

BANDING STUDIES ON THE ENGLISH SPARROW

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INTRODUCTION

Banding studies were made on the English Sparrow, or House Sparrow, (*Passer domesticus* Linn.), between the spring of 1941 and the fall of 1946. Trapping was done at irregular intervals, but all seasons were included at sometime or other with fairly equal representation, and trapping was carried on throughout one complete calendar year without interruption. Two stations were established. One was located on the roof of McGilvrey Hall on the campus of Kent State University; the other was located two blocks away in a backyard at 324 East Erie St., Kent, Ohio. The latter one was not established until the second year of the study. Altogether, 668 English Sparrows were banded. These were captured for the most part in regular government sparrow traps slightly modified (Dexter 1943). The number in operation varied from one to three. Each station had two traps for about one-half of the time it was in operation. For a period during one season, one of the government sparrow traps was converted into a water trap (Dexter 1944b). Since the baited traps were more successful for capturing English Sparrows, the water trap was abandoned for this study, although it was very successful in capturing other passerine birds. A drop-trap, or sieve trap, was tried without much success, and since it required the presence of the operator at frequent intervals, it was soon given up. A false-bottom type of trap was constructed, but birds would not enter it.

Since most banders do not bother with the English Sparrow, and as a matter of fact are not encouraged to do so by the Fish and Wildlife Service, and since the bird is regarded as an undesirable one on the whole, the writer has often been asked why he undertook this investigation. It was for the very reason that so little has been done and so little is known about the behavior, movements, longevity, etc. of this common bird of considerable economic importance that this study was undertaken in the hope that some contribution might be made to our understanding of it. Regardless of how much we may despise it, it has become so well established in North America that we should accept it rather than ignore it. Since we must tolerate its presence in our avifauna, the more we can learn about it the more intelligently we can cope with its problems. In addition, this bird has in recent years been used many times for experimental purposes, and indications are that it will be utilized in that manner to an even greater extent in the future. Therefore, in spite of widespread prejudice, we should give attention to an understanding of the biology of this bird.

One method of learning about birds is the practice of banding them. While some banding cooperators are interested only in getting annual returns and distant recoveries, the method of banding has rich possibilities for the investigation of studies on the life history and behavior of bird life (Dexter 1945). This paper presents the results of banding the English Sparrow over a period of six years, interpretation of the data, and observations on the behavior of this bird made in the process of banding.

TABLE I.
REPEATS AND WEIGHTS OF ENGLISH SPARROWS—SUMMER OF 1944
(Roof of McGilvrey Hall, Kent, Ohio)

Band No.	Sex	Dates of Banding & Repeats; Weights in grams given in parentheses.
43-129711	Imm.	6-7 (25.4); 6-12.
43-129712	"	6-11 (24.0); 7-17 (22.5).
43-129719	"	6-15 (26.85); 6-18 (A.M. 26.1, P.M. 23.25); 6-19 (24.7); 6-20 (A.M. 25.3, P.M. 25.1); 6-21 (25.5); 6-22 (A.M. 22.8, P.M. 24.6); 6-23 (A.M. 24.3, P.M. 24.4, Eve. 23.1); 6-24 (A.M. 22.15, P.M. 22.2); 6-25 (A.M. 20.9, P.M. 20.7); 6-26 (18.1).
43-129726	"	6-16 (23.3); 6-17 (24.4); 6-22 (26.7).
43-129727	"	6-17 (23.3); 6-22 (25.6).
43-129748	Imm. ♂	7-1 (24.4); 7-4 (22.95); 7-5 (22.3); 7-6 (20.3); 7-8 (A.M. 21.9, P.M. 20.5); 7-9 (P.M. 23.4, Eve. 23.4); 7-10 (23.0). 7-15; 7-16 (21.4).
43-129754	Imm.	7-4 (24.8); 7-7 (A.M. 24.8, P.M. 26.5); 7-8 (A.M. 24.2, P.M. 23.5); 7-9 (23.35); 7-10 (26.1); 7-12 (26.0); 7-13 (23.55); 7-14 (24.2); 7-15; 7-16 (19.0).
43-129760	"	7-5 (22.8); 7-8 (24.15); 7-12 (24.3).
43-129761	"	7-5 (25.7); 7-6 (25.4).
43-129766	"	7-8 (A.M. 23.4, P.M. 22.2); 7-9 (25.0).
43-129770	"	7-16 (21.1); 7-24 (24.9).
43-129777	"	7-19 (24.0); 7-23; 7-24 (26.1).
43-129779	Imm. ♂	7-24 (27.1); 10-2 (30.4).
43-129793	Imm.	8-13 (26.1); 8-19 (24.8); 8-20 (23.5).
43-129796	"	8-17 (24.2); 8-23.
43-129810	"	8-21 (27.6); 8-28 (26.3).
43-129813	"	8-24 (20.2); 8-25; 8-26 (19.5); 8-27 (21.55); 8-28 (21.9).
43-129819	"	8-26 (25.0); 8-28; 8-30.

STATUS OF THE ENGLISH SPARROW

The status and economic importance of the English Sparrow was at an early date made the subject of an exhaustive investigation (Barrows 1889). This classic monograph summarizes the introduction, spread, acclimatization, food habits, ecological and economic relations, and control measures of the bird from the initial importation in 1850 to the date of publication. A more recent report (Kalmbach 1940) brings the subject up to date with additional information on distribution, abundance, and food habits, and with a reappraisal of the status of the bird. Life history studies, especially on repro-

duction, have been published recently by Weaver (1939, 1942, 1943)¹. Much evidence has been presented for and against the desirability of the English Sparrow, with an overwhelming mass of evidence against it. Testimonials pro and con have been published from the report of Barrows to the present time. However, Weaver (1939b) pointed out that the English Sparrow "now is probably settled into the niche that it is destined to keep for some time." Also, Kalmbach (1940), in his re-evaluation of the bird, concluded that this species is becoming adjusted into a natural balance in places, and there is evidence of a gradual change of food habits which at times has been very beneficial. The writer has received reports from bird students describing the feeding of English Sparrows on canker worms, aphids, and the Japanese beetle. An outbreak of canker worms in north-eastern Ohio in the spring of 1944 threatened the destruction of the foliage on great numbers of elm trees which were saved by the predation of the English Sparrow on these insect pests. Kalmbach (*ibid*) wisely advises that control measures be confined to those cases where this sparrow is particularly obnoxious. A partial elimination would not be effective in any case because of its rapid reproduction and the fact that others would move in to replace a depleted population. Perhaps the best method of control is to modify, so far as possible, the conditions which favor the presence of the sparrow.

TABLE II
REPEATS ON BANDED ENGLISH SPARROWS—JUNE AND JULY, 1945
(324 E. Erie St., Kent, Ohio)

Band No.	Sex	Dates of Capture
44-203173	Imm. ♂	6-6; 11-4.
44-203180	Imm.	6-7; 6-8.
44-203185	Imm.	6-8 (10 A.M. & 5:45 P.M.).
44-203186	Imm.	6-8; 7-2.
44-203194	Imm.	6-11; 6-13; 9-17.
44-203193	Imm.	6-11; 6-14.
44-203197	Imm.	6-12; 6-13; 6-15.
44-203196	Imm.	6-12; 7-5.
43-129825	Imm.	6-14; 6-20; 6-24.
43-129824	Imm.	6-14; 6-21.
44-203200	Imm.	6-14; 6-23.
43-129829	Imm.	6-16; 6-24.
43-129859	Imm.	6-20; 6-22; 7-2.
43-129856	Imm.	6-20; 6-25.
43-129875	Imm.	6-26; 7-2 (9 A.M. & 5:30 P.M.)
44-102607	Imm.	7-25; 7-27 (9 A.M., Noon, 5:45 P.M., 7 P.M.); 7-28 (12:15 P.M. & 2:30 P.M.)
44-102609	Imm.	7-27 (9 A.M. & Noon).

¹. Since this manuscript was prepared, the following paper has also been published. Calhoun, John B. 1947. The role of temperature and natural selection in relation to the variations in the size of the English Sparrow in the United States. *American Naturalist* 81: 203-228.

TRAPPING BEHAVIOR OF THE ENGLISH SPARROW

English Sparrows are well known to be trap-shy. Earlier reports (Nichols 1930, 1934a; Venables 1936; Brenkle 1936) have testified to this fact, and many banders have experienced it. As early as 1889, Hill, writing in the report of Barrows (*ibid*), said, "I have found the (English) Sparrow, considering its numbers, to be the most difficult of all birds to catch." The great majority of English Sparrows trapped are immature birds, many of them just off the nest, and nearly all of the repeats are of the same group. Nichols (1934a), who banded 450 of them, attributes the repeating behavior of these immature sparrows to a "lack of memory which causes them to repeat much more freely than adults." Returns, on the other hand, are usually adults, but these are few in number. The frequency of capturing English Sparrows is correlated with the nesting season and the time when fledglings leave the nest. The largest number of this bird banded by the writer each month of the year shows this pattern well:

January	1	July	88
February	5	August	114
March	2	September	14
April	2	October	18
May	33	November	13
June	85	December	1

Young birds just off the nest readily enter the traps, and seldom are able to find their way out. They repeat frequently, sometimes during the same day, and often repeat day after day. They do not fear the trap, do not seem to benefit from their experience, and are unable to cope with the situation when they become trapped. An easily available and abundant source of food will bring them back time and again regardless of their experience with the traps. One individual (39-162359, immature male) had the experience of escaping from the weighing bag at its fourth repeat on October 25, 1943, and, while trying to get away, struck the walls and window so hard that it fell to the floor stunned. It offered no resistance when picked up. The next day this bird was retaken in the same trap and repeated seven additional times within the following two weeks.

Immature birds are present from early spring to late fall. The extreme dates for fledglings taken in this study were April 10, 1942, and September 23, 1946. With age they become suspicious of the traps, hesitate to enter, often reaching inside the trap without actually going inside. Some learn to enter, pick up the food in the first compartment, face about immediately and leave through the entrance funnel. The older birds perch within sight of the traps, wait for an opportunity to dash over to the entrance, feed briefly,

and make a hasty retreat. In many instances a group will assemble on a perch near the trap. After a close scrutiny, one individual will fly to the trap, soon followed by the others. If one leaves suddenly, the others depart with alarm. When an occasional adult is captured, it struggles to find a way out. Often it succeeds in going back out through the openings in the funnels. This is observed particularly in the fall and winter seasons. If it does not escape, it is pugnacious toward the operator. As soon as the door of the trap is opened, an escape is sought. A sudden dash toward the door is often made. Others will watch for an opening and at the first opportunity will take advantage of it. This is especially true when more than one bird is in the trap, and while the operator is attempting to seize one, or is in the process of removing one, others will attempt an escape through an opening or by squeezing between the trap and the operator's arm. Brenkle (1936) made similar observations. He wrote that they, "avoid getting in the traps and quickly learn how to get out or find the first opportunity to dash out." When taken in hand, they struggle and bite fiercely. This is especially true of the males which seem most anxious to escape. The intelligence of the adults is probably one reason why this bird has been so successful in its survival.

The adults are very cautious. They perch near the station and watch for an opportunity to make a quick trip to the station and back again to the perch. They are also alert while feeding, always listening and looking around occasionally. They depart promptly at the slightest disturbance, even by the silent appearance of the operator at a window many yards away. On one occasion behaviour was observed that might be interpreted as an attempt to teach other birds a means of escape. Several birds were captured on July 8, 1944, and were excitedly moving about in the second compartment. An adult was observed to fly from the guard wall of the roof directly to the trap, run through the entrance, turn about and run out again to return to the wall. This was repeated several times, appearing as though it were trying to demonstrate to the trapped birds how they might get out. Hill, quoted by Barrows (1889), described a bird which repeatedly led others away from a net trap.

In winter time a fresh cover of snow will bring quantities of birds to the station where they feed about the traps, but are very cautious about penetrating too far within them. Sparrows were very seldom captured in the winter season. Once in a while, when the bait has been consumed outside of the trap, a sparrow will be seen to enter, pick up a grain quickly, turn about and leave through the entrance as described before. When the traps are completely snowed under, foot prints in the snow indicate an effort on the part of the sparrows to locate bait in the place at which they were accustomed to feed.

They were reluctant to feed under the drop-trap. They fed freely

outside of its bounds, and when the bait was exhausted there, single individuals stepped under the cover of the trap, picked up a piece of grain and left immediately. Occasionally a bold individual remained for a few minutes to feed, but stood erect and looked about after picking up each grain of food. The least disturbance frightened such birds away.

While the traps on the roof of a four story building, and in a backyard adjacent to a fence and brush pile were successful, no English Sparrows were captured or even attracted by traps set for an entire summer season in the following locations: under a group of closely-set pine trees; in the margin of a grove of black locusts, and in a second-growth thicket. They prefer an open station. They are hardy birds, and once captured they can remain in the traps for many hours without being harmed.

At the height of the nesting season, large numbers of sparrows will be found in the trap at one time, often at intervals of a few days. Many are obviously just off the nest. These peaks probably coincide with the fledging of various broods. The largest number taken at any one time was eleven, which occurred on July 9, 1943, on the roof of McGilvrey Hall. Numbers ranging up to and including seven were very common at both stations. The average number found together in one trap, when birds were captured on the roof in 1944, was 2.3. In 1945 the average number, whenever birds were in the trap, was 1.9. Compare these with the averages for 1941 and 1943 (Dexter 1942a, 1944a) which were 3.9 and 3.7 respectively. During this investigation, sparrows gradually ignored the traps in general. During 1945 and 1946 they practically stopped coming to the roof station; the bait remained untouched for days and sometimes for weeks. The number captured at the ground station in 1946 declined noticeably below that of the preceding year.

Birds taken in the traps with English Sparrows were as follows: Song Sparrow, White-throated Sparrow, Cardinal, Cowbird, Blue Jay, and Crested Flycatcher (immature). In addition, the following species were observed feeding at the stations with the English Sparrows, but were not captured with them: Rock Dove, Mourning Dove, Rusty Blackbird, Baltimore Oriole (immature), Starling, and White-breasted Nuthatch.

TABLE III.
REPEATS ON BANDED ENGLISH SPARROW—MAY, 1946.
(324 E. Erie St., Kent, Ohio)

Band No.	Sex	Dates of Capture
44-102672	Imm.	5-9; 5-13; 5-14; 5-15; 5-16; 5-17; 5-19.
44-102674	Imm.	5-9; 5-13; 5-16 (8 A.M. and 6:30 P.M.).
44-102675	Imm.	5-9; 5-11; 5-16; 5-22.
44-102677	Imm.	5-9; 5-12; 5-13; 5-14; 5-15; 5-16; (12:45 P.M. and 6:30 P.M.); 5-17.
44-102684	Imm.	5-13; 5-14; 5-15; 5-16 (12:45 P.M. and 6:30 P.M.); 5-17.

WEIGHTS AND SEX RATIO OF BANDED SPARROWS

In the fall of 1943 and throughout the year of 1944, the majority of the English Sparrows which were captured on the roof of McGilvrey Hall were weighed at the time of banding. The average weight of 71 immature birds was 23.8 grams. The minimum weight was 18.1 gms. while the maximum was 30.4 gms. From the records of those that were captured more than once, it becomes evident that their weights vary from day to day. Some lost while others gained. Those repeating in the traps several times showed daily fluctuations. Table number 1 records the weights of the 18 birds which repeated. Birds number 43-129719,—748, and—754 show these fluctuations well. Quiring and Bade (1943) reported the average body weight of adult English Sparrows studied by them to be $24.17+0.29$ gms, with the males being somewhat heavier than the females. This would indicate that the total weight of adults is on the average less than one-half a gram more than immature birds off the nest.

Nichols (1934b) found the males to be more numerous, except at times of nesting, among the adults of English Sparrow populations which he observed. In 1945 the writer banded 140 sparrows. Of these, 113 were immature, 16 were males, and 11 were females. While only 11 percent of the banded birds were adult males, 59 percent of the adults were males. This percentage, while based on a small sample, agrees with that of Nichols.

REPEATS AND LOCAL RECOVERIES OF BANDED SPARROWS

Data on repeats during the seasons 1941 and 1943 have been published earlier (Dexter 1942a, 1944a). These reports, the paper published by Nichols (1934a), and the present material given in tables 1-4 inclusive, show quite well the repeat pattern of the English Sparrow. Table number I lists the repeats taken on the roof of McGilvrey Hall during the summer of 1944. Table II gives the repeat data for the months of June and July, 1945, for the ground station, while table III does the same for May, 1946. Of the 668 English Sparrows banded in this study, 67 (10 percent) repeated one or more times. All but two of these were immature birds. There was a total of 147 repeats recorded. Thirty-nine birds were trapped twice (one repeat each), 15 trapped three times, three taken four and five times, two captured seven times and ten times, and one bird was taken eight times, nine times, and 13 times respectively. In addition, 21 birds were captured twice, one captured three times, and one four times during the same day. Bird number 43-129719 was captured 17 times in all.

The shortest interval between captures was one and one-quarter hours. Several birds were recaptured three to four hours after being

released. The average time between repeats was nine days. The greatest span between consecutive repeats was 151 days, from June 6 to November 4, 1945. Next in order were 120, 95, and 70 day intervals.

It was observed that 21 repeats, nearly one-third of the total, were taken for the first time when other sparrows with them were repeating. A total of 150 sparrows were banded which were taken originally with repeats, so that 14 percent of the newly caught birds having had contact with repeats later repeated themselves. This is 5 percent higher than the repeating percentage of those having no contact with repeats in the traps. It cannot be stated whether there was any communication involved in this case or not. If there had been communication, it lead to results contrary to those reported by Nichols (1930) who believed that trapped sparrows communicated to others in the locality, resulting in a failure to trap any more during the weeks following his initial banding.

TABLE IV.

LOCAL RECOVERIES OF BANDED ENGLISH SPARROWS		
37-114661	Imm.	7-9-43 (McGilvrey Hall); 7-29-43 (Found dead on roof of McGilvrey Hall).
43-129707	Imm. ♂	6-4-44 (McGilvrey Hall); 6-8-44 (Killed by a chipmunk on campus of K.S.U.).
44-203151	Imm.	5-19-45 (324 E. Erie St.); 6-6-45 (Found dead on campus of K.S.U.).
44-102654	♂	4-28-46 (Captured 10 miles south of Akron, banded and released at 324 E. Erie St., Kent); 4-30-46 (Found dead at 607 E. Main St., Kent).

Table IV reports four local recoveries of birds found dead in the vicinity of the stations within a short time after banding. These records, in one sense, may be regarded as repeats. However, they are not included with the others since those found dead did not actually enter the traps a second time and consequently did not exhibit "repeating behavior."

RETURNS OF BANDED SPARROWS

Seven birds, five males and two females, returned to the traps between seven and twelve months after banding. Four others were captured by boys in the vicinity of Kent. (See Table V.) All but two of these eleven were adult birds when banded. This agrees with the experience of Nichols (1934a) who also found that the adults return more often than the juveniles. One returned after seven months, one after eight months, one after nine, one after ten, two after eleven months (see Dexter 1942b for report on one of these) and one after nearly a year's interval. Of the two sparrows captured by boys, one was taken nine months and one nearly three and one half

years after banding. The small number of returns is without doubt explained by the small number of adults that were banded, and the trap-shyness of adults. Nichols (1934a) believed that adults remain in a very restricted area and a few will return to the traps, whereas the immature birds, which repeat more frequently, leave the home territory by the end of the year in which they hatch, and consequently are not usually taken as returns.

Two returned to the McGilvrey Hall roof station and two returned to the ground station. Three were banded on the roof but returned at the ground station the following year. One was recaptured in a milk house on a farm one mile south of McGilvrey Hall on which it was banded while another was shot three quarters of a mile east of the building. These were the most distant "recoveries" of the birds banded in this project, and because of the short distance they are regarded here as station returns. Weaver (1939a) released banded English Sparrows at various distances from the places of capture and banding, and got returns from distances of 5, 10, 20, and 30 miles. None of those released over 30 miles away returned.

The oldest return to date is a male which was banded on McGilvrey Hall and killed by a car on Morris Road a quarter of a mile away, nearly five years later.

TABLE V
RETURNS ON BANDED ENGLISH SPARROWS

Band No.	Sex	Dates and Sites of Capture
136169	♂	6-15-41 (McGilvrey Hall); 5-14-42 (Same)
41-134285	♀	7-21-41 (McGilvrey Hall); 4-42 (Flew into a milk house on a farm one mile south of Kent).
139-79410	♀	10-26-42 (McGilvrey Hall); 7-9-43 (Same)
43-129724	♀	6-16-44 (McGilvrey Hall); 6-3-45 (324 E. Erie Street)
43-129779	Imm. ♂	7-24-44 (McGilvrey Hall); 6-3-45 (324 E. Erie Street)
43-129822	♂	10-2-44 (McGilvrey Hall); 6-12-45 (324 E. Erie Street)
39-162394	♂	11-14-44 (324 E. Erie Street); 10-20-45 (Same)
43-129895	♂	7-11-45 (324 E. Erie Street); 2-24-46 (Same)
38-67428	Imm. ♀	8-3-43 (McGilvrey Hall); 1-23-47 (Shot $\frac{3}{4}$ mile west of McGilvrey Hall).
44-102621	♂	11-4-45 (324 E. Erie Street); 7-28-47 (Flew into University Service Station, E. Main St., opposite campus of K.S.U.)
37-114651	♂	7-11-43 (McGilvrey Hall); 5-14-48 (killed by car on Morris Road).

SUMMARY

1. English Sparrows were trapped during various seasons from 1941 to 1946 inclusive at two banding stations: (1) on the roof of McGilvrey Hall and (2) two blocks away at 324 E. Erie St., Kent, Ohio.

2. Adult sparrows were extremely trap-shy, although the newly fledged birds were easily captured in government sparrow traps. Trap-shyness and trapping behavior are discussed.

3. The present status of the English Sparrow is reviewed briefly and reasons are given for this banding study.

4. The average weight of 71 immature sparrows was 23.8 grams, slightly less than average weight for adults. The weight of immature birds fluctuates from day to day.

5. Males were somewhat more numerous than females among the adult birds.

6. A total of 668 sparrows, the vast majority of them immature, were banded.

7. Sixty-seven (10 percent of the total) repeated in the traps one or more times, with a total of 147 repeats. All but two were immature. These immature birds had no fear of the traps for the first several months after leaving the nest, but by fall they became trap-shy.

8. Most of the repeating took place soon after banding, often within a day or two. The average interval was nine days. A few repeats did not occur until several weeks or months after banding.

9. Fourteen percent of the birds which were first captured with other sparrows that were repeating, themselves repeated at a later date. This is five percent higher than the percentage of birds repeating without previous contact in the traps with another repeater.

10. Four local recoveries were made. These were birds which died shortly after banding and may be regarded as repeats.

11. Seven birds, all adults but one when banded, returned from seven months to one year later, while four others were captured locally by boys and are regarded as returns.

12. The most distant "recovery" of any bird in this study was one mile, and the oldest "recovery" was nearly five years after banding.

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GENERAL NOTES

Arctic Tern banded in Greenland, recovered in Ontario.—On July 4, 1948 I collected an immature female Arctic Tern (*Sterna paradisaea* Pontoppidan) on the west coast of James Bay, about 25 miles south of Cape Henrietta Maria, Ontario. It carried a band inscribed "762245, Zoolog. Museum, Denmark". Dr. Finn Salomonsen Curator of Birds at the Zoological Museum of the University of Copenhagen has supplied the following data: The bird was banded as a nestling on July 22, 1947 at Grønne Ojland, Disko Bay, West Greenland at about 69° north latitude. The bird was not in breeding condition when collected but was frequenting a small nesting colony and joined in the diving attacks on me by the breeding birds.—T. M. Shortt, Royal Ontario Museum of Zoology, Toronto, Ontario.

Junco Family's Interrelations Reveal Further Complications.—Close by our isolated cabin in Millbridge, Maine, during the summer of 1946, male *Junco hyemalis hyemalis* (Linn.) 44-53134 and his mate, female 44-53135, raised an adequate family which included juveniles 44-53154 and 44-53156. The subsequent mating of father and daughter (44-53134 and 44-53154) during the summer of 1947 was reported as a General Note on page 22 of *Bird-Banding* for January, 1948, Vol. XIX, No. 1. We were at our cabin again during the summer of 1948 and female 44-53154 was there also. This time, however, her father-husband was not with her. She was accompanied, instead, by her brother, male 44-53156. Although no nest was discovered the behavior of these two juncos was consistently that of a mated pair and by mid-July they were frequently observed feeding a single youngster.—G. Hapgood Parks, 99 Warrenton Avenue, Hartford, Conn.