

OBSERVATIONS AND BANDING NOTES ON THE BANK SWALLOW—IV.

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SEASON OF 1927.

A continuation of the banding work on the Bank Swallow, begun by the writer and Mrs. Stoner at the Iowa Lakeside Laboratory in northwestern Iowa in the summer of 1923, was found possible in the summer of 1927 when, between June 15 and July 18, 1008 individuals were banded.¹ In this lot, 208 adults and 800 immature birds were represented, thus bringing the total number of individuals of this species banded by us in the Okoboji region to 2432; about 21% of these are adult birds.

The greatest number of birds banded in one day was on July 9 when 90 young were furnished with the metal tags. The greatest number of adult birds banded in one day was 24. Our banding was done at 30 substations of which 18 had been worked in previous seasons; all were within a radius of 12 miles of the Laboratory. Some of these comprised only two or three burrows but most of them were in roadside cuts with from eight to twenty burrows each, and in large gravel pits containing well over a hundred burrows.

General Remarks.—Many new colonies had been established since the preceding season; apparently the birds were attracted by the precipitous banks of roadside cuts a considerable number of which had been excavated recently in carrying out an extensive road construction program.

In burrows near the top of a bank or on the face of a bank exposed to a great amount of afternoon sunshine the young, as a rule, were a little farther along than the young inhabiting burrows where these conditions did not prevail. Perhaps the added warmth of the soil accelerates not only the development of the eggs but also the growth of the young.

One item of interest relating to birds which are excavating is worthy of mention. The claws of many of the birds thus engaged

¹ Reports on previous years' observations appear in 'The Auk,' XLII, No. 1, 1925, 86-94; XLIII, No. 2, 1926, 198-213, and XLV, No. 1, 1928, 41-45.

often become much worn and blunt from the constant scratching and burrowing in the gravel banks. Sometimes individuals are found with the claws so blunt and rounded that they are of little use in clinging. The usual form, length and curvature are soon attained once the period of excavation is over.

Quite by accident, an interesting accomplishment of these birds was discovered. In a large unworked gravel pit three miles north-east of Spirit Lake, a pond of water about a hundred feet long and forty feet in width marked the area where the deepest excavation had been made by workmen in removing gravel. A large number of Bank Swallows were nesting in the sheer sides of the pit and the young here, on June 28, were more fully developed than in other pits where incubation had been frequently interrupted. Some of the young were able to fly well, others only a little. Several of the latter group were dislodged from their burrows and, being unable to maintain themselves in the air, dropped into the water. Without the slightest hesitation these birds struck out strongly, swimming with quick, powerful strokes which gave a sort of bobbing movement to the swimmers. Some of the birds swam from eight to ten yards and appeared to be none the worse for the experience. Three of the birds upon arriving at the edge of the pool were tossed lightly back into the water and immediately they swam out as before; once again they were tossed back into the pond and with apparently as much energy as ever they swam for the shore. Thus was demonstrated the fact that even young Bank Swallows with more or less soft and downy feathers can swim for a considerable distance before becoming exhausted, the front limbs serving as the means of propulsion. May not this ability be of marked survival value in adult birds should they be overtaken by difficulties in migrating over large bodies of water?

Among the hundreds of adult birds handled during our five seasons' work, but one major deformity has been encountered. No. 97351A, taken on July 4, from a burrow containing another adult, had a malformed bill, the upper mandible being somewhat enlarged, thickened at the base and elongated into a point so that its tip did not appose that of the lower mandible but crossed it to the right. The anomaly was suggestive of the beak of a Crossbill in miniature. In spite of this deformity the bird seemed to be in

good condition although it must have been forced to modify somewhat its ordinary method of securing food.

An analysis of the data obtained in this and preceding summers suggests a breeding season somewhat longer than was at first suspected;¹ for, young have been found as early as June 15 (our earliest date of observation), while newly hatched young have been discovered as late as August 5; and fully fledged young ready to leave the nests have been found as early as June 28 and as late as August 7. Without doubt the rearing of two broods in a season is a common occurrence.

Weight of Young Birds. In an effort to ascertain the rate of increase in weight of young Bank Swallows, the occupants of a number of nests were banded so that chronological records for a given individual could be obtained. The observations made on two families are typical and while not complete they illustrate the important features. Nos. 97282A-97285A refer to a family of four nestlings about seven days old when the first reading was made on July 3, while Nos. 97347A-97350A refer to another family of four which were about five days old when the first reading was taken, also on July 3. The observations were made at approximately the same time of day (5:00 P.M.), on alternate days and continued until the birds were ready to leave the nest; weight readings are indicated in grams.

TABLE OF WEIGHTS.

No.	July						
	3	5	7	9	11	13	15
97282A.....	16.8	17.6	18.7	18.5	16.1		
97283A.....	16.0	17.0	18.3	18.0	17.3	15.1	
97284A.....	16.8	17.7	18.3	18.5	17.3		
97285A.....	15.9	17.7	19.4	18.5	18.0		
97347A.....	12.2	15.4	18.4	—	19.0	18.0	17.0
97348A.....	12.1	15.0	17.4	—	19.0	18.0	17.3
97349A.....	9.0	13.0					
97350A.....	9.1	13.6					

¹'The Auk,' XLIII, No. 2, 1926, 200.

From these and other available data we conclude that the weight of young birds does not increase gradually until maturity is attained. On the contrary, it increases fairly regularly although not rapidly until about eleven to thirteen days after hatching when a decrease is to be noted. This seems to be due primarily to a resorption of fat which develops but which gradually diminishes as the time for leaving the nest approaches. Even at the time of initial flight the average weight of the birds observed in these experiments was somewhat greater than the average for adults, so that following that important event further weight reduction occurs.

Repeats.—Recoveries of birds banded during the season covered by this report are termed "Repeats." These total 101 of which 87, including four fatalities, were furnished by immature birds; the remaining 14 were adults. Eight immature birds repeated more than once. Of course a great many more repeats might have been secured by visiting and inspecting nests of banded birds frequently but no effort was made to obtain records in that manner.

It seems quite unnecessary to set forth all the repeats here but twenty-two of the most interesting and informational are cited together with remarks concerning them.

Remarks on Repeats.—It seems apparent that breeding birds sometimes change their abode even after having arrived on the breeding grounds and established a home. The change may take place suddenly and for various possible reasons but the laying of eggs and their incubation is of paramount importance to the bird for usually little time is lost when this change of abode occurs. Nos. 61148A and 61152A afford examples of this feature.

The occasion of the second recovery of No. 97227A affords a good illustration of the intermingling of families after flight ability is attained when members from three families, all reared in adjacent burrows in the same gravel pit were taken together. However, it is to be noted that no family was *completely* represented at this time, thus further illustrating the inclination of the young to wander.

Still another good illustration of the intermingling of young from different families is afforded by the data on No. 97284A. On the

TABLE OF REPEATS

No. and Age	Date and Locality of Banding	Date and Locality of Recovery	Remarks on Recovery
61148A. Ad.	June 16. 1 mile S. E. Arnolds Park	July 16. 3 miles away	Incubating on both occasions
61152A. Ad.	June 16. 1 mile S. E. Arnolds Park	July 24. 9 miles away	Incubating when recovered
61153A. Ad.	June 16. 1 mile S. E. Arnolds Park	July 11. Same pit but different burrow	Incubating when recovered
97170A. Juv.	June 29. 3 miles N. E. Spirit Lake	July 7. Same pit but different burrow	3 unbanded birds and 2 Imm. repeats from same family in nest
97176A. Ad.	June 29. 1 mile S. W. Milford	July 7. 8 miles away	3 Imm. repeats from family different in nest
97210A. Fldg.	June 30. 5 miles W. Spirit Lake	July 7. 3 miles away	No repeats from other 4 members of family
97227A. Nstlg.	July 1. 1 mile S. E. Arnolds Park	July 11 & 13. Same	On July 11, other 5 members of family and Imm. unbanded bird in nest. On July 13 repeats from 2 other families in nest
97284A. Nstlg.	July 1. ½-mile S. Ia. Lake. Lab.	July 16. Same pit, different burrow July 17. Same as last July 18. Same as last	

TABLE OF REPEATS—*Continued*

No. and Age	Date and Locality of Banding	Date and Locality of Banding	Remarks on Recovery
97300A. Juv.	July 2. 2 miles E. Spirit Lake	July 18. 7 miles away	
97305A. Fldg.	July 2. 2 miles E. Spirit Lake	July 12. 3 miles away	In burrow containing 5 unbanded young
97307A. Fldg.	July 2. 2 miles E. Spirit Lake	July 12. 3 miles away	
97554A. Juv.	July 7. 3 miles N. E. Spirit Lake	July 16. 6 miles away	Another repeat in burrow
97560A. Imm.	July 7. 3 miles N. E. Spirit Lake	July 9. Same pit	
97585A. Fldg.	July 7. ½-mile S. Ia. Lake. Lab.	July 18. Same	4 repeats from 3 other families in same burrow
97624A. Juv.	July 8. 1 mile S. E. Arnolds Park	July 13 and 16. Same	
97748A. Imm.	July 11. 1 mile S. E. Arnolds Park	July 13. Same	2 repeats from same family and 2 more from 2 other families in same burrow
97757A. Imm.	July 11. 1 mile S. E. Arnolds Park	July 13. 11.00 A.M. Same	In burrow with an unbanded bird and a family of 4 Juv. repeats
		July 13. 2 P.M. Same pit but in burrow 12 yds. away	In burrow with 4 other Imm. repeats from 2 families

three occasions of its recovery this bird was taken from the same burrow which was about twenty-five feet from the one in which it was reared. When first recovered, repeats from two other families together with an unbanded bird were with it in the burrow; four families were thus represented. The next day it was recovered alone, while on the following day it was again recovered with representatives of three *altogether different* families. Thus, within a period of thirty-seven hours, representatives of at least seven families of Bank Swallows had visited this burrow, although at no one time of our observations was any family *completely* represented therein.

Fledglings No. 97305A and 97307A were two of a family of four. In this case *two* of the members of a family *remained* together and were *recovered* together from a burrow three miles away and which also contained five unbanded birds.

No. 97560A was recovered from a different burrow than the one in which it was originally captured; this burrow also contained four banded young together with an immature repeat from still another burrow.

Repeat No. 97585A is of considerable interest for it, too, affords an unusual example of the mingling of members of different families after flight ability has been acquired. The data on the four birds recovered with it are as follows: No. 97284A; one of a family of four; banded as a nestling from the same gravel pit, July 1. Nos. 97761A and 97762A; two of a family of four; banded as juvenals from the same gravel pit July 11. No. 97700A; banded as an immature bird in a gravel pit ten miles away on July 9.

No. 97624A was one of a family of five; on the occasion of its first recovery an unbanded immature bird and an immature repeat were in the burrow with it. At the time of its second recovery a member of its own family and an immature repeat from still a different family were found with it.

Many similar findings could be cited from our records and they further substantiate the conclusion that after flight ability has been acquired intermingling of the young of different families occurs, not only in a given gravel pit but also among the inhabitants of burrows separated by a distance of from three to ten miles.

Returns.—From the inception of our work down to the close

of the 1926 season, 1424 Bank Swallows were banded in the Okoboji region. Excepting the casualties, at least some of which were known, this number was available for returns in 1927. Fourteen returns, all from this region, have been reported previously, from the 1176 birds available. During the season covered by this report, 15 additional individuals from 1923, 1924, 1925 and 1926 bandings were recovered, thus bringing the grand total of returns to 29 and increasing the recovery rate to a little more than 2%. A detailed summary of these returns is here indicated in tabular form.

TABLE OF RETURNS ON BANDED BIRDS

Yr.	No. Banded	No. Returns	Total
1923	76	1 in 1924 1 in 1927	2
1924	207	5 in 1925 1 in 1926 1 in 1927	7
1925	893	7 in 1926 6 in 1927	13
1926	248	7 in 1927	7
1927	1008		

It is of interest to note that the very first bird taken in the 1927 season was a return. The data on this and subsequent ones follow.

No. 5724A. Adult; banded June 16, 1925, in a roadside cut five miles southwest of the town of Spirit Lake. Recovered June 15, 1927, three miles north of the Iowa Lakeside Laboratory and about two miles, air-line, from the place of original capture. At the time of recovery the bird was brooding six young about thirty-six hours old.

No. 8510A. Fledgling; one of a family of five; banded June 25, 1925, in a gravel pit two miles east of Spirit Lake. Recovered June 18, 1927, as an incubating bird in a roadside cut five miles west of the place of original banding.

No. 24648A. Immature; taken July 8, 1925, from a burrow in a gravel pit one mile southeast of Arnolds Park, together with an adult bird and another immature one. Recovered July 1, 1927, in the same gravel pit but from a burrow about twenty yards north-east of the one from which it was banded. Just previous to its recovery the bird had flown into the burrow with an unbanded adult with which it may have been mating.

No. 24747A. Juvenal; one of a family of five; banded July 10, 1925, in a gravel pit at the north edge of the town of Spirit Lake. Recovered June 28, 1927, in a small pit 100 yards from the Iowa Lakeside Laboratory grounds, and more than five miles from the place of original banding. The bird was recovered from a burrow in which there was no nest and it was probably simply resting there.

No. 24823A. Immature; banded July 13, 1925, in a gravel pit one mile southeast of Arnolds Park. Recovered June 16, 1927, in a burrow in an adjoining gravel pit a few yards west of the one from which it was originally taken. Incubating at the time of recovery.

No. 36320A. Adult; banded July 6, 1926, in a gravel pit one mile southeast of Arnolds Park. Recovered June 18, 1927, from a burrow in a roadside cut about seven miles, air-line, from the place of original banding; the bird was incubating. On July 13, 1927, the bird was again recovered from a burrow in a gravel pit about twenty yards east of the place of original capture.

No. 36324A. Juvenal; one of a family of four; banded July 6, 1926, in a gravel pit one mile southeast of Arnolds Park. Recovered June 27, 1927, from a burrow in a roadside cut about six miles from the place of original banding; young in the nest. Just previous to its recovery this bird had flown into the burrow with an unbanded adult.

No. 36367A. Adult; another adult (No. 36368A), in burrow with it; banded July 8, 1926, in a gravel pit one mile southeast of Arnolds Park. Recovered as an incubating bird, June 16, 1927, in a gravel pit three miles from the place of original banding. On July 12, 1927, the bird was again taken from a burrow in a roadside cut about nine miles, air-line, from the place of recovery on June 16, and six miles from the place of original banding. On this occasion the bird was again incubating.

No. 36375A. Adult; another adult (No. 36376A), in burrow with it; banded July 8, 1926, in the gravel pit one mile southeast of Arnolds Park. Recovered July 1, 1927, in the same gravel pit but from a burrow fifty yards south of the one in which it was originally captured.

No. 36401A. Immature; able to fly well; another immature (No. 36402A), in same burrow; banded July 9, 1926, in a gravel pit two miles east of the town of Spirit Lake. Recovered as an incubating bird on July 16, 1927, from a burrow in a gravel pit about 100 yards south of the place of original banding.

No. 61019A. Adult; banded July 12, 1926, in a small gravel pit one mile southwest of Milford. Recovered July 4, 1927, in a gravel pit about three miles, air-line, from the place of original banding.

No. 61119A. Nestling; one of a family of four; banded July 20, 1926, in a gravel pit one mile southeast of Arnolds Park. Recovered June 16, 1927, as an incubating bird from a burrow in an adjoining gravel pit and about fifty yards south of the one in which it was reared. Another adult, banded as No. 61148A was in the burrow with it. On July 4, 1927, the bird was again taken from the same burrow and on July 15 it was recovered once again from that burrow as an incubating bird. It is of interest to note that on the following day, July 16, 1927, No. 61148A was taken as a repeat from a burrow in a gravel pit three miles away where it too was incubating.

No. 73658. Adult; banded July 8, 1924, in a gravel pit at the north edge of the town of Spirit Lake. Another adult was taken from this burrow a few minutes previous to the capture of No. 73658. Recovered June 30, 1927, from a burrow in a roadside cut about a mile, air-line, from the place of original banding; it had just flown into the burrow with food for young.

No. 115726. Fledgling; one of a family of five; banded July 9, 1923, from a burrow in a small roadside gravel pit two miles northeast of the Iowa Lakeside Laboratory. Recovered July 5, 1927, as an incubating bird from a burrow in a gravel pit about two and one-half miles south of the place of original banding.

No. 141890. Nestling; one of a family of five; banded July 9, 1925, in a gravel pit one mile southeast of Arnolds Park. Re-

covered as an incubating bird, June 16, 1927, from an adjacent pit about thirty yards northwest of the place of original banding.

Remarks on Returns.—Although 1424 marked birds were available for returns, this represents but a fraction of the total number of Bank Swallows present in the region during the four seasons preceding that of 1927. The 29 returns obtained from these, suggest then, that the proportion of birds returning to breed in the same general region in which they had previously bred or been reared, is greater than at first believed.

Among the birds banded, only one is known to have attained as great an age as four years. No. 115726 was recovered as an incubating bird four days less than four years after it was tagged.

Among all the 29 returns secured, no representative has been taken more than one season. This suggests a considerable wandering of individuals within the breeding range as well as, perhaps, a rather high mortality rate.

Among the scores of families of young birds banded, no two members of any one family have ever been recovered as returns. This again seems to indicate not only a considerable amount of wandering and little uniformity in selecting a nesting region, but also that at least the *immediate* place where the birds were hatched has little or no attraction for most individuals. Family ties are left behind with the attainment of flight ability.

Further evidence of polygamy is suggested by the actions of Nos. 61119A and 61148A. On the date of its first recovery, about a year after it was banded, No. 61119A occupied a burrow with an unbanded bird which was then furnished with band No. 61148A. At the time of its second recovery, eighteen days later, No. 61119A was alone in the burrow and at the time of its third recovery, eleven days after the second recovery, it was incubating. Meanwhile, No. 61148A was also incubating in a burrow three miles away.

The colony life of the Bank Swallow is very complex but loosely organized and the behavior of individual birds comprising a colony appears to follow no set plan.

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