

OBSERVATIONS AND BANDING NOTES ON THE BANK SWALLOW—II.

BY DAYTON STONER.

SEASON OF 1924.

IN a recent paper¹ the writer set forth certain observations and banding data on Bank Swallows occurring in the Lake Okoboji region, northwestern Iowa, during the summer of 1923. The present account is intended in part as a sequel to that narration and, in addition, as a brief discussion of some supplementary observations that are only indirectly connected with the preceding work.

It so happened that the writer and Mrs. Stoner were again fortunate enough to be in residence at the Iowa Lakeside Laboratory on West Lake Okoboji between June 16 and July 15, 1924. Since our stay occupied approximately the same length of time and the identical season of the year as in 1923, it afforded a basis for making certain comparisons which, however, must extend over still other seasons to give conclusive evidence. In the four weeks a total of 409 birds representing nineteen species were banded. Of the 207 Bank Swallows in this lot, ninety-one were adult and 116 were immature birds. These together represent slightly more than fifty per cent of all the birds banded and an increase of about twenty per cent over the total number of Bank Swallows banded in 1923, when this species made up approximately thirty-one per cent of the total number of birds banded.

The greatest number of Bank Swallows banded in any one day was forty-eight on July 3, when two adults and forty-six fledglings were taken; on July 5 one adult bird and forty-six additional fledglings were fitted with bands. Since only well fledged young were banded this item is of interest as indicating something concerning the height of the nesting season in this locality.

Observations on Colonies. Our efforts in 1924 included observations and banding operations in thirteen different colonies; five of

¹ 'The Auk,' XLII, No. 1, 1925, 86-94.

these had been worked in the summer of 1923. All were in gravel pits of greater or lesser size, and some of them showed marked fluctuation in size in the two years, as here shown:

Locality	1923	1924
Colony ½-mile S. of Laboratory	163 burrows	50 burrows
“ 2 miles N.E. of Laboratory	6 “	75 “
“ ½-mile N.E. of Laboratory	3 “	3 “
“ 1 mile W. of Milford	50 “	20 “
“ 2 miles W. of Milford	(about) 8 “	(about) 5 “

Although the species seemed more abundant in the region in 1924, conditions in these gravel pits were practically the same during both seasons and no good reason can be advanced for the variation in number of the birds. The figures given suggest that perhaps a considerable number may not return to the same nesting site year after year and that the Bank Swallow population of a given pit in any season is an extremely variable quantity and largely dependent on chance. Our failure to recover more than one of the birds banded in 1923 lends some weight to this conclusion.

The largest colony that we worked was one inhabiting a large abandoned gravel pit two miles east of the town of Spirit Lake which, on June 28, contained 272 burrows in various stages of completion, some of them with eggs others with young birds.

In practically all the burrows examined the outer one-third to one-fourth was somewhat lower than the terminal two-thirds or three-fourths. This feature of construction has several advantages for the Swallows, in that it prevents rain from washing into the burrows for any considerable distance; it prevents such flying enemies as Hawks from easily seeing the young birds while, as is their custom, they await the return of the adult at the mouth of the burrow; and furthermore, the angle or curvature thus formed excludes the light to which these creatures seem averse while nesting. Perhaps also as Audubon suggests (*Birds of America*, I, 191) the slight ascent contributes to the easy disposal of the loose materials as they drop down during and subsequent to burrow construction.

The inhabitants of a group of about fifty burrows in a gravel pit one-half mile south of Milford exhibited unusual activity on and about June 26 for incubation of the eggs and feeding of the young

were under full sway at this time. Due to frequent rains the banks of the pit had fallen down in some places with the resulting destruction of several burrows, some young and possibly some adults. In one case a nest with five well fledged young had fallen in such a way as to leave the occupants quite unharmed. The interesting part of the find was that the nest, presumably constructed this season, had been built exactly on an old nest and was contained by it. This would seem to suggest that while these birds use the same burrows season after season fresh materials are each year fashioned into a new nest which may or may not be built on an old one.

The breeding season seemed farther along in this colony than in any other visited at this season. This might have been due to the fact that the members of the colony had been less disturbed than those in other gravel pits and so had been able to mate, excavate their burrows, lay eggs and go through the incubation period with little or no molestation. The burrows averaged deeper here also, perhaps for the same reason.

Observations on Adults. Ordinarily adult birds do not struggle much in the hand though they usually void their excrement during the excitement incident to being handled and banded. Not many adult birds of other species do this although it is a common occurrence among young birds of practically all the forty-six species that I have banded.

As noted in my 1923 observations, practically all the nests were lined with grayish or white feathers from the domestic fowl. In one instance a bird was observed to fly after and grasp in its bill a small white feather that had blown from the ground near its burrow and fly away with it.

Mating seems to continue over an extended period of time. Even as late as June 25 when some pairs had young in the nest others were not yet mated. The following brief table will epitomize the situation in this region.

Eggs found as early as June 19

Eggs found as late as July 9

Young found as early as June 25

Fully fledged young ready to leave nest found June 30

Newly hatched young found as late as July 9.

The members of one colony in particular, the one at Spirit Lake, were uniformly late for they were still mating and excavating burrows on July 1. Six days previously thirty-five burrows had been excavated while on July 1 the number had been increased by fifteen. Sometimes the birds flew around after one another, apparently, two males after a female; occasionally the pursuit ended when all three flew into a burrow. Few if any new burrows were excavated in any of the colonies after July 3 and I do not believe that the species is double-brooded in this locality.

In an attempt to secure a considerable number of these birds quickly for banding, a small khaki-colored blind was set up in two of the colonies at a distance of fifteen to twenty feet from some of the burrows. At first the Swallows seemed quite undisturbed by it, flying in and out of their burrows and carrying on as usual. However, they became more suspicious after I had crawled out to make a capture or two with the long-handled net and the time between their returns to the nest after such a performance became increasingly greater. Even when they had young in the nest the adults occupying the burrows nearest the blind seldom entered them after they "discovered" that some one might issue from it at an inopportune moment.

Although several of the birds banded in 1924 were retaken during the season, these records are included under the head of "Repeats" in this paper although, of course, not all of them belong strictly in that group for sufficient time had elapsed between the date of banding and the time of recovery to term the record a "Return."

Returns. Of the seventy-six young and adult Bank Swallows banded between June 18 and July 16, 1923 but one was recovered in 1924. This I am calling a "Return." Adult No. 15338, banded on June 28, 1923, at 4:45 P.M. in a small gravel pit one-half mile northeast of the Laboratory was recovered at the same place and from the same burrow on June 19, 1924, at 10:00 A.M. On both occasions the bird was taken with a hand net as it flew from the burrow. On the date of its recovery it had just carried nesting material into one of the three burrows in the pit, all three of which were occupied this season as in 1923. Both the band and the bird were in excellent condition after the year of wear and tear. Apparently this adult had mated again and was preparing to rear

another family. Where it had been in the meantime I do not venture to guess.

The appended table gives in summarized form certain information on the birds banded and recovered in 1924 and which are here termed "Repeats."

TABLE OF REPEATS

All were adults and all were recovered in the same colony in which they were banded with two exceptions.

No.	Banded	Locality	Recovered
73657	July 8, 9:25 A.M.	Spirit Lake ¹	July 9, 10:10 A.M.
82036	June 16, 3:30 P.M.	½-mile S. Lab.	June 17,
82042	" 19, 11:30 A.M.	½-mile S. Lab.	July 1, 8:50 A.M. ³
82043	" 19, 11:45 A.M.	½-mile S. Lab.	June 24, 10:30 A.M.
82045	" 19, 2:30 P.M.	2 miles N. E. Lab.	" 30, 5:15 P.M.
82047	" 19, 3:00 P.M.	2 miles N.E. Lab.	" 19, 7:45 P.M.
83406	" 25,	Spirit Lake	" 28, 2:10 P.M.
83411	" 25, 3:00 P.M.	Spirit Lake	July 1, 3:10 P.M.
			" 8, 9:15 A.M.
83419	" 26, 2:15 P.M.	½-mile S. Milford	" 2, 11:20 A.M.
83424	" 26, 3:05 P.M.	½-mile S. Milford	" 9, 10:00 A.M. ³
83436 ²	" 28, 2:00 P.M.	Spirit Lake	" 8, 9:10 A.M.
83437 ²	" 28, 2:00 P.M.	Spirit Lake	June 28, 2:10 P.M.
129194	July 1, 3:00 P.M.	Spirit Lake	July 8, 9:00 A.M.

Remarks on the Table. Capture of the birds for banding is apparently not a deterrent to nesting, e.g., No. 83411 and No. 83419 had carried food to the young a moment before they were captured the second time.

Capture of the birds does not frighten them greatly, e.g., No. 83437, and at the height of the nesting season they quickly return to the nest.

While the sex of Bank Swallows can not be determined on external characters, promiscuous mating, perhaps even polyandry or polygamy is suggested by the actions of No. 82042 and No. 83424.

The bird bearing the former number was first taken from a bur-

¹ Colony on northern edge of town.

² Taken at same time from same burrow, the latter one repeating in the same burrow.

³ Recovered in Spirit Lake colony.

row occupied by that bird and another which we did not capture. Eleven days later No. 82042 was taken from a burrow in a gravel pit six and one-half miles air-line northeast of that in which it was originally captured. Furthermore, in the same burrow at the same time and captured with it was another individual which we banded No. 129187. Possibly it was the one that escaped us on June 19, although it does not seem likely that a pair once mated in a given colony would voluntarily leave and take up their abode together in a new colony.

No. 83424, banded on June 26, at a gravel pit one-half mile south of Milford, was recovered twelve days later in one at the north edge of the town of Spirit Lake, nine miles, air-line from the place in which it was originally captured.

The above events occurred at the height of the breeding season. Were these birds unable to secure mates? Had laborers or bird banders frightened them away from the places in which they were originally banded? Were they outcasts, so to speak, from society? Were they just visiting? Or does polyandry or polygamy or promiscuous mating sometimes obtain among Bank Swallows? Perhaps future observations and banding work will answer these questions definitely. For the present the species is under suspicion.

SEASON OF 1925.

Observations on Colonies. Our observations in 1925 were carried on in 18 different colonies, nine of which had been worked in 1924. The largest colonies were found in gravel pits, but a few small ones occupying burrows in roadside cuts were visited. One occupied the precipitous gravelly bank of a small lake. This year 127 adults and 766 young were banded, making a total of 1176 for the three seasons.

As before noted in my account of this species¹ the size of a given colony varies a good deal from year to year and our banding operations seem to indicate that a considerable number of the birds making up a colony one year are not present the next. Some of the smaller colonies in which a considerable proportion of the adult population was banded in 1924 furnished not a single "Return" record in 1925.

¹'The Auk,' XLII, No. 1, 1925, 86-94.

Even though a sufficient number of old burrows may be available, with little or no digging, for the individuals that desire to nest in a given colony, a few new excavations, at least, are made each season so that a certain number of the old burrows usually remain without occupants.

On the whole, the number of Bank Swallows nesting in the region seemed to be considerably larger than in the two previous seasons. Evidently the species is a very successful one although our observations indicate a rather high mortality rate.

Observations on Adults. Large numbers of birds were incubating on June 16, and, as in previous seasons, the breeding period seemed to reach its climax between June 15 and July 12. However, as late as June 26, the members of some colonies were still mating and constructing burrows.

As a result of this season's observations I am compelled to modify my earlier belief that the species is single-brooded here, for I found a few adults incubating as late as July 27, and others with young two days old on August 1. This seems to indicate beyond a reasonable doubt that at least a partial second brood is reared in this latitude. Further evidence substantiating this belief is afforded by adult No. 5716A, which on June 15 was incubating, while on July 10 the bird was again incubating in a different burrow of the same gravel pit. It seems, therefore, that some of the early breeding birds rear two broods.

As the period of incubation and rearing the young progressed and the latter became able to shift for themselves, the number of adults making up the colonies grew less and less until by July 25 the only adults about the pits were the few that had eggs or young in the nest. A week later the number of adult birds had been reduced to a mere handful and most of the burrow entrances were covered with cobwebs, a sure indication that the last family in that burrow had been reared for the season.

While the average number of eggs deposited in the first clutch is five or six, the second clutch averages somewhat smaller, one to four being the rule.

The melancholy air and quietness of the pits where, a few days before, the bustling activity of hundreds of gayly chattering birds held sway, now called to mind a deserted village. Only a few

stragglers, immature birds and adults with second brood young remained. These conditions prevailed in practically every colony visited and I am inclined to the belief that the return migratory journey must have had its inception at about this time.

While the adult birds were not particularly shy during the incubating period and the first few days after the young were hatched, they soon became more wary and reluctant to enter the burrows when an observer was about, even though hidden in a blind.

Although the young returned to the burrows frequently for some days after they were able to fly, the adults seldom returned to them after the family became separated. And although excrement was cast in the burrows, neither adults nor young made any attempt to remove it. Consequently some of the more popular and populous burrows became rather filthy before they were finally abandoned for the season.

Where are the Adults at Night? For the purpose of ascertaining the whereabouts of adult birds at night two large colonies were investigated. Our first excursion occurred on July 13, when a gravel pit a mile southeast of Arnolds Park and containing over 200 burrows was visited. Our examination of the burrows there between 8:00 and 9:00 P.M. revealed not a single adult even in those burrows containing immature birds of various ages. Nineteen unbanded and repeat young were taken on this excursion.

Again, on July 14, we inspected a gravel pit two miles east of the town of Spirit Lake which contained over 300 burrows. In the scores of burrows examined here between 8:30 and 10:00 P.M., but one adult bird was discovered although twenty unbanded and repeat young were captured.

While these investigations occurred at a time when most of the young were fairly well developed, it was somewhat of a surprise to find that the adults were so uniformly conspicuous by their absence. Do they congregate in other and more distant gravel pits where bird banders are not likely to molest them? Do they retire singly or in groups to some woodland roost near the pits? Does the return migratory journey date from this time? The question of their nocturnal resting place is still unanswered.

Weight of Adults. In order to determine the weights of both

young and adult birds a set of balances sensitive to one-tenth gram was fitted into an old microscope case so reconstructed that it could be carried into the field and opened readily thus exposing the balances for immediate action. Between June 17 and July 10, thirty-six readings were made on adult birds including, probably, both males and females. The weights ranged between 11.7 grams and 17.1 grams with an average of 14.89 grams. Weights taken in June averaged a little higher than those taken in July, probably due to the presence of developing eggs in at least some of the females.

Observations on Young. The first young, nestlings about five days old, were banded on June 16. This was our earliest date for birds of this age. They were successfully reared and left the nest in due time.

When young birds, that have not previously taken wing, leave the nest or the hand after being banded, they are able to fly almost as well as the adults. On several occasions I have been able to follow the initial flight of a given bird for five minutes or more and the results were invariably the same. While the young appear to be a little more uncertain of their equilibrium in the air and flap their wings rather more rapidly than the adult they seem to acquire the ability of the parent in a few seconds and dart and zig-zag in remarkable fashion. However, they apparently tire quickly and return to a burrow in a short time, there to rest and also, I believe, to receive food from the adults. The very first burrow examined on our night excursion of July 13 contained, in addition to three of the five young originally banded from it, two immature repeats each from a different burrow in the same gravel pit.

I believe that young birds after making their first few flights from the home burrow usually return to it to rest. However, as they grow stronger they fly and forage for food farther from home and hence are less likely to return to the parental burrow. An illustration of this proclivity is afforded by two immature birds which were taken from a burrow a mile southeast of Arnolds Park. These birds which were able to fly fairly well were banded and instead of being returned to the burrow were tossed lightly into the air whence they flew away easily. Twenty-four hours later we found them resting comfortably in the burrow from which they

were first captured. Some of the repeat records mentioned beyond afford additional confirmatory data.

The weight of young birds which are able to leave the nest and to successfully attempt the initial flight averages about 13.5 grams.

Additional evidence in favor of the belief that the species is double-brooded here was furnished by a family of two fledgling birds which were banded on August 7 in a gravel pit one mile southeast of Arnolds Park. Earlier in the season another family of Bank Swallows had been reared in the same burrow.

Apparently May-flies (Ephemeridæ) form an important article of diet of the young, for, during the last week in June and first few days of July, we frequently found these insects in the burrows. On a few occasions we found them in the bills and throats of young birds.

Two fledgling birds, banded from a burrow on the banks of the Little Sioux River, July 20, exhibited a tendency to walk backwards after the manner of young Belted Kingfishers. I have not observed this habit among other young Bank Swallows.

Toward the close of the nesting season when the days began to grow cooler and the warm sunshine to prove agreeable, hundreds of young birds from adjacent gravel pits settled in the dusty roads and on near-by telephone wires.

One of the interesting traits of young birds is associated with their propensity for burrowing. Apparently they expend no effort in enlarging old burrows, but, after they are able to fly well, they frequently excavate little concavities in the precipitous walls of the gravel pits at their junction with the sand and gravel that have previously fallen away. Here the birds rest and sun themselves and, at the same time, maintain a watchful eye for possible enemies.

Parasites of Bank Swallows. Occasionally small mites were found in nests occupied by Bank Swallows and sometimes the birds themselves, both adults and young, were lightly infested. However, I have never found these parasites in great numbers on any of the more than 1100 Swallows examined.

The most interesting parasites observed on Bank Swallows were the larvae of the muscoid fly *Protocalliphora* sp. Of four immature birds occupying the same nest and about ready to leave it

on July 17, one bore, on the left side of the head just above the eye, one of these reddish brown larvae. Of a family of five young, scarcely able to fly and occupying a nest in another colony on July 18, two were not afflicted; one bore a single larva, another bore three, while the third bore four small larvae. In all cases the parasites were attached at or near the top of the head of the host. Immediately about the point of attachment the skin of the bird was bare and a little beyond this area was a small mass of clotted blood and matted feathers. That the birds bearing the larvae suffered more than inconvenience from the presence of these external parasites was attested by the fact that they were neither so active nor so smoothly feathered as the non-infested occupants of the nest.

The above afford the only instances of this type of parasitism encountered among Bank Swallows and apparently it is not of common occurrence in this locality.

Other Inhabitants of Bank Swallow Burrows. The usually precipitous banks in which the burrows of Bank Swallows are excavated do not always prove to be effective barriers against the entrance of other animals and a few of more or less interest were encountered.

One burrow, uninhabited by birds, contained a garter snake (*Thamnophis* sp.) two feet long. Another burrow, about a foot below the surface of the earth, was unoccupied by birds, and it also sheltered a two-foot garter snake. There was no opening from the burrow to the turf above and how the snakes gained entrance I am unable to say.

Fleas (*Ceratophyllus riparius* R. & J.) were abundant in the mouths of some of the burrows and occasionally they were found on the bodies of well fledged and adult birds. They seemed most abundant in burrows recently deserted by Bank Swallow occupants. The insects probably breed in the debris of the nests.

A large, brownish camel cricket frequented the mouths of some burrows particularly those in more or less moist soil. It was determined by Mr. A. N. Caudell of the United States National Museum as *Ceuthophilus testaceus* Scud.

On one occasion a large carrion beetle (*Necrophorus* sp.) was discovered in a burrow feeding on the decaying remains of a young Bank Swallow.

The night excursion of July 14 revealed a rather unusual roosting place for the Northern Flicker (*Colaptes auratus luteus*). A male of this species was found, fast asleep and clinging to the sheer sides of a gravel pit, with his head inserted into the mouth of a Bank Swallow burrow.

Not infrequently numbers of a large sarcophagid fly (*Sarcophaga bullata* Park.) were to be found about and in the openings of the burrows, particularly those on which the bright sunlight fell on cool mornings. In the siftings from some of the burrows, puparia of this fly were discovered on August 13, thus indicating that it breeds in such situations. However, the fly has its enemies even under these conditions for, from four puparia discovered in one burrow and placed in rearing cages, there emerged not four Sarcophagas but four small hymenopterous parasites (*Xyalosoma* sp.) of the family Figitidae. A surprisingly high degree of parasitism is suggested by these findings.

Another adult fly, an anthomyid (*Helina* sp.) was taken from the mouth of a Bank Swallow burrow. It is possible that this insect breeds in the nest debris of the birds.

Returns. Of the 207 Bank Swallows banded in 1924, five were recovered in 1925. The following data on these returns will be of interest.

No. 83422. Adult; banded June 26, 1924, in a gravel pit one-half mile south of Milford. Recovered, June 25, 1925, from a burrow in a gravel pit two miles east of the town of Spirit Lake and about eight miles distant from the place in which it was originally banded. Bird and band were in excellent condition. The bird was incubating in a very deep burrow from which it was removed with some difficulty.

No. 83448. Adult; banded June 30, 1924, in a gravel pit two miles east of the town of Spirit Lake. Recovered from the same gravel pit but a different burrow, June 18, 1925. Band appeared like new.

No. 94620. Fledgling; one of a family of four; banded July 3, 1924, in a gravel pit two miles east of the town of Spirit Lake. Recovered (dead), July 10, 1925, in a gravel pit on the opposite side of the road and about 200 yards north of the place where it was banded. A portion of the bank of this pit had fallen away and

perhaps the bird was thus injured although evidences of external abrasion were lacking. Possibly it was breeding here. .

No. 94627. Fledgling; one of a family of five; banded July 3, 1924, in a gravel pit two miles east of the town of Spirit Lake. Recovered June 27, 1924, in the same gravel pit but from a burrow several yards distant from the one occupied last year and which, on the date of recovery, contained four fledglings.

No. 129216. Fledgling; one of a family of five; banded July 3, 1924, in a gravel pit two miles east of the town of Spirit Lake. Recovered in a gravel pit at north edge of that town, June 26, 1925, two and one-fourth miles from the place in which it was originally captured; the bird was incubating on this date. Recovered again (dead) in the same place as last mentioned, July 3, 1925. The wall of the gravel pit in which the burrow was excavated had fallen away destroying the nest and perhaps injuring the bird.

While the return records are relatively few they point to the following conclusions:

1. Comparatively few birds return to the particular region in which they were reared or have bred, although some do so.
2. In no case were recovered birds breeding in the same burrows which they occupied in 1924, though it is possible that they may do so.
3. Selection of a breeding and nesting place seems to be largely a matter of chance.

Repeats. All recoveries of birds banded in the summer of 1925 are here termed "Repeats" and of these 73 were recorded, 20 of adult and 53 of immature birds. Only a portion of them are of immediate interest and value and the following will afford a basis for certain conclusions regarding activities and behavior in this species. Wherever the locality "Spirit Lake" occurs in these tables it should be understood that reference is made to the town and not to the lake itself.

Two outstanding features are indicated by the above table. Apparently family ties are broken as soon as the young are able to fly with any degree of facility. During the first few days of flight the young return to the burrows at frequent intervals, but once having left the parental burrow another one is as likely to be chosen for a temporary resting place.

1. REPEATS—ADULT.

No.	Date and Locality of Banding	Date and Locality of Recovery	Remarks
5716A	June 15. N. edge Spirit Lake	June 18. Same	Incubating
5718A ¹	June 15. N. edge Spirit Lake	July 10. Same	Incubating in different burrow
5719A ¹	June 15. N. edge Spirit Lake	June 18. Same	Recovered with 5719A
		" 22. Same	
		June 18. Same	Recovered with 5718A
		" 20. Same	
		July 1. Same	

¹ Taken from same burrow at same time.

2. REPEATS—IMMATURE

No. and Age	Date and Locality of Banding	Date and Locality of Recovery	Remarks on Recovery
8158A Fledgling	June 20. 2 miles E. Spirit Lake	July 3. N. edge Spirit Lake	In burrow with 2 members of 2 other families
8579A Imm. Able to fly	June 27. 2 miles E. Spirit Lake	June 30. Same	In burrows with 5 juvs. and 1 adult of another family
24506A Imm. Able to fly	July 1. N. edge Spirit Lake	July 3. Same	Taken with it were 2 other repeats from other families
24521A Imm. Able to fly	July 2. 2 miles E. Spirit Lake. In nest with 5 members of another family	July 4. Same	In burrow 200 yds. from the one in which it was originally banded; with 3 members of another family
24526A Nestling	July 2. 2 miles E. Spirit Lake; one of a family of 5	July 14. Same	This juv. and 1 other the only members of family at home
24708A Fledgling	July 9. 1 mile S. E. Arnolds Park	July 13. Same	8:00 P.M. In burrow 30 yds. S. E. of original one. Members of 3 other families in same burrow

24734A Fledgling	July 9. 1 mile S. E. Arnolds Park	July 17. Same	One individual from another family in same burrow
24746A Juv.	July 10. N. edge Spirit Lake. 3 others in nest	July 14. 8:50 P. M. 2 miles E. Spirit Lake	In burrow with another repeat from this colony
24788A Imm.	July 11. 1 mile S. E. Arnolds Park. 2 others in family	July 13. Same, but in a burrow 30 yds. from one in which it was originally banded	Members of 3 other families in same burrow and taken at same time
36225A Imm. Able to fly	July 21. 3 miles N. E. Spirit Lake	July 23. Same burrow	
36252A Juv.	July 24. 1 mile S. E. Arnolds Park. 4 others in family	July 29. Same	The only one at home. 10:15 A. M.
36260A Juv.	July 25. 1 mile S. E. Arnolds Park. 2 others in family	July 30. Same, but in burrow 40 yds. E. of one in which it was originally banded	Accompanied by 1 member of brood
141891 Nestling	July 9. 1 mile S. E. Arnolds Park. 4 others in family	July 22. Same burrow	Only 1 other member of family in. 11:00 A. M.
141914 Juv.	July 14. 2 miles E. Spirit Lake. 3 others in family	July 22. Same burrow	1 member of family and an- other juv. in nest.
251181 Imm. Able to fly	July 17. 2 miles E. Spirit Lake. 3 others in family	July 21. Same burrow; 2 others of family also. ²	9:25 A. M.
251125 Imm. Able to fly well	July 18. 1:30 P. M. 8 miles N. Spirit Lake	July 18. 2:00 P. M. In burrow 25 ft. from one occupied at 1:30 P. M.	Burrow also contained 3 imm. unbanded birds
36256A ¹ Imm. Able to fly	July 24. 1 mile S. E. Arnolds Park	July 25. Same	
36257A ¹ Imm. Able to fly	July 24. 1 mile S. E. Arnolds Park	July 25. Same	

¹ Taken from same burrow at same time.² Also July 23 in burrow 20 ft. away with the one missing on 21st.

I am indebted for help in banding operations to Mrs. Stoner, Dr. Willis DeRyke and Mr. George E. Potter, while through Dr. A. K. Fisher of the Bureau of Biological Survey I secured identifications of the insects found in the burrows. I would also acknowledge assistance in furnishing professional equipment to the Graduate College of the State University of Iowa through the kindness of Dean C. E. Seashore.

*State University of Iowa,
Iowa City, Iowa.*