Chimney Swift banding operations at Chattanooga. 1, the author, in white, and students at work on the roof of the main building of the University of Chattanooga. 2, a temporary trap on the Clemons Bros.' furniture store. 3, trap and receiver containing about 800 Chimney Swifts. 4, close-up view of one of the receivers showing how the swifts cling to the walls. 1 and 2 by Henry Howard.

birds that bore bands that we had placed on them. Of these a few were from each of our four previous catches.

We have used a considerable variety of traps, as to shape, size, and construction. Naturally the size and type of trap may be conveniently modified to suit the particular chimney on which it is to be used. The accompanying illustration (Fig. 7) shows one of our most satisfactory traps and a receiver which is designed to hold several thousand birds. In general our traps have all resembled the one here shown, being much the same as other banders are using. (See Miscellaneous Publication No. 58, of the United States Department of Agriculture). Hence a detailed description would be entirely superflous. In all of our traps we have used a transparent sheet of celluloid at one end. Our experience indicates that it is better to place this sheet at an angle, say of forty-five degrees, rather than to have it strictly vertical as it is in all of the traps of other workers, so far as I am informed. This arrangement deflects the birds downward into the funnel, or hopper, the first time they strike the sheet. In my previous traps, with sheet vertically placed the birds would often flutter against the sheet and then try to find a place to alight in the cage. In my first experience my trap walls became practically lined with swifts. I remedied this in part by substituting black oil cloth for the burlap walls of the trap, and by eliminating all roughness inside the traps.

By considering a certain habit the swifts have on entering the chimneys in the evening one can appreciate the great importance of maintaining an unobstructed right of way through the trap into the receiver when the birds once decide to come out of the chimney. Perhaps everyone has observed that the swifts circle about for a time in the evening before starting into the chimney. Then in cases where there are thousands of birds concerned a few will dart in, literally pouring in for a few moments, but it will be observed that the rate of entrance slows down perceptably, and after a few seconds, completely ceases for perhaps half a minute, or even longer sometimes. I imagine that this is to give those that entered time to get settled in their places. Then the process is repeated, until the last bird enters. So when the birds are coming out if the passage becomes the least bit obstructed by fluttering birds this same instinct operates, as I believe, to call a halt, until the fluttering birds either fall down the shute or find a perch in the cage, or possibly go back down the chimney again. It is obvious that if possible all of the flock should come out at their first attempt.

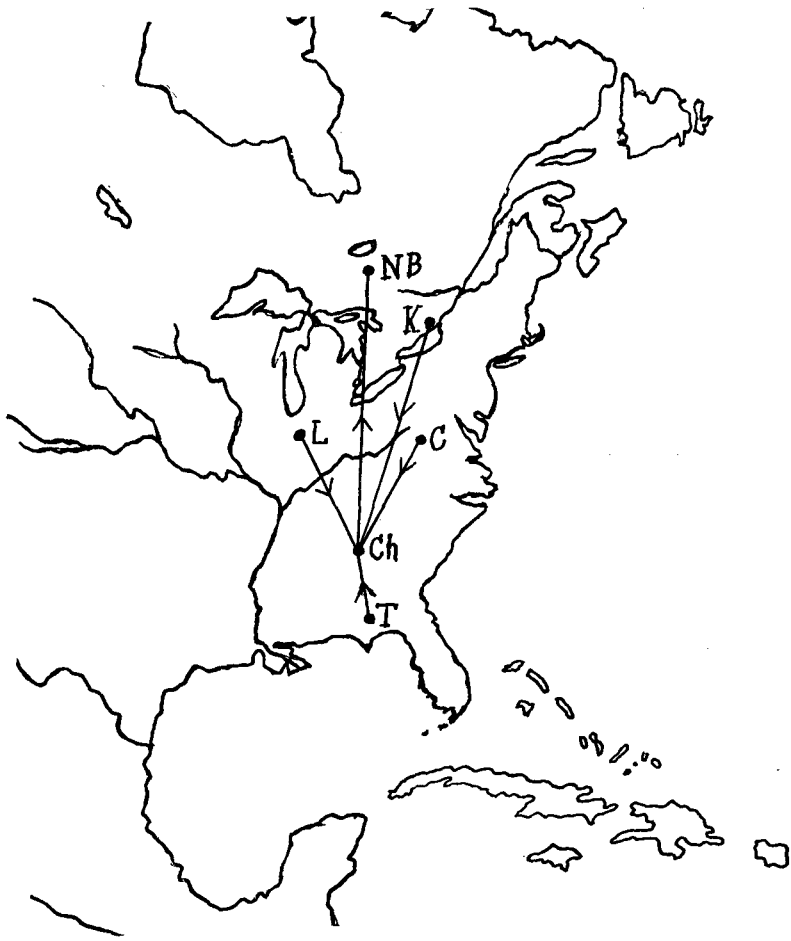

FIG. 8. Eastern portion of North America which is involved in this study of Chimney Swifts. The banding was done at Chattanooga, Tennessee (Ch). Birds were taken which had been banded at Thomasville, Georgia (T), Lafayette, Indiana (L), Charleston, West Virginia (C), and at Kingston, Ontario (K). Some of the birds banded at Chattanooga were taken later at North Bay, Ontario (NB). The study indicated a number of migrations of minor importance which are not shown on the map. It will be seen that returns up to date indicate a certain degree of convergence of Chimney Swifts in the fall migration. Obviously banding stations are needed in northeastern Canada, southern Florida, the West Indies, Central America, and South America.

In the case of tall chimneys it is very inconvenient if the swifts congregate in the trap. We believe that with the transparent sheet placed at an angle as indicated there will be very few birds which ever strike it a second time before being deflected into the funnel leading to the receiver.

Now let us consider a few details with reference to the receiver or gathering cage. If one is trapping on a large chimney which may harbor 6,000 or 7,000 swifts at one time he needs a large receiver or several small ones which can be easily handled. An essential feature of a receiving cage is that it must provide ample room for all of the birds in it to cling to its walls. If swifts are allowed to flutter about in the trap and become partially exhausted before coming into the cage, they may accumulate on the floor of the receiver and smother. After experience indicated the necessity I made the large cage shown in the illustration. It is about seven feet tall and approximately two feet in the other two dimensions. We have found it more convenient to use a single large receiver. When several thousand birds come out in a few minutes one is saved the trouble of changing the cages. Every little saving counts when one has several thousand birds to band.

All four sides and the two ends are made of one-half inch mesh hardware cloth. The bottom, being constructed of the same material as the sides and top, makes it possible for the few birds that do become exhausted and drop to the bottom of the receiver, to get plenty of air and thus avoid suffocation. The receiver, in case there are many birds, should be slightly raised off the ground so there is the most complete ventilation for the swifts that may come to rest on the floor of the cage.

With a cage which is tall several men may stand about it and inspect the legs of the birds attached to its walls for specimens which are already banded. Very little or no stooping is necessary.

In a receiver of this size it is convenient to have four openings for removing the swifts. They should be about nine inches square. In a cage six or seven feet tall they should be placed, one in each of the four walls, so that all parts of the cage may be easily reached. This desideratum is realized when two of them are located about eighteen inches from the bottom in opposite walls, and the other two are about four feet from the bottom, opposite each other, in the other two walls. Thus half a dozen workers may have ample access to the birds at the same time and not be in each other's way.

Tabluation of the Data on Banding Chimney Swifts

DATA ON LOCAL BANDING				DATA ON CHIMNEY SWIFTS BANDED ELSEWHERE			
Date and Station	Birds Banded Numbers Used	Released Not Banded	Bearing Local Bands	Bearing Strange Bands	Place of Banding	Date of Banding	By Whom Banded
Oct. 16, 1928 Old H. S.	1000 B72001 to B73000	900	None	2 LSURV 19735	Charleston W. Va.	Sept. 18, 1926	I. H. Johnston
				BISURVB 15195	Charleston W. Va.	Sept. 15, 1927	I. H. Johnston
May 25, 1929 Univ.	91 C6410 to C6588	None	None	None			
Sept. 21, 1929 Univ.	1500 623301 to C25000	5500	8 banded Oct. 16, 1928 B72285	11 BISURVA 82771	Thomasville, Ga.	Oct. 1, 1926	H. L. Stoddard
			B72286	BISURVB 1265	George School, Pa.	May 26, 1927	John Bartram
			B72041	BSURVB 14419	Charleston W. Va.	Sept. 15, 1927	I. H. Johnston
			B72541	BISURVEY 14983	Charleston W. Va.	Sept. 15, 1927	I. H. Johnston
			B72594	B14094	Charleston W. Va.	Sept. 15, 1927	I. H. Johnston
			B72431	C28449	Charleston W. Va.	Sept. 15, 1927	I. H. Johnston
			B72873	C28640	Charleston W. Va.	(?)	I. H. Johnston
			B72039	C27800	Charleston W. Va.	(?)	I. H. Johnston
				C28596	Charleston W. Va.	(?)	I. H. Johnston
				A107321	Charleston W. Va.	Sept. 14, 1928	I. H. Johnston
				B97875	Kingston, Ontario	June 7, 1929	R. O. Merriman
Oct. 8, 1929 Clemons	1146 C32001 to C32197 and C36051 to C37000	1559	11 banded Oct. 16, 1928 B72039	4 BISURV 15978	Charleston, W. Va.	Sept. 15, 1927	I. H. Johnston
			B72098	BIOLSURV 197202 (both on same bird)	Charleston, W. Va.	Sept. 17, 1926	I. H. Johnston
			B72118				
			B72122				
			B72486				
			B72575				

TABULATION OF THE DATA ON BANDING CHIMNEY SWIFTS—*Continued*

DATA ON LOCAL BANDING				DATA ON CHIMNEY SWIFTS BANDED ELSEWHERE			
Date and Station	Birds Banded Numbers Used	Released Not Banded	Bearing Local Bands	Bearing Strange Bands	Place of Banding	Date of Banding	By Whom Banded
			B72694 B72789 B72809 B72849 B72970	BISURV 14860 BISURV 14112 BIOLSURV 469234	Charleston, W. Va. Charleston, W. Va. Lafayette, Ind.	Sept. 15, 1927 Sept. 15, 1927 Sept. 6, 1929	I. H. Johnston I. H. Johnston S. E. Perkins
			2 banded May 25, 1929 C6463 C6499				
			4 banded Sept. 21, 1929 C23586 C23717 C23867 C24893				
Oct. 19, 1929 Central H. S.	None	955	7 banded Oct. 16, 1928 B72378 B72398 B72497 B72593 B72602 B72665 B72746	None			
			1 banded May 25, 1929 C6446				
			9 banded Sept. 21, 1929				
			13 banded Oct. 8, 1929				
Totals	3737	8914	54	17			

Note: Three swifts banded October 16, 1928 have been recaptured elsewhere: B72601 by E. J. Pifher at Trout Lake, North Bay, Ontario, June 21, 1929; B72496 by A. Chevrier at Markstay, Ontario, June 24, 1929; B72707 by Noah Bales, Decatur, Tenn., April 20, 1929.

A narrow strip of tin may be bent around the edges of these doors to cover the cut edges of the hardware cloth, so as to avoid the possibility of tearing the clothing when reaching in after the birds. A piece of burlap about fourteen inches square is hung over each door on the inside of the cage. This effectively prevents the escape of the birds and makes easy their rapid removal.

In closing, let us consider briefly some plans for the future. Since the swifts do not always go to the same chimney each evening but use several different roosting places, we have planned to do some experimenting, when they return again next year, to determine the extent of these local movements. We hope to organize our men into groups, so that we can trap all of the birds at the different chimneys the same day, at intervals for the month or two that the swifts are present. Several objects would be accomplished by this procedure. Aside from discovering the local movements we can determine how long individual birds remain in the locality, and most important of all, we will have an opportunity to band every unbanded swift that visits the region.

We hope soon to get in touch with everyone in America who is interested in swift banding. With the co-operation of many workers much can be accomplished in a very short time with birds like these that can be banded in such enormous numbers. There is an enthusiastic group of workers in Chattanooga. We are definitely planning to become the blue-ribbon swift banders of America. We intend to band from 10,000 to 20,000 swifts by the end of October, 1930. I realize that it is a hazardous thing to announce our ambition, but if this announcement inspires a formidable competitor in this field, or indeed a score of them, so much the better. In the interest of our common objective they will all be welcome.

UNIVERSITY OF CHATTANOOGA,
CHATTANOOGA, TENN.

SOME NEW BIRDS FOR OKLAHOMA FROM OKMULGEE AND TULSA COUNTIES

BY EDITH R. FORCE AND W. H. KOONS

The purpose of this account is to amplify the records of the bird life of Oklahoma. These records are of especial interest because the geographical position of the state makes it a region of unique climatic changes, for it is the cross roads of the humid east and the arid west, of the cold north and the warm south. For this region a wide range in