BIBLIOGRAPHY[1]

1. Bird Watching. 1901. J. M. Dent. London.
2. Bird Life Glimpses. 1905. George Allen. London.
3. The Bird Watcher in the Shetlands. 1905. J. M. Dent. London.
4. Realities of Bird Life. 1927. Constable & Co. London.
5. Thought Transference (or What?) in Birds. 1931. Constable & Co.
6. Evolution of Habit in Birds. 1933. Constable & Co.
7. The Romance of the Animal World. 1921. Seeley, Service & Co. London.
8. The Romance of Insect Life. 1921. Seeley, Service & Co. London.
9. The Tommy Smith Series. 7 vols. Methuen & Co. London.

ARTICLES

Saturday Review, last years of the nineteenth century.
The Zoölogist, between 1901 and 1916.
The Naturalist, 1920, 1921.
Wild Life, 1915, 1916.
The Auk, 1917.
Journal für Ornithologie, 1929, a translation of his study of Courtship and Sexual Selection in the Ruff.

HOUSE SPARROW REPLACEMENT AND A SEVERE WINTER

By JOHN T. NICHOLS

BANDING of House Sparrows at a Garden City, Long Island, station was begun in January, 1930. On account of the trap-shy nature of this species, it was found that repeats and returns were not in sufficient amount to tell much of the movement of the birds at the station. The proportion of sparrows of the two sexes, unbanded, banded as adults, and banded as young, could, however, be determined by observation, and this proportion was found, during some forty months from the summer of 1930, when it was first made a matter of record, to the fall of 1933, to show a progressive change with continued banding, and also more or less definite seasonal fluctuations, such as males banded as adults in maximum proportion in June, July or August and again in November, December, or January. These fluctuations were interpreted, in terms of distributional or migratory movement, in a paper presented before the American Ornithologists' Union in the fall of 1933 and published in the January, 1934, issue of *Bird Banding*.

Then came the winter of 1933 to 1934, which was a decidedly abnormal one. After intermittently cold weather in December most of January was very open, but at the end of January a prolonged period of unusual cold with abundant snowfall set in, which lasted almost continuously to the middle of March, with a principal storm on the night of February 19th when the locality was blanketed with some fifteen or eighteen inches of snow, badly drifted. This

[1]For much of this bibliography I am indebted to M. Delamain's paper.

severe weather may have been a contributing factor to the striking and unexpected changes in the proportion of the groups of male House Sparrows present at the trapping station in 1934.

A normal maximum abundance of banded males occurred in December, 1933, those banded as juvenals (left leg) somewhat more than half as plentiful as those banded as adults (right leg). This was the highest percentage of the total (17 per cent) yet attained by left-banded males, which had been gradually increasing for two years. Once they were established as adults about the station, it is obviously immaterial whether they were banded as adults or young; those banded as adults would be older, but merely an average difference.

In February, 1934, on the other hand, the right-banded males had dropped out altogether, though the left-banded were little reduced. In March, when an increase was to be expected, there were only a few right-banded males, and the left-banded birds appeared in remarkable numbers, making 44 per cent of the total number of sparrows, a percentage higher than any previous figures for a banded group. It seemed as though right-banded birds had been replaced abruptly as a class by left-banded birds. This was not the case, however, since in April and May right-banded slightly outnumbered left-banded. There was a secondary summer peak of left-banded in July, when they again outnumbered the right-banded two to one, and a secondary peak of right-banded in August, when they outnumbered the left-banded four to three. Notice the tendency for younger birds to precede older birds seasonally. The highest "summer" maximum for all banded males in 1934 was in March and was due to the large number of left-banded in that month; the highest for right-banded was in May instead of June, July, or August, as previously noted. This suggests that it was the older birds in this latter group that had been eliminated, and its age as a whole reduced. The following winter maximum of banded males came normally in December, with right-and-left-banded about equal in number, but the actual maximum for left-banded alone was in October, when they outnumbered the right-banded more than three to two. Furthermore, these figures suggest that something more than chance may bring young birds back to a locality to fill gaps in the ranks of their elders, though I am not yet convinced that such is the case.

As very likely bearing on the problem of replacement, I may note that from November, 1934, to February, 1935, a large number of unbanded males raised the percentage of all males well above normal—68, 66, 61, 55, versus 56, 57, 53, 49 per cent of the sparrow population (1934, *Bird-Banding*, V (4), page 188).

It is thought that this discussion will contribute something to the very obscure subject of the replacement of older by younger birds. The data on which it is based are found in the table, which continues the one published in 1934, *Bird-Banding*, V (1), page 22.

TABLE I

HOUSE SPARROW PERCENTAGES

Dec.,	1933	11 ♂unb.	29 ♂rt.	17 ♂lft.	34♀unb.	9♀rt.		= 100
*Jan.,	1934	12½ ♂unb.	24 ♂rt.	12½ ♂lft.	42♀unb.	9♀rt.		= 100
*Feb.,	1934	26 ♂unb.		15 ♂lft.	41♀unb.	18♀rt.		= 100
Mar.,	1934	3 ♂unb.	8 ♂rt.	44 ♂lft.	34♀unb.	11♀rt.		= 100
April,	1934	5 ♂unb.	25 ♂rt.	22 ♂lft.	42♀unb.	6♀rt.		= 100
May,	1934	3 ♂unb.	26 ♂rt.	21 ♂lft.	42♀unb.	7♀rt.	1♀lft.	= 100
*June,	1934	11 ♂unb.	13 ♂rt.	15 ♂lft.	54♀(j)unb.	1♀rt.	6(j)lft.	= 100
July,	1934	3 ♂unb.	11 ♂rt.	23 ♂lft.	55♀(j)unb.	7♀rt.	1♀(j)lft.	= 100
Aug.,	1934	14 ♂unb.	20 ♂rt.	14 ♂lft.	38♀(j)unb.	7♀rt.	7♀(j)lft.	= 100
Sept.,	1934	29 ♂unb.	12 ♂rt.	16 ♂lft.	26♀(j)unb.	12♀rt.	5♀(j)lft.	= 100
Oct.,	1934	27 ♂unb.	14 ♂rt.	24 ♂lft.	28♀(j)unb.	7♀rt.		= 100
Nov.,	1934	27 ♂unb.	21 ♂rt.	20 ♂lft.	25♀unb.	5♀rt.	2♀lft.	= 100
Dec.,	1934	21 ♂unb.	22 ♂rt.	23 ♂lft.	23♀unb.	10♀rt.	1♀lft.	= 100
Jan.,	1935	41 ♂unb.	11 ♂rt.	9 ♂lft.	34♀unb.	4♀rt.	1♀lft.	= 100
*Feb.,	1935	55 ♂unb.			44♀unb.	1♀rt.		= 100

From June to October, in feeding birds, females could not be differentiated from birds of the year and the figures there marked (j), are for these two groups combined.

Counts were not sufficiently high for percentages to be satisfactory in months marked with an (*) in the table.