THE AUK

A QUARTERLY JOURNAL OF

ORNITHOLOGY

VOL. 69 JULY, 1952 NO. 3

DISPERSAL, BREEDING BEHAVIOR, AND LONGEVITY OF BANDED BARN OWLS IN NORTH AMERICA

BY PAUL A. STEWART

INTRODUCTION

RECOVERIES of banded Barn Owls, *Tyto alba pratincola*, indicate that vast displacement sometimes occurs among certain segments of the population in spite of the fact that the Barn Owl is usually considered a permanent resident species wherever it nests. Banded Barn Owls have traveled from Ohio to Florida, Louisiana, Arkansas, Alabama, Georgia, North Carolina, Virginia, and Ontario; from Pennsylvania to Arkansas and Georgia; from Maryland to New York; from New Jersey to North Carolina and South Carolina; from Illinois to South Dakota and Mississippi; from Massachusetts to Maryland; from Wisconsin to Arkansas; from Nebraska to Texas; and from the northern half of California to its southern tip. This geographic displacement of Barn Owls is frequently mentioned in the literature, but there are only fragmentary references to its implications. There are also neglected facts on breeding behavior and longevity hidden among the banding data. The recovery records of banded Barn Owls are clearly deserving of a more searching analysis than has yet been attempted, and this is the purpose of the present paper.

It is at once apparent that the data pertinent to specific problems cannot be sufficiently extensive in each case to support adequately all deductions to be made, and any hypothesis which is suggested will be offered with the realization that convincing support must await the accumulation of many more data. Certainly, final conclusions are not possible without vastly more data than are available. Conclusions presented in the following pages are necessarily tentative, and some may not stand the test of time.

ACKNOWLEDGMENTS

I am grateful to Seth H. Low, of the U. S. Fish and Wildlife Service, for placing at my disposal all of the recovery records of Barn Owls

banded in the United States. I am also grateful to Chandler S. Robbins, of the U. S. Fish and Wildlife Service, for giving me access to the manuscript of the forthcoming edition of the American Ornithologists' Union check-list and to the bird distribution files of the U. S. Fish and Wildlife Service. The persons responsible for marking these birds and for reporting their recovery to the Fish and Wildlife Service have performed a service essential to this study, but space does not permit mention of their names.

CORRECTION

Seth H. Low has asked me to record a correction pertaining to the place of recovery of Barn Owl, 38–644785, which was erroneously reported by M. T. Cooke (1941:159). This bird was reported to have been taken at Mills Island, Ontario. The correct place of recovery is Girdle Tree, Maryland.

DATA AVAILABLE

Because of its large size and close association with human dwellings, and because it has the misfortune to be considered a pest by misinformed persons, the Barn Owl is very productive of returns of banded birds. I have received returns on 27.6 per cent of the 76 birds banded at Leetonia, Ohio, and 14.7 per cent of all Barn Owls banded in the United States have been recovered. No Barn Owls have been banded since 1945 at Leetonia, and it can perhaps be assumed that a high percentage of the total returns is now in for that station. The overall percentage in the United States could be expected to increase through successive years and should reach its peak in approximately 12 years, if no new birds are banded in the meantime.

Up to March 20, 1950, a total of 2298 Barn Owls had been reported banded with U. S. Fish and Wildlife Service (formerly U. S. Biological Survey) bands. Of this total, 336 individuals had yielded 340 returns. The age was not given for nine of these birds; 87 were considered to be adult when banded; and 240 were nestlings. Most of these birds were banded in California (37.5%) and Ohio (20.2%), but some were banded in each of 21 states (Table 1).

It should be pointed out that the ages used in this paper are based on the time between the original banding and the recovery dates. About one month should be added to the ages of those banded as nestlings if the actual ages of the birds are desired.

Birds recovered within 10 miles of their banding localities are arbitrarily assumed to have been taken at the same places they were banded. As a matter of fact, a high degree of exactness in spotting

TABLE 1

LOCATION OF BANDING OF 336 BARN OWLS WHICH WERE LATER RECOVERED

State	*Number nestlings*	*Number adults*	*No age given*	*Total*
Alabama	—	1	—	1
California	75	48	3	126
Delaware	4	1	—	5
Florida	1	—	—	1
Illinois	7	5	—	12
Indiana	5	3	—	8
Kansas	3	2	1	6
Maryland	1	3	—	4
Massachusetts	16	1	—	17
Michigan	6	4	2	12
Missouri	—	1	—	1
Nebraska	1	1	—	2
New Jersey	17	3	1	21
New York	10	1	—	11
Ohio	64	4	—	68
Oklahoma	3	4	—	7
Pennsylvania	20	3	—	23
South Dakota	—	1	—	1
Tennessee	5	—	2	7
Texas	1	1	—	2
Wisconsin	1	—	—	1
Total	240	87	9	336

the various localities of recovery is impossible, for it sometimes happens that a bird is reported from the finder's address rather than from the spot where the bird was found. This factor may introduce some error into the data, but it is not believed to affect the conclusions to a significant degree. Likewise, the dates for recovery are not entirely dependable, and there are cases where the birds were found after being dead an indefinite period of time. In a few cases no exact dates are available, and only month or season is given. In such cases the first day of the indicated period is used.

DISPERSAL OF BARN OWLS FROM HATCHING PLACES

Two hundred and forty Barn Owls, banded as nestlings, were later recovered. The places of recovery of four could not be located. Of the remaining 236, there were 155 birds (65.7%) taken within 50 miles of their hatching places and 81 (34.3%) at points 51 or more miles distant (Fig. 1). Many of these birds which failed to travel were killed near their hatching places before they had opportunity to travel. Some displacement of young occurs soon after they are out of the nest, but it reaches its peak when the young are eight months of age (Table

2). It can certainly be assumed that a Barn Owl killed near its hatching place before it is six months of age has not had full opportunity to travel. After eliminating the 64 birds which were taken near their hatching places before they were six months of age, there were still 52.9 per cent of the young owls recovered within 50 miles of their hatching places. In the absence of evidence to the contrary, it

TABLE 2

AGE OF BARN OWLS RECOVERED DURING THEIR FIRST YEAR MORE THAN FIFTY MILES FROM THEIR HATCHING PLACE

Age in months	*Number of birds*	*Age in months*	*Number of birds*
1	3	7	5
2	4	8	10
3	6	9	2
4	7	10	2
5	8	11	4
6	3	12	0

must be assumed that all birds recovered near their hatching places have been continuously present there. This is by no means certain, but it is reasonably certain that some birds remain to nest in the general locality of their hatching places. The remaining 47.1 per cent were recovered at a distance of more than 50 miles from their places of nativity.

There is a striking difference between the degrees of displacement occurring among birds banded in the northern and in the southern parts of the present range of the Barn Owl. If 35° N is chosen as a line to divide northern and southern birds, all southern birds are relatively sedentary (Table 3). No southern birds have been recovered more than 90 miles from their hatching places and only eight, or about 11.9 per cent, of the 67 recoveries were of birds which traveled as much as 50 miles. Of the 119 northern birds which lived to be six months of age or traveled before six months—38.7 per cent were taken within 50 miles of their hatching places, and 61.3 per cent were taken at distances of more than 50 miles; 56.3 per cent were recovered within 100 miles of their hatching places, and 43.7 per cent were recovered more than 100 miles distant; 72.3 per cent were taken within 200 miles, and 27.7 per cent more than 200 miles from the places of nativity.

Unfortunately, there are few recovery records for Barn Owls banded in the southern part of the eastern United States and the northern part of the western United States; this makes it uncertain whether the difference in the dispersal pattern is between north and south or east and west. Of 13 recovery records of birds banded north of the

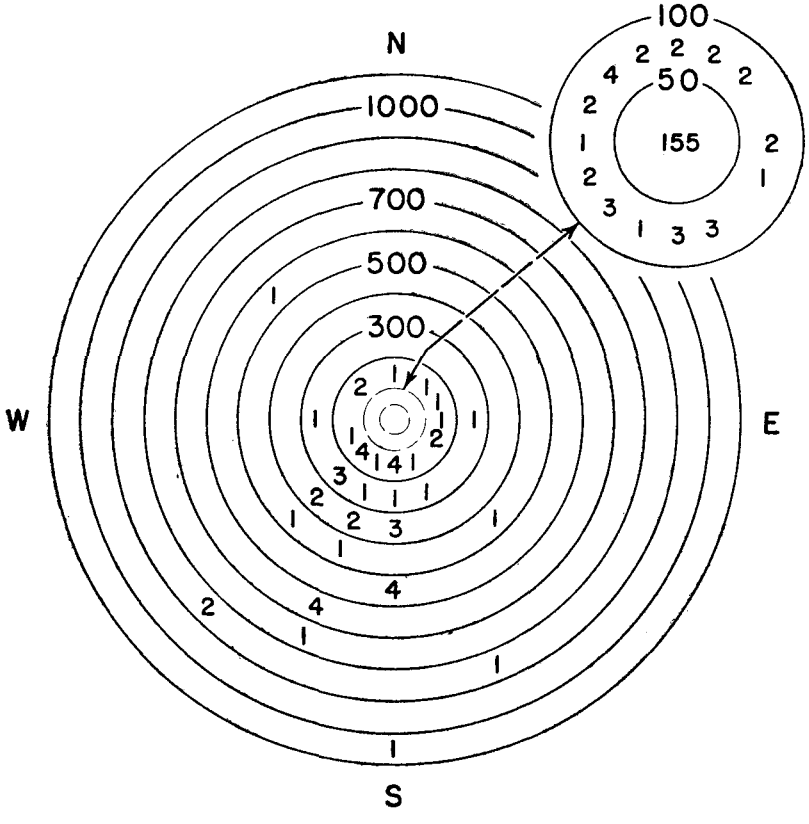

FIGURE 1.—Dispersal of Banded Barn Owls in Relation to Their Hatching Places. Distance of movement in terms of miles is indicated by the concentric circles. The number of birds moving any given general direction is indicated by the numbers between the circles.

35° parallel in California, two were of birds which traveled more than 100 miles southward. One of these made a notable flight of 475 miles and was recovered at the southern tip of California. It would seem that Barn Owls in northern California have a dispersal pattern similar to those in the northern part of the eastern United States. It may be that the sedentary pattern of southern birds extends somewhat farther north along the Pacific Coast than in the eastern part of the range.

The sedentary pattern shown by Barn Owls in southern California cannot be definitely assigned to birds in southeastern United States, as there are too few records from the latter area to support such a conclusion. On the basis of the records from southern California and

TABLE 3

DISTANCE OF RECOVERY FROM HATCHING PLACES OF BARN OWLS

Miles traveled	*Number birds* *northern*	*southern*	*Miles traveled*	*Number birds* *northern*	*southern*
0–50	96	59	501–600	5	—
51–100	21	8	601–700	4	—
101–200	19	—	701–800	1	—
201–300	9	—	801–900	3	—
301–400	7	—	901–1000	—	—
401–500	3	—	1001–1100	1	—
			TOTAL	169	67

the few records from southeastern and south-central United States, a sedentary pattern of behavior is suggested for all Barn Owls native to the area south of 35° N.

All significant displacement of Barn Owls involves northern birds. The majority of the northern birds which traveled more than 50 miles from their hatching places went in a general southward direction, but movement was by no means confined to that direction. Of the 54 birds which traveled more than 50 miles during their first year, 63.0 per cent went in a southerly direction. Of the remaining 37.0 per cent, some of the birds traveled in each of the other main compass directions. In Europe, Schneider (1937:161) also reported the dispersal of young Barn Owls, *Tyto alba guttata*, in all directions from their hatching places. Progressing northward from 35° N, our banded birds show a diminishing tendency for dispersal to be restricted to a southward direction (Fig. 2). At the northern periphery of the range of the Barn Owl, which is considered to include northern Ohio, there is little concentration of southward flying birds. This habit of northward dispersal may have been a very effective mechanism for extending the range of the Barn Owl. The literature gives abundant evidence of the fact that the range of the Barn Owl has been extended northward in comparatively recent years.

Wheaton (1879: 406) reported that the first positive Ohio record was made about 1861. Dawson (1903:372) considered the Barn Owl common in the Scioto River Valley, but it was accorded that status nowhere else in Ohio. However, its occurrence had been recorded at various points in Ohio, and it had reached the southern shore of Lake Erie. The Barn Owl now breeds north to southern British Columbia, North Dakota, southern Michigan, southern Ontario, and Massachusetts. It ranges north casually to southern Saskatchewan, southern Manitoba, eastern Ontario, northern Vermont, and southern Maine (from manuscript of forthcoming edition of A.O.U. check-list).

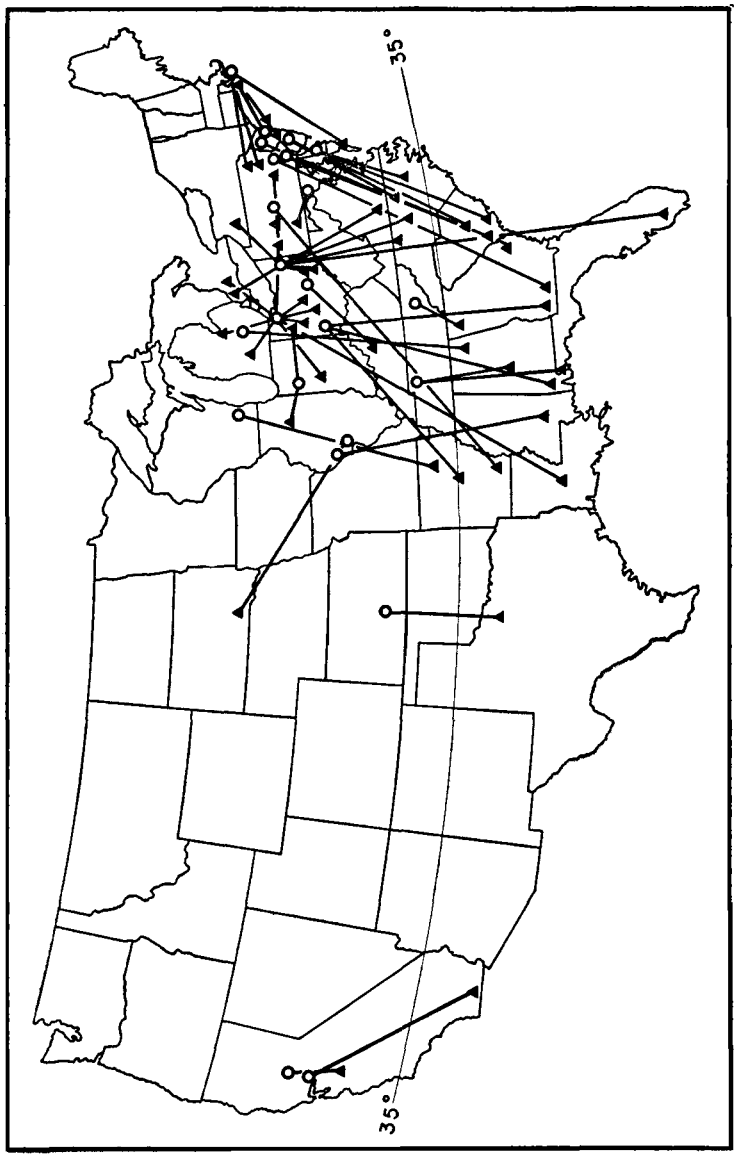

FIGURE 2.—Geographic Displacement of Barn Owls Banded as Nestlings and Recovered 100 Miles or More from Their Hatching Places. Places of banding are indicated by circles, and places of recovery are indicated by triangles.

There is a distinct probability that the non-sedentary pattern of behavior shown by northern Barn Owls may be associated with the newer portion of the bird's North American range. However, it is not restricted to the new part of the range as it is now known.

The Barn Owl is a bird of the open country, rather than a woodland species, and removal of the forest doubtless played a part in its northward spread. Temperature and food supply also have a marked inhibitory effect on the northward distribution of this bird. Errington (1931:60) and Speirs (1940:571) have published records of Barn Owls which died in the north, either because of intense cold or lack of accessible food or both. The birds reported by Errington and Speirs failed to migrate southward but remained in the north in the midst of adverse weather they were unable to withstand. This, as well as the fact that much southward movement of the Barn Owl occurs in the late summer, suggests that southward movement is not related to adverse winter weather or to food shortages. On the other hand, an unusual abundance of food sometimes induces high concentrations of these birds in restricted areas. From southern California, Gallup (1949:150) reported having "seen as many as 30 birds on the beach at night feeding on grunion when these were running."

There is a marked displacement of northern Barn Owls during an early stage of life, and at this period there is flight in all directions (Table 4). Some birds, in addition to those listed in Table 4, were recovered in subsequent years more than 50 miles from their hatching places, but it cannot be known when the flights were made. The high percentage recovered at notable distances from their hatching places during the first year suggests that there may be more dispersal at this stage of life, but this may not be a valid conclusion as other factors are involved. Such a conspicuous bird as the Barn Owl must be relatively more susceptible to capture when it first arrives in a new area than after it has had opportunity to adjust to local conditions. The annual yield of returns is also reduced in successive years by the fact that there are fewer banded birds alive to produce returns.

Fall migration of the Barn Owl is not a new idea, for it is implied in the early literature. A. K. Fisher (1893:133) stated "it migrates more or less in the northern part of its range, and there is an appreciable increase in the number of individuals to the southward during the fall months."

Stone (1937:624) reported: "The Barn Owl is a regular autumn transient in the pine woods at Cape May Point [New Jersey] occurring most frequently during October; some remain through the winter and a few doubtless nest in the vicinity. Usually we see only a single bird

but, as they are very secretive during the day, others may often be present that we do not discover. Our dates of occurrence run from October 11 to November 11 during the years 1923 to 1931. These were merely the result of scattered trips covering only single days, but in 1925, William Rusling, who was present throughout the autumn until early November watching the hawk flight, counted twenty-six Barn Owls, some of which of course may have been duplications and on some occasions he saw as many as five or six in the course of a day, which probably gives a fair idea of their maximum abundance. He saw none until September 16 and his last record was November 3. He tells me that they roosted quietly in the pine groves during the day and flew over the houses at night uttering their harsh whistling gasp *eeeeee séeek.*"

TABLE 4

DIRECTION OF MOVEMENT OF BARN OWLS WHICH TRAVELED MORE THAN 50 MILES DURING THEIR FIRST YEAR

Direction of flight	*Number birds*	*Direction of flight*	*Number birds*
North	3	South	11
North-Northeast	3	South-Southwest	9
Northeast	2	Southwest	9
East-Northeast	1	West-Southwest	1
East	3	West	3
East-Southeast	2	West-Northwest	2
Southeast	1	Northwest	2
South-Southeast	1	North-Northwest	1

Banding records show that Barn Owls have made many notable flights of over 500 miles southward during the fall. The longest of these was 1075 miles or from Leetonia, Ohio, to Naples, Florida. This flight was made by a bird banded on May 22, 1933, and "probably killed" on January 30, 1934. The pattern of movement is shown on an accompanying map (Fig. 2) for all young Barn Owls which were recovered more than 100 miles from their hatching places.

Birds in their first year have been taken more than 50 miles in a general southward direction from their hatching places during every month except July and August (Table 5). It is significant that when the minimum distance is increased to 100 miles the southern returns for the summer months decrease, and when the minimum distance is further increased to 200 miles the southern returns are eliminated from June through August. No banded birds have ever been taken more than 200 miles south of their hatching places during the summer months, and 27 have been recovered more than 200 miles south from their places of nativity at other seasons. The possibility that these birds return north in the spring is strongly indicated.

Stone (1937:626) hinted at a possible spring migration: "I have no spring Barn Owl records . . . that would indicate a northward migration but Julian Potter heard one flying overhead and uttering its characteristic screech on March 21, 1926, at Collingswood, Camden County [New Jersey], and at about the same time John Gillespie flushed one from near the ground at Glenolden, Pa., which evidently had no permanent retreat so that it appeared as if a migration might be under way."

TABLE 5

MONTHS DURING WHICH YOUNG BARN OWLS WERE RECOVERED DURING THEIR FIRST YEAR AND MORE THAN 50 MILES IN A SOUTHWARD DIRECTION FROM THEIR HATCHING PLACES

Month	*51–100 Miles*	*101–200 Miles*	*201 or more miles*
January	5	5	4
February	8	8	5
March	2	2	2
April	2	1	1
May	2	2	1
June	3	2	–
September	2	1	1
October	2	2	2
November	8	6	6
December	6	5	5

This is the only published evidence which I am able to find for northward migration of the Barn Owl. In addition to the evidence furnished by birds banded as nestlings, the adults give similar support to the proposition of northward migration. This will be further considered in a subsequent section, and it suffices to say here that young are believed to return northward to nest somewhere within 200 miles of their hatching places. With the single exception of the Illinois bird which was recovered in South Dakota, this conclusion is valid for all of the birds which were taken during the summer months.

In Europe, Schneider (1937:161) has suggested that young Barn Owls, *Tyto alba guttata*, settle down to nest after dispersal has taken place, and that there is no hint of a return flight. Two of his birds, which had been banded as nestlings, were later recovered on their breeding grounds 60 and 75 miles north and southwest, respectively, from their hatching places. Schneider reported no evidence for breeding of Barn Owls recovered at greater distances from their hatching places. Both the hatching places and the breeding places are definitely established for two American Barn Owls. One of these was a female which was banded at Horsham, Pennsylvania, and nested 60 miles east at Staten Island, New York. The second was

banded as a nestling at Chilmark, Massachusetts, and was found nesting 140 miles southwest, at Hunts Point, New York, the second and third years following the banding date. This also was a female, and it was known to remain at the New York location for three broods of young during two successive years.

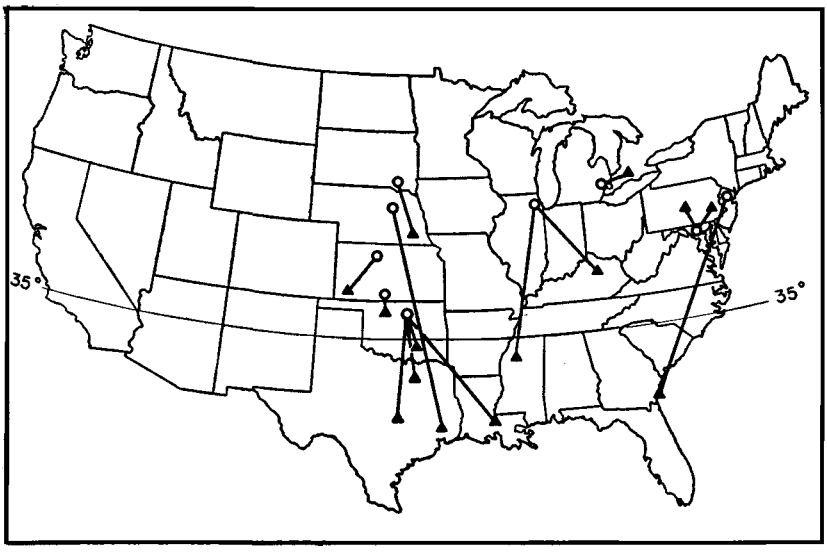

FIGURE 3.—Geographic Displacement of Barn Owls Banded as Adults and Recovered 100 Miles or More from Their Banding Places. Places of banding are indicated by circles, and places of recovery are indicated by triangles.

GEOGRAPHIC DISPLACEMENT OF ADULTS

A total of 87 Barn Owls, considered to be adults when banded, were later recovered. The recovery places of four could not be located. Of the remaining 83, there were 64 birds (77.1%) taken within 50 miles of the places of banding and 19 (22.9%) which had traveled more than 50 miles. Of those which were taken within 50 miles of the places of banding, 20 had been killed within two months from the time of banding and scarcely had an opportunity to travel. Of the 14 which had traveled more than 100 miles, 78.6 per cent were taken in a general southward direction from the banding places (Fig. 3).

When the northern banded adults are segregated (Table 6), the case for displacement of adults becomes far more impressive. Of the 33 northern adults which were known to be alive 10 days after banding, 51.5 per cent traveled more than 50 miles from the banding place. It would seem that northern adults travel about the same extent as

do young birds. However, additional recoveries of northern adults are desirable to support adequately this conclusion.

An important weakness in this conclusion involves the difficulty in making accurate identification of the age of Barn Owls during their first six months out of the nest. According to Bent (1938:144), ". . . the first winter plumage is acquired at a very early age and is nearly complete when the bird leaves the nest . . . Most authorities state the first winter plumage, which is the first real plumage, is like that of the adult . . ." It is conceivable that all of the banded adults

TABLE 6

DISTANCE OF RECOVERY FROM BANDING PLACE OF ADULT BARN OWLS

Miles traveled	*Number birds* northern	southern	*Miles traveled*	*Number birds* northern	southern
0–50	22	43	401–500	1	—
51–100	3	2	501–600	1	—
101–200	6	—	601–700	0	—
201–300	3	—	701–800	1	—
301–400	1	—	801–900	1	—
			TOTAL	39	45

which later traveled were actually young birds in their first six months. In view of this possibility, Schneider (1937:167) assumed that all of his adult banded European Barn Owls which later traveled a significant distance from their banding localities were actually young birds. Our data definitely forestall a similar procedure, as the percentage of adults (22.9%) to travel more than 50 miles from the places of banding is not sufficiently lower than the percentage of nestlings (34.3%) to do the same. It must be borne in mind that non-selective banding during the critical period would also include the sedentary segment of the young bird population. Consequently, it would be necessary that almost all of the birds banded as adults should actually be young birds only recently out of the nest.

As with birds banded as nestlings, no adult Barn Owls have been taken during the summer months more than 200 miles in any southerly direction from the locality of banding (Table 7). Therefore, seven nestlings banded in the north and recovered more than 200 miles southward sometime after their first year must have gone south as adults. It seems practically certain that adult birds migrate to nearly the same extent as do young birds.

Three birds banded as adults give some definite clue as to the time and speed of southward migration. The records of these birds are given in an accompanying table (Table 8). These birds were obviously in movement at the time of banding or started promptly afterward.

TABLE 7

MONTHS OF CAPTURE, MORE THAN 50 MILES SOUTHWARD FROM BANDING LOCALITY, OF BIRDS BANDED AS ADULTS OR NESTLINGS AND RECOVERED MORE THAN A YEAR LATER

Month	*51–100 miles*	*101–200 miles*	*201 or more miles*
January	3	2	2
February	4	4	3
March	2	2	1
April	3	2	1
May	3	—	—
June	1	1	—
July	4	4	—
September	1	—	—
October	3	3	2
November	6	6	4
December	3	3	2

The average speed of movement was 17.5 miles per day for the three birds, and the maximum speed shown by a single bird was 26.1 miles per day for 23 days.

The banding data give evidence of northward as well as southward movement of northern Barn Owls. Likewise, there is good indication of the general period in which these movements occur. All Barn Owls have returned northward to within 200 miles of their hatching places by the first of April. There seems to be some continued northward movement within the 200-mile zone through April, and the last of the northward movement may not be complete until mid-April

TABLE 8

SELECTED SAMPLES SHOWING SOUTHWARD MIGRATION OF ADULT BARN OWLS

Band number	*Banding place*	*Banding date*	*Recovery place*	*Recovery date*	*Miles traveled*	*Days elapsed*	*Average miles per day*
36–607607	Stockton, Kan.	Sept. 30, 1936	Elkhart, Kan.	Oct. 15, 1936	225	15	15
36–715920	Blue Island, Ill.	Nov. 27, 1938	Shaw, Miss.	Dec. 20, 1938	600	23	26.1
39–671810	Stillwater Okla.	Dec. 9, 1939	Van Alestyne, Tex	Jan. 1, 1939	225	22	10.2

or early May (Table 7). The southward movement may be made rather rapidly by individual birds, but the period of fall movement for the species probably covers the period through August to December or January.

There is a single record of a bird which was evidently enroute northward when it was banded. This bird was banded at Laurel, Maryland, on April 8, 1947, and recovered 125 miles north-northwest

at Bellefonte, Pennsylvania, on May 14 of the same year. The dates strongly suggest spring migration. The possibility exists, of course, that this may have been a case of post-natal wandering by a young bird only recently out of the nest.

BREEDING BEHAVIOR OF BANDED BARN OWLS

Wallace (1948:16) noted that "There are cases of downy young for every month of the year," and the literature contains other references to the lack of confinement of breeding activities of Barn Owls to any

TABLE 9

MONTHS IN WHICH NESTLING BARN OWLS WERE BANDED

Month	*Number of Birds Banded*		
	southern	*northern*	*Total*
January	1	1	2
February	—	—	—
March	3	1	4
April	38	2	40
May	13	32	45
June	14	71	85
July	—	29	29
August	—	5	5
September	—	8	8
October	—	8	8
November	—	7	7
December	—	3	3

given season. Likewise, the records for banding of nestlings are distributed through every month of the year except February (Table 9). However, there are relatively more nestlings banded during the period, April to July. Allowing three weeks for incubation and one month for the birds to reach the age for banding, maximum egg laying probably occurs during March, April, May, and June. Within this period there is a marked peak in June for the banding of nestling owls. The peak of egg laying which produced these birds must occur in April or early May.

In view of the possibility that banders may have been more active during the period of April through July, several of the more active Barn Owl banders were questioned on this point. In each case they reported having checked their nesting sites at different periods during the year. In my own case, two Barn Owl nesting sites were regularly checked in connection with annual Christmas bird counts. Irregular checks were also made through the summer months in connection with a Barn Swallow banding program.

Again it proves desirable to segregate those Barn Owls which were banded in the southern United States (Table 9) since a different pattern of breeding behavior is shown there. A well-defined breeding season is indicated, and all except one of the southern young were banded during March, April, May, and June, with the maximum number being banded during April. The single southern bird banded in January as a nestling was banded in Texas, and the possibility is suggested that southern birds to the eastward do not share the pattern of California birds in restricting nesting activities to the spring months.

Bendire (1895:180) reported two instances of winter nesting of Barn Owls at Washington, D. C.; Williams (1902:198) recorded a December nesting in Florida; and Wayne (1908:21) noted a November nesting in South Carolina. Other records of winter nesting are reported by Goetz (1932:221) for Ohio, by Poole (1930:84) for Pennsylvania and by W. I. Fisher (1947:472) for Illinois. It seems fairly certain that southern California is the only locality in the United States where the breeding of Barn Owls is uniformly confined to the spring months. Gallup (pers. corresp., 1950) pointed out that the nesting period in southern California is closely associated with the rainy season.

Nestling northern Barn Owls have been banded during every month except February, but the species does show a well-defined spring nesting period which is indicated in our data by the banding of larger numbers of nestling birds during May, June, and July. Within this period, a higher peak is shown during the month of June. The banding records suggest that there is a less definite nesting period during September, October, and November. It should be kept in mind that all of these dates must be adjusted backward six to seven weeks, if the comparable egg-laying period is to be determined.

In discussing the second nesting of Barn Owls, Wallace (1948:20) stated that ". . . they often appear to raise a second brood, though what appears to be a second brood could conceivably be merely a reoccupation of a favored nesting site by a new pair after it has been vacated by the first." We have at least one banding record in which this possibility is precluded. This was a female taken from a nest with five young at Hunts Point, New York, on July 27, 1939, and captured four months and eight days later (December 5, 1939) from a nest with three young at the same place.

There is the possibility that continuous nesting of Barn Owls may be associated with the population of prey species. Guerin (1928) in France and Schneider (1937:161) in Germany showed that there is a close relationship between the mouse population and the nesting ac-

tivities of European Barn Owls. Wallace (1948:17) stated: "An alternative explanation, rapidly gaining favor with further study of population cycles, is that the owls may breed more or less continuously during the periods of abundant *Microtus* prey (for about 2 years), and then slow down or cease nesting during periods of rodent scarcity (roughly, for another 2 years)." There needs to be more investigation along this line in the United States.

The Barn Owl is supplied with several attributes, each of which contributes to a high biotic potential. In addition to its ability to raise 2 broods of young per year, which is an unusual feat for a predator, it commonly lays a large clutch, from 5 to 11 eggs. Furthermore, it may be able to breed at a very early age, for a nesting female was captured only 10 months and 9 days after it had been banded as a nestling. Schneider (1937:166) reported two cases of European Barn Owls nesting at a comparable age. These were found nesting 9.0 and 9.5 months, respectively, after being banded as nestlings.

LONGEVITY

Banding is potentially a perfect method for obtaining information on the life span of wild birds. Actually, the method contains minor flaws which forestall absolute perfection. Birds are sometimes found after having been dead for an indefinite period of time; then the dates recorded are not the dates of actual death. Also, the finder of the bird has sometimes given only the month or season, and in such cases the first day of the indicated period has been used. All birds have been considered dead at the time of capture unless their release is definitely recorded. In the final analysis, it is believed that factors on one side very nearly counterbalance the effect of opposing factors. At any rate, the average ages given are based on the known ages at the time of recovery, except in the instances of those birds which were definitely known to have been released and those which were known to have been dead a relatively long time before they were found. These few are eliminated from the average.

The average age of 220 Barn Owls banded as nestlings and later recovered dead is 1 year, 5 months, and 25 days. Of these, 5.4 per cent were recovered within the first month after banding, and 65.2 per cent were recovered within the first year (Table 10). The oldest bird reported by Schneider (1937:169) was between eight and nine years of age. In the United States, the oldest banded Barn Owl lived to be at least 11 years, 6 months, and 4 days of age. It was banded as a nestling at Escondido, California, on April 24, 1935, and was captured

near by on October 28, 1946. This bird was kept alive by the finder until it died, which evidently was rather soon.

There is an impressive difference between the average life span of northern and of southern birds. Seventy southern birds had an average life span of 2 years, 2 months, and 26 days; and 150 northern birds had an average life span of 1 year, 1 month, and 4 days. The

TABLE 10

LONGEVITY OF BARN OWLS

Life span in years	*Percent of birds recovered*
0–1	65.2
1–2	15.0
2–3	7.3
3–4	3.4
4–5	3.0
5–6	0.8
6–7	0.4
7–8	2.1
8–9	1.2
9–10	0.4
10–11	0.4
11–12	0.4

cause for this marked difference is not clearly indicated by the banding data. Adverse winter weather is known to be a factor in the mortality of Barn Owls in the northern part of their range, as frozen or starved birds are sometimes found. Analysis of the records of 71 northern Barn Owls and 56 southern birds which were reported "found dead" does not disclose significant clustering in the winter months for the northern birds. Also there is no significant difference in seasonal distribution for the records of birds found dead in the two areas.

The above results may indicate too few data. It is probable, too, that the banding records contain many inaccuracies in the item pertaining to the method of capture. Persons may sometimes be uncertain about the legal status of the Barn Owl, and in such cases the most logical thing is to report as found dead a bird which was shot. Because of the inability to make any significant deductions from this item, that part of the record involving the method of capture has been, for the most part, omitted from this analysis.

SUMMARY

1. Before March 20, 1950, a total of 2298 Barn Owls had been banded in the United States; 14.7 per cent had been recovered.

2. Two hundred and forty Barn Owls banded as nestlings were later recovered. Of the 236 birds for which the places of recovery were

determined, 65.7 per cent were taken within 50 miles of the hatching places, and 34.3 per cent were taken more than 50 miles distant. The longest distance traveled by any of these birds banded as nestlings was 1075 miles.

3. Eighty-seven Barn Owls banded as adults were later recovered. Of the 83 birds for which the places of recovery were determined, 77.1 per cent were taken within 50 miles of their banding places and 22.9 per cent had traveled more than 50 miles. The longest distance traveled by any of the birds banded as adults was 850 miles.

4. Dispersal of part of the northern banded Barn Owl population took place in all directions during the first year out of the nest, but 63 per cent of the 54 birds that moved went in a southerly direction.

5. Of the 14 adults which traveled more than 100 miles from the place of banding, 78.6 per cent went in a southerly direction.

6. Banded Barn Owls native to the northern part of their North American range were partly migratory; those native to the southern part were relatively sedentary.

7. The absence of northern banded Barn Owls in the south during the summer suggests a return to the north for that season.

8. A study of the banding records suggests that southward migration occurs chiefly through the period August to December, and that northward migration occurs during March and April.

9. An average southward migration speed of 17.5 miles per day was shown by three birds. One averaged 26.1 miles per day for 13 days.

10. The banding data and published records indicate that northern and eastern Barn Owls breed during every month of the year, but chiefly during May, June, and July with the peak occurring in June. Barn Owls in southern California breed only during March, April, May, and June, with the peak occurring in April. All of the months given represent the time of banding and should be adjusted backward about six or seven weeks, if the dates of egg laying are desired.

11. Banding data indicate that Barn Owls nest somewhere within 200 miles in any direction from their hatching places.

12. Barn Owls sometimes rear two broods of young per year.

13. One Barn Owl in the United States has been known to nest ten months and nine days after being banded as a nestling.

14. The average life-span of 220 Barn Owls banded as nestlings is 1 year, 5 months, and 25 days. Of these, 1 bird lived to be at least 11 years, 6 months, and 4 days of age.

15. The average life span of 70 southern Barn Owls is 2 years, 2 months, and 26 days; the average life span of 150 northern birds is 1 year, 1 month, and 4 days.

LITERATURE CITED

BENDIRE, C. E. 1895. The American Barn Owl breeding at Washington, D. C. in winter. Auk, 12: 180–181.

BENT, A. C. 1938. Life histories of North American birds of prey. Part II. U. S. Natl. Mus. Bull. 170: 1–482.

COOKE, M. T. 1941. Returns of banded birds: Recoveries of some banded birds of prey. Bird-Banding, 12: 150–160.

DAWSON, W. L. 1903. The birds of Ohio. Part II. (Wheaton Publ. Co., Columbus, Ohio), pp. 1–671.

ERRINGTON, P. L. 1931. Winter-killing of Barn Owls in Wisconsin. Wilson Bull., 43: 60.

FISHER, A. K. 1893. The hawks and owls of the United States in relation to agriculture. U.S. Dept. Agr., Div. Ornith. and Mamm., Bull. 3: 1–210.

FISHER, W. I. 1947. Barn Owl breeding near Chicago, Illinois. Auk, 64: 472.

GALLUP, F. N. 1949. Banding recoveries of *Tyto alba*. Bird-Banding, 20: 150.

GOETZ, C. J. 1932. Late nesting of the Barn Owl. Auk, 49: 221.

GUERIN, G. 1928. La Vie des Chouettes. Regime et Croissance de l'Effraye Commune *Tyto alba alba* (L) en Vendee. (P. Lechevalier, Paris), pp. 1–157.

POOLE, E. L. 1930. Winter nesting of the Barn Owl. Auk, 47: 84.

SCHNEIDER, W. 1937. Beringungs-Ergebnisse an der Mitteleuropaeischen Schleiereule (*Tyto alba guttata* Brehm). Vogelzug, 8: 159–170.

SPEIRS, J. M. 1940. Mortality of Barn Owls at Champaign, Illinois. Auk, 57: 571.

STONE, W. 1937. Bird studies at Old Cape May. (Del. Valley Ornith. Club, Phila.), Vol. 2: 521–941.

WALLACE, G. J. 1948. The Barn Owl in Michigan. (Mich. State Coll., E. Lansing), pp. 1–61.

WAYNE, A. T. 1908. The breeding season of the American Barn Owl (*Strix pratincola*) in South Carolina. Auk, 25: 21–25.

WHEATON, J. M. 1879. Report on the birds of Ohio. Rept. Geol. Surv. Ohio, 4: 189–628.

WILLIAMS, R. W., JR. 1902. Unusual nesting date of the Barn Owl. Auk, 19: 198–199.

Department of Zoology and Entomology, Ohio State University, Columbus 10, Ohio, January 3, 1952.