

1929. "Notes on Banding Terns at Chatham, Mass., for 1929." *Bull. N. E. B. B. A.*, 5 (4), October: 144-148.
 1930. "Further Banding Notes from Tern Island, Mass." *Bird-Banding*, 1 (4), October: 181-184.
 1932. "Report of Tern Banding on Cape Cod During 1932." *Bird-Banding*, 3 (2), April: 63-65.
 FORBUSH, E. H.
 1925. "Birds of Massachusetts and Other New England States, 1: 105-126. North Eastham, Cape Cod, Massachusetts.

BIRD BANDING IN THE LAST FIVE YEARS¹

By O. A. STEVENS

THE annual reports in Bird Banding Notes are always received from the Biological Survey with great interest by the coöperators. While there is a certain amount of rivalry to see who has banded the largest numbers, I believe the greatest interest is to see the grand total and the numbers of certain species in which the operator has a special interest. Personally, I have been interested to see the number of stations which have passed my own mark during the last ten years. In 1928 I was seventeenth on the list, the highest number being then 5,707. Since then I have dropped to about fiftieth place while the first place is now headed by 28,845.

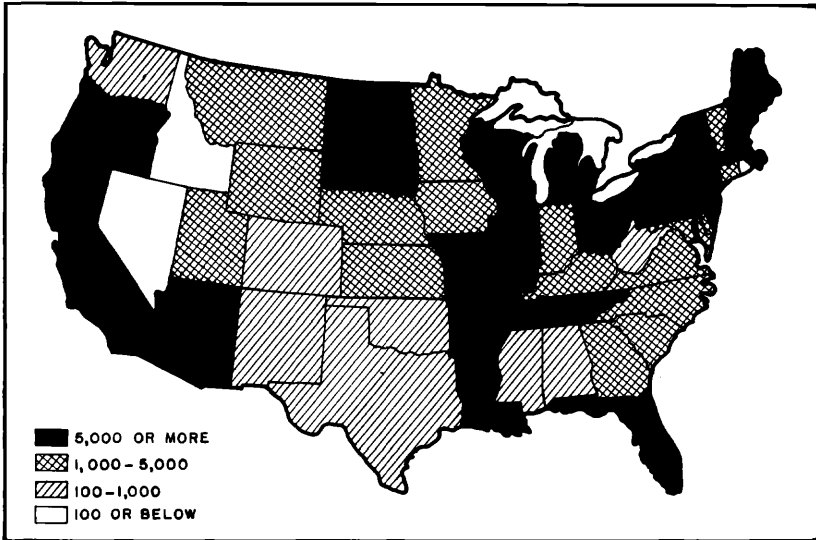
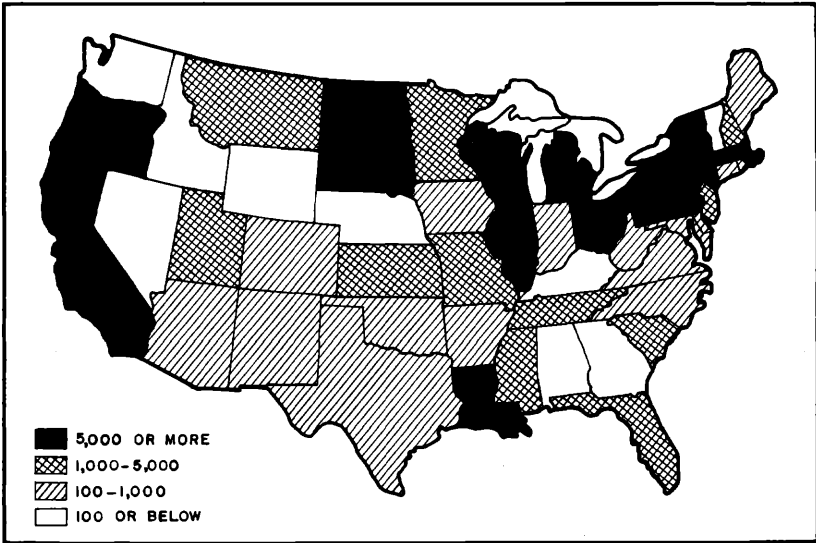
Five years have passed since I undertook to present a survey of the distribution of the banding stations,² and it has seemed worth while to repeat the study for indications of progress during that period. A comparison of the reports for the years ending June 30, 1934 and 1939 shows the following summaries.

<i>Number Banded</i>	<i>Number of Stations</i>		<i>Birds Banded</i>	
	<i>1934</i>	<i>1939</i>	<i>1934</i>	<i>1939</i>
More than 1000.....	64	102	159,438	320,272
From 800 to 1000.....	13	19	11,700	17,100
From 500 to 800.....	19	59	12,350	38,350
From 300 to 500.....	55	58	22,000	23,000
From 200 to 300.....	46	64	11,500	16,000
From 100 to 200.....	100	106	15,000	15,900
From 1 to 100.....	—	—	43,029 ³	5,826
Totals.....	297	408	275,017	436,648

It will be observed that the chief gain was made in the larger stations. The 500 to 800 group also had a material increase in numbers, the others remaining about the same. By charting on a map of the United States the totals for the various states as in the earlier article according to groupings, over 5,000, 1,000 to 5,000, 100 to 1,000 and none over 100, the gains are seen to be well distributed. Only Idaho, Nevada, and Rhode Island now remain blank. Washington, Wyoming, Nebraska, Kentucky, Alabama,

¹ Acknowledgment is made to the Works Progress Administration for aid in assembling data
² *Bird Banding*, 6: 25-28, 1935.

³ See correction in *Bird-Banding*, 7 : 84, 1936.



Numbers of birds banded in each State during the fiscal years ending June 30, 1934 (upper), and June 30, 1939 (lower), by stations banding more than 100 birds.

Georgia and Vermont advanced from the lowest group. Arizona, Missouri, Arkansas, Tennessee, Florida, New Jersey, New Hampshire and Maine reached the "over 5,000" group. Tennessee and Arkansas seem to have made the largest gains. The numbers from the "100 or less" group have continued to decrease.

Listing the stations by States and Provinces, we find fifteen of these divisions totaling above 10,000, as compared with seven for five years ago. For comparison with the earlier article, all are tabulated as follows:

Massachusetts.....	43,029	Arkansas.....	12,645
Louisiana.....	40,494	Pennsylvania.....	11,582
Illinois.....	39,015	Oregon.....	11,496
Tennessee.....	36,012	New Jersey.....	10,154
California.....	22,046	Ontario.....	9,274
Michigan.....	19,566	Wisconsin.....	7,371
Florida.....	19,292	Maine.....	7,253
New York.....	18,945	Missouri.....	6,932
North Dakota.....	16,730	Manitoba.....	5,935
Ohio.....	14,020	Arizona.....	5,550
South Dakota.....	12,861	New Hampshire.....	5,327
1,000 to 5,000	Hawaii, Alberta, Connecticut, Kansas, Georgia, Minnesota, Saskatchewan, South Carolina, Iowa, Indiana, North Carolina, Utah, Virginia, Kentucky, Montana, Vermont, Wyoming, Delaware, Maryland, District of Columbia, Nebraska, Quebec.		
100 to 1,000	Texas, British Columbia, Oklahoma, West Virginia, Washington, Colorado, New Mexico, Nova Scotia, Alabama, Mississippi, Midway Island and Pacific Ocean.		
None over 100	Idaho, Nevada, Rhode Island.		

Perhaps the most significant feature is the list of 37,223 birds banded upon 21 federal refuges. It will be heartening to the private coöperators, who often are persevering under difficult conditions, to see this contribution from the Survey workers.

The following survey of subjects has been compiled from the files of this journal (1934 to Jan. 1940 inclusive), both as to original articles and reviews, and is limited chiefly to North America. An article on the White Stork appeared (July '36) and there are numerous references to studies on the Starling in Europe. In the absence of any complete report of returns since 1926, the various abridged lists are of much interest though they are not sufficient for anyone who wishes to study a particular species in detail.

Some general problems of banding were discussed briefly by Mrs. Nice (April '34) and special ones are frequently mentioned, but on the whole there is a lack of general planning. The gull project by colorbanding is the outstanding attempt at an extended co-operative study (Oct. '37, Jan. '38, July '38, Jan. '39, July '39, Jan. '40). After three years this is beginning to reach a stage where its possibilities can be evaluated. Perhaps it would not be out of place here to call attention to the extensive and uncertain duplication which will occur in observations, since a given individual bird may be noted repeatedly by different observers or by the same observer.

Color banding has been employed in a number of local studies, as on mockingbirds (July '35) and quail (July '39) in California, and on warblers in Michigan (Oct. '39). (See also general method of use, Apr. '38.) Feather marking has received attention (Jan. '34, Jan. '35, July '38, Dec. '38, Jan. '40). Methods of trapping seem to have made little progress during this period aside from occasional minor features. The Verbaile pole trap was described (Oct. '35) and I note articles on traps for grouse (Oct. '38), shore birds (Jan. '35) and woodcock (July '38). Some other subjects which have received attention are: sex ratios (Oct. '34, July '37, Oct. '38, Oct. '39), weights (Apr. '34, Oct. '37, Jan. and Oct. '38), warbler migration (July '35), length of stay of transients (Oct. '39), homing (Oct. '34, July '36, Apr. '37, Jan. '40), wing molt (Apr. '36), diseases (July '37, Jan. '38, Apr. '38, Jan. '39), insect parasites (Jan., July and Oct. '36, Oct. '37, Apr. '38), and blood parasites (Oct. '35, Jan. and July '38, Oct. '39). Banding has been used in some notable studies of Mockingbird (July '35), Song Sparrow (July '37, July '39), Ovenbird (Jan. '39), Wren (Jan. '35, Apr. '37), Tree Sparrow (Apr. '36), and Wren-tit (July '38).

Mrs. Commons's *Log of Tanager Hill* (Oct. '38), stands out as the only book entirely on banding, though the topic is an essential part of Lincoln's, *Migration of North American Birds* (Oct. '39), and Mrs. Nice's, *The Watcher at the Nest* (July '39). The more condensed, long-time reports of McIlhenny (Oct. '34, July '37) and Mrs. Beals (Jan. '39) are essentially similar to Mrs. Commons's book so far as subject matter is concerned.

The following list of rather comprehensive articles on the banding of particular species may be useful for reference.

Blackbird, Red-winged	Jan. '36, Oct. '37.
Bluebird	Oct. '35, Jan. '38, Jan. '39.
Catbird	Oct. '34, Jan. '40.
Chimney Swift	Jan. '37.
Finch, Purple	July '35, Oct. '36.
Grosbeak, Evening	Oct. '34, Oct. '38, Oct. '39.
Gull, Herring	Jan. and Apr. '34.
Hawks	Apr. and July '39.
Mockingbird	Jan. '34, July '35, Jan. '36.
Mourning Dove	Apr. '35.
Murre, Atlantic	Jan. '40.
Osprey	Oct. '36.
Owl, Burrowing	Oct. '36.
Redpoll	Jan. '37.
Sparrow, Field	Oct. '34, July and Oct. '39.
Sparrow, Fox	Apr. '34, Apr. '39.
Sparrow, Tree	Jan. '34, Jan. '35, Apr. '37, Apr. '38
Starling	Jan., Apr., and July '34, Apr. '37.
Swallow, Bank	Oct. '38.
Swallow, Barn	Oct. '36, Apr. '37.
Swallow, Tree	Jan. '34, Apr. '35, Apr. '37, Apr. '39.
Terns	Oct. '34, Jan. '38.
Thrush, Wood	Jan. '39.
Waxwing, Cedar	July '35, Apr. '36.

It is to be noted that in practically all of these articles, the work of a single worker or station is represented. There is a notable lack of coöperative attack or report upon a particular species or topic. A number of difficulties usually are encountered in trying to bring together data from scattered stations on a given species or subject, but in a field where coöperative effort is especially needed to present a broad picture, it would seem that effort in this manner would be more worth while than a series of disconnected papers.

North Dakota Agricultural College, Fargo, North Dakota.

GENERAL NOTES

Differential Erosion of Gastroliths in a Mourning Dove.—While doing a post mortem on a Mourning Dove (*Zenaidura macroura carolinensis*), I thought I saw bird-shot in its gizzard. Examination of all the gastroliths under a dissecting microscope disclosed the following facts about them.

There were two chief kinds. The first were grains of quartz, the largest one 5 mm. in diameter in its longest axis. They were uneven in their outlines, and the more transparent white and yellow ones showed internal fracture-lines or crystal-faces which accounted for the irregular surfaces. During the wearing-down process, cleavage occurred along one of the internal planes, so that only occasionally did any of the well-worn ones begin to approach a spherical shape. Even the most perfect of these, however, would have only partially rounded zones, the result being oval or kidney-shaped bodies.

The second kind, resembling bird-shot, were black cinders worn down into perfect spheres. All of these averaged smaller in size than the quartz gastroliths, indicating that they wore down not only more evenly but also more quickly. Some of the cinders showed an admixture of quartz sand. In these cases the sand particles protruded from the cinder, again showing that the sand offered greater resistance to the eroding process. A pure slag cinder of homogeneous structure wore down into a perfect sphere, its further reduction in size being continued in spherical form. Its surface was pitted with small holes which were gas bubbles trapped when the slag congealed. The margins of these holes probably make good cutting edges during the process of trituration by the gizzard. The cinder spheres, seen under the microscope, looked like close-up photographs of the moon, the gas bubbles corresponding to lunar craters.

One gastrolith was evidently a piece of brick, and there was one child's white bead 2 mm. in diameter.—C. BROOKE WORTH, Rockefeller Institute for Medical Research, Princeton, New Jersey.

Chimney Swifts Destroy Many Insects.—Interesting results were obtained from an experiment conducted during the past summer to determine the approximate number of insects a family of Chimney Swifts (*Chaetura pelagica* Linnaeus) might consume in a day. Authorities tell us that insects form a large part of the Chimney Swift's diet, but none of them state this information in quantitative terms. The results obtained indicated that the Chimney Swift is perhaps our most valuable bird as a destroyer of large numbers of insects.

The experiment began when three young Chimney Swifts, which had fallen into a neighbor's fireplace, were entrusted to my care on August 7, 1939. They were soon doomed to a diet of hamburger and water because my ability to catch enough insects to satisfy these little wide-mouthed creatures was extremely limited.