AN ANALYSIS OF SOME BANDING RECORDS OF THE EASTERN RED-WING

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DURING the four years between July, 1930 and August, 1934, 1,498 Eastern Red-wings (*Agelaius p. phœniceus*) were banded on Cape Cod by workers at the Austin Ornithological Research Station.[1] A total of 169 returns were recorded, comprising 121 individuals, and 368 birds repeated a total of 1083 times during the period. Seventeen birds were recovered from localities away from Cape Cod. Over two hundred Red-wings were banded by the staff at substations and breeding colonies on other parts of the Cape, and the records of these birds are kept at the headquarters station at North Eastham, with the records of the local colony.

The writer is grateful to Dr. G. M. Allen of Harvard University for valuable suggestions which helped him utilize the material more efficiently. Pertinent information was generously supplied by the Department of Conservation of New Jersey and by the Chamber of Commerce, Salem, New Jersey.

THE MORTALITY RATE OF THE YOUNG

Table I shows that of 28 birds banded in the nest in June, 1933, ten repeated in July or August and three returned in 1934, involving twelve individuals. Thus further reports were received on 43 per cent, indicating a possible 57 per cent mortality during the first year. Allowing a certain percentage for individuals which did not visit the traps, or which may have slipped their bands in the nest, the mortality of the young may have been between 40 and 50 per cent before they were three months old.

TABLE I

NESTLINGS BANDED AT NORTH EASTHAM IN 1933

Nest	*Date Banded*	*Band Numbers*	*Number of Birds*	*Number of Birds Repeating in July or August, 1933*	*Number of Birds Returning, 1934*
1	June 3, 1933	B234324–26	3	1	..
2	June 6, 1933	B234327	1	1	..
3	June 6, 1933	B234328–30	3	..	1
4	June 9, 1933	B234331–33	3	2	..
5	June 13, 1933	B234335–37	3	..	..
6	June 17, 1933	B234413–14	2	..	1
7	June 21, 1933	B234449–52	4	2	1
8	June 21, 1933	B234453–55	3	1	..
9	June 21, 1933	B234456–58	3	1	..
10	June 25, 1933	B234460–62	3	2	..
			28	10	3

[1] Contribution No. 21 of the Austin Ornithological Research Station. For a description of the station see Austin, O. L., "The Austin Ornithological Research Station," *Bird-Banding*, Vol. 3, No. 2, 1932, pp. 51–63.

THE ORGANIZATION OF THE MIDSUMMER FLOCKS

It has been suggested that in the premigratory movements of July and August the young leave the swamps in family groups accompanied by some of the females which raised them. Table II below shows the relationships of the nestlings banded in June, 1933, to one another after they began moving to the uplands the following month.

TABLE II

THE RECAPTURES OF THE NESTLINGS OF TABLE I DURING JULY, 1933

A=a.m.
P=p.m.

Numbers following time indicate trap:
Trap 1—House trap on drive near field.
Trap 2—House trap in field.
Trap 3—Duck trap in marsh.

	Nest No.	*July 22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*
B234326	1	.....	.....	.....	8A; 2	11A; 1	11A; 2 6P; 2	.....	.....
B234327	2	.....	.....	.....	.....	.....	.....	.....	8A; 3
B234331	4	8A; 1	.....	.....	.....	.....	.....	.....	.....
B234333	4	.....	8A; 2	.....	8A; 1	.....	8P; 2	.....	.....
B234449	7	.....	8A; 2	8P; 2	.....	.....	.....	.....	.....
B234452	7	.....	11A; 2	.....	8A; 2	8A; 1	6P; 2	8A; 2	.....
B234454	8	.....	8A; 1	.....	.....	8A; 2	.....	.....	.....
B234456	9	.....	.....	.....	.....	.....	8A; 2	.....	.....
B234460	10	.....	.....	.....	.....	2P; 1	.....	.....	.....
B234461	10	.....	.....	.....	.....	8A; 2	.....	.....	.....

Traps 1 and 2 are near together in a large field a few hundred feet from the marsh where the birds were born. At no time were two birds from the same nest caught together in a trap. In a single instance one bird (B234452) was taken from a trap three hours after its sibling (B234449). Again, birds from nest 10 were released from associated traps within six hours of each other. Apart from such distant relationships there seems to have been little tendency to move in family groups.

Among the midsummer flocks of 1933 were six birds identified as adult females. Three of these were unbanded birds, and the rest had been banded early the preceding spring. As they had not been caught during the nesting season, it is unlikely that they were local residents, or the parents of any of the local young with which they were trapped. None of them repeated more than twice in July nor showed any tendency to associate with any particular juveniles. The adult males do not associate with the young in this midsummer movement between the swamp and the uplands, being trapped with them but rarely, and, when seen, the males are always flying alone.

THE INSTABILITY OF THE FLOCKS

The make-up of the flock appears to change continually, different birds flocking together at different times of the day. It was possible to reconstruct with some degree of accuracy the membership of each flock as it visited the traps, and it was clearly evident that indi-

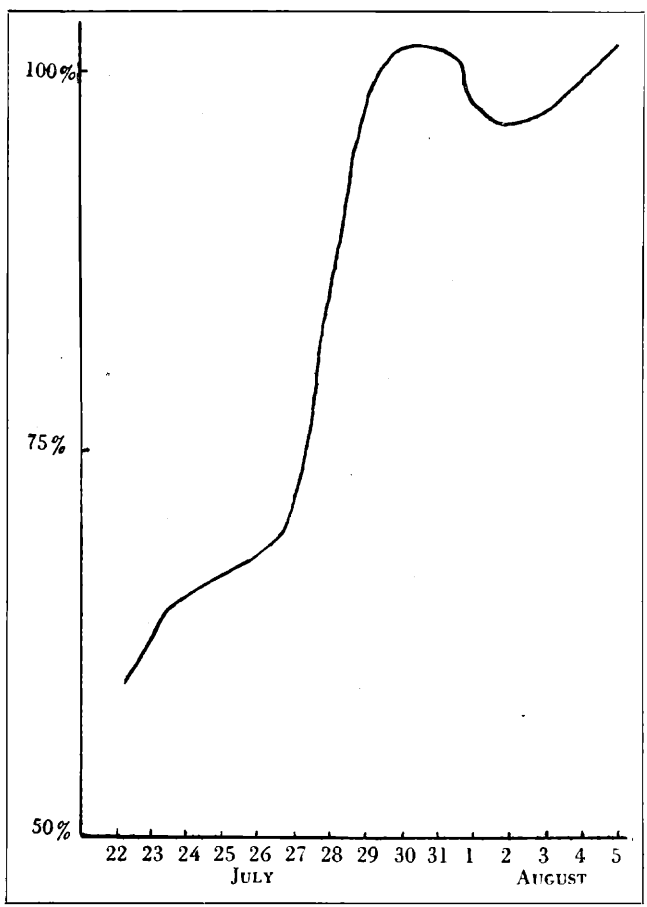
viduals frequently shift from one flock to another. For example, B234454 was captured at 8 A.M. in an upland trap with seven other young; at 11 A.M. it was retaken there with another group of seven, none of which had been in the first flock. At 8 P.M. it reappeared with six companions, of which two had been caught separately during the day: one had been with B234454 at 8 A.M., and the other at 11 A.M. This is as close an association of individuals as is shown by any of the records, and most of the relationships appear to be quite haphazard. A further indication of the instability of the flock is the fact that one often sees birds from one flock break away from it and join another group as it passes over the place where the first group may be feeding.

Each day more young appear at the upland traps and merge their ranks with the early venturers. Almost every round of the traps discovers many unbanded juveniles. Most of the young known to have been raised on the property (Table I) visited the traps more or less continuously over a period of several days before disappearing for the season. These have been omitted from the accompanying graph, which shows the general percentages of the young banded during the period which did not reappear after the banding date that summer. The curve shows that from July 23d to 27th about sixty per cent of the new young each day were not recaptured during the summer; after the 28th a much higher percentage of the young banded appeared but this once. Such extremely high numbers of disappearing birds indicate that many of these birds do not stay on the property, but are already on their way to other localities by late July. These figures are based upon captures of 185 young birds, many of which were probably not local residents, but had come from other parts of Cape Cod, or even from the mainland.

To summarize, it has been shown that there is no reason to believe that the conspicuous premigratory flocking of the juvenile Red-wings is organized on the basis of family groups, but rather that the organization of the flocks is quite haphazard and variable. The few adults (mostly females) trapped with the young at this time give no evidence of being more than casually associated with them. The juveniles themselves are at this time already moving slowly through the area to other regions.

THE MIDSUMMER MOLT AND THE FALL MIGRATION

By the time the flocks of young are visiting the upland traps from July 21st until August 6th, the adults have almost entirely disappeared from the fields. Dr. A. A. Allen (1914, p. 102 *et seq.*) summarizes the literature upon this point stating that such a disappearance takes place each season all over their nesting area during the first part of August. He explains this disappearance as being due to molting, the handicapped birds retiring to the seclusion of the marshes, where they are seldom seen. Their diet now becomes



Percentage of young which visited the traps only once during the summer of 1933, as compared with the total number visiting the traps daily during that period

insectivorous, and remains so while they are molting. In September, he continues, the males emerge from the swamp freshly clad, and are soon followed by the females and the immature birds. Then for a considerable period they spend their days in the uplands and their nights in the marsh. Migration begins in the middle of October. The flocks are very large and conspicuous, numbering as many as several tens of thousands of individuals.

To a certain extent the Austin records agree with these conclusions. In late July the males disappear; then the females, and finally the flocks of young also vanish. Occasionally a single bird is seen flying across the dam at the station, or sometimes groups of two or three; but this movement lasts only a few days. The records in middle August tend to be of birds captured in traps bordering the marsh, and these individuals show evidence of molt. The latest midsummer capture during the four years was on the 13th of August. According to Allen's experience, the birds at this season are molting in the swamp, and may be expected back in the uplands in early September when they may be caught in the traps then. But this does not happen on Cape Cod. There is not a single September or October capture at the station in any of the four years. If the local birds were preparing to move south at the time, it is very improbable that some of them should not be caught at the traps, with which they are familiar, and which would be normal places for them to seek food. (Their diet changes to vegetable material after molting.) There had been two hundred and twenty takes in midsummer of one year (1933) and some of these birds, if still in the vicinity, would in all probability have visited the traps in the fall. Our findings give every indication that the local Cape Cod birds have left the breeding-area in July and August, and that the birds seen occasionally in fall and winter are visitors from the mainland to the north.

Allen's conclusions about the August molting habits of the Red-wing were derived from his observations in the Renwick marshes at Ithaca, New York. These swamps, which he describes in detail, are very extensive. The predominating plant is the cat-tail, which, he found, grows to a height of between ninety and one hundred inches by June and remains at that height during July and August. This forms the shelter in which the Red-wings molt and find seclusion.

The swamps of Cape Cod differ considerably from those about Ithaca. Cat-tails are few at the station, and the marsh plants rarely grow taller than four feet, affording but little shelter, as contrasted with those of the Renwick swamp. While the marsh studied by Dr. Allen is an ideal place for birds to remain undisturbed during the molting period, the swamps of Cape Cod seem poorly suited for such a purpose.

TABLE III. RECOVERIES

	Age and Sex when banded	*Date*	*Recovered*	
B234368	jv.	6/14/33	Groton, Mass.	July 10, 1933
A267514	im. ♂	4/20/32	Salem, N. J.	July 21, 1932
B262250	ad. ♀	4/28/34	Salem, N. J.	Aug. 1, 1934
A267513	im. ♂	4/20/32	Salem, N. J.	Aug. 15, 1932
A278000	ad. ♂	5/ 5/32	Chester, Conn.	Aug. 20, 1932
A259043	jv.	7/19/30	Salem, N. J.	Aug. 23, 1930
B215389	jv.	7/31/32	Bridgeport, N. J.	Sept. 9, 1933
B271243		7/30/34	Newbridge, N. J.	Sept. 25, 1934
B209965	jv.	7/27/32	Newport, Del.	Oct. 1, 1932
A277211	jv.	6/23/31	Burlington Swamp, N. J.	Oct. 10, 1931
A273457	ad. ♂	4/22/31	Gloucester County, N. J.	Oct. 19, 1931
A273462	ad. ♂	4/23/31	Kearny Meadow, N. J.	Oct. 29, 1932
A277692	im. ♂	4/25/32	Georgetown, S. C.	Dec. 1, 1933
B224969	ad. ♂	4/16/34[2]	New Bern, N. C.	Dec. 4, 1934
B271336	jv. ♂	8/ 1/34	Summerville, S. C.	Dec. 5, 1934
B262274	ad. ♂	5/15/34	Westover, Md.	Dec. 31, 1934
A277793	im. ♂	5/17/32	Back Bay, Va.	Feb. 27, 1934
B234251	♂	5/12/33	Orleans, Mass.	May 12. 1933

The table (No. III) and accompanying map of recoveries show that Red-wings banded at the station were found at many points along the migration route during the early summer and fall. In July, August, and September these birds were found from Connecticut to southern New Jersey, and not only in one year, but in all four years. The midsummer molt is in progress at this time, and yet station birds are to be found three hundred fifty miles or more from their nesting area.

Considering (1) the numbers of young birds captured but once during the summer; (2) the almost complete absence of Red-wings in September and later at the station; (3) the dates and localities of recoveries; and (4) the nature of the local swamps, we conclude that most of the Cape Cod birds do begin the southward migration in July and August before the summer molt is started, and that they probably complete the molt in swamps after their migration has begun. Unlike the swamps of Cape Cod, many of the marshes on the flight route, such as those found near Newark and Salem, New Jersey, afford suitable protection for molting, comparable to that provided by the marsh at Ithaca. It is probable that some of Allen's molting birds had come to that well-protected swamp at Ithaca from distant places to undergo the molt, and did not migrate farther until autumn.

THE FLIGHT ROUTE

The flight route of the Cape Cod birds is clearly shown by the map of the recoveries received before January, 1935. All the records

[2] Banded at Barnstable, Mass.

are of fall or winter recoveries, so they are comparable. (The Groton recovery is discussed elsewhere.)

The Atlantic coastal swamps extend from Cape Cod along the northern shore of Long Island Sound, around Newark Bay and the Hackensack River west of New York City, and decrease in extent from Raritan Bay to Sandy Hook, where they disappear. (See map.) "From Bay Head south, there are broad expanses of swampy ground bordering the Bays between the mainland and the Barrier Islands. These extend all the way to Cape May."[3] Along the Delaware River from Trenton southward lies another series of marshes, which continues along the margins of the Chesapeake Peninsula. The western shore of Chesapeake Bay is also bordered with extensive swamps, which stretch down the coast to Florida.

All but one of the recoveries came from these swamps. Following the mainland swamps from Cape Cod to the Newark meadows, the birds proceed across the State from Kearny to the Delaware River Valley, instead of following the New Jersey coast. That this is of regular occurrence is indicated by the fact that forty per cent of the recoveries come from this region, and that they are dated at different times during the same season, and during four separate years.

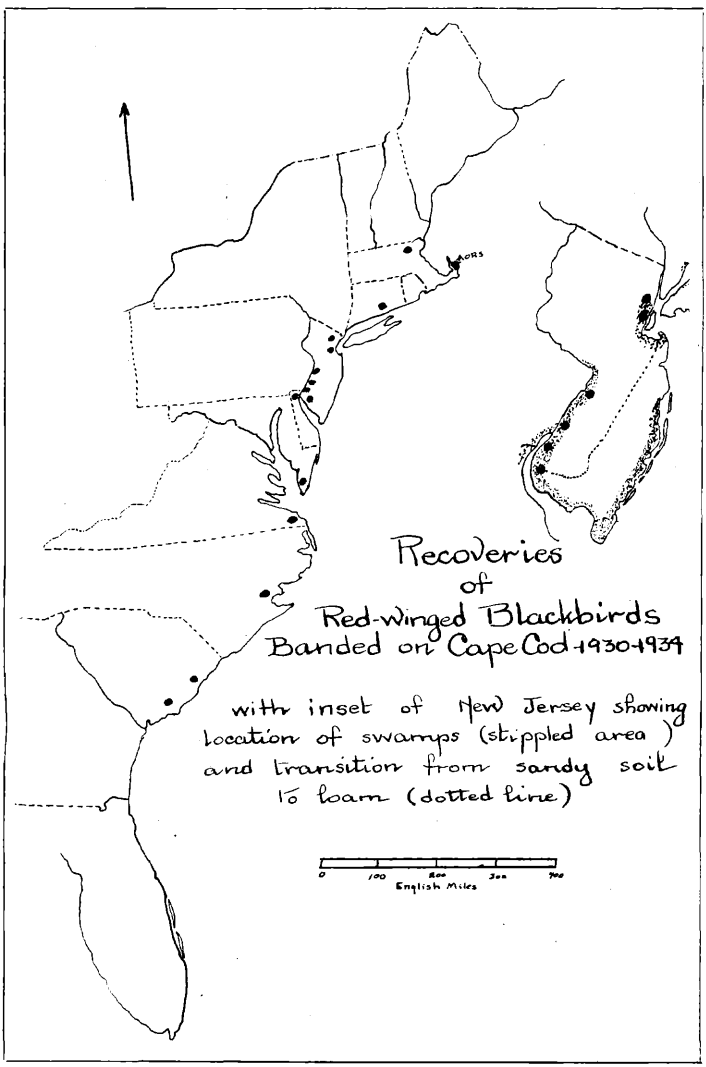
There are several possible reasons for this choice of route: (1) the difference in the soil, as indicated by the dotted line on the inset map, affecting the general ecology; (2) the fact that there is considerable shooting of these unprotected blackbirds at Kearny and Salem; or (3) the fact that the migration path of most landbirds follows this line across the state, except when they are blown to the coast by northwest winds, to concentrate at Cape May.

Red-wings are abundant in the swamps of the shore of the Chesapeake Peninsula, and this is probably the route the Cape Cod birds followed to reach Westover, Maryland, and Back Bay, Virginia.

The most southern records are also the winter ones. The *Bird-Lore* census lists indicate that Red-wings regularly winter in numbers near Georgetown, South Carolina, but also record them from Salem and Cape May, New Jersey. I am informed that all the Red-wings leave Salem shortly after Christmas, and do not winter there. The wintering-grounds of the Cape Cod Red-wings are not definitely known, and it is very possible that the birds of a single summer colony are scattered over a wide area in the winter.

It should be stated that theories based solely upon eighteen recoveries are dependable only if supported by field observations in the regions concerned. These conjectures on the flight route of the Cape Cod Red-wings are supported by the field work of a number of competent observers, but space prohibits the discussion of it. Mr. Ludlow Griscom, to mention but one, did intensive field work in

[3] Quoted from a letter from Mr. Meredith E. Johnson, Assistant State Geologist for New Jersey, who has supplied much information about the topography of New Jersey.



Atlantic-Coast States, Maine South to Florida

New Jersey for many years, and informs me that his observations concur with the conclusions presented here.

THE TRURO COLONY

Between June 14 and 19, 1933, eighty-seven nestlings from thirty nests were banded in the marshes of the Little Pamet River, at Truro, five and a half miles north of the Austin station. The single recovery of one of these birds (B234368) was made on July 10, 1933, by William P. Wharton at Groton, Massachusetts.

There were very strong easterly and northeasterly winds on Cape Cod from the 3d of July until the 6th, which probably blew the young bird recovered at Groton across Cape Cod Bay. The date of recovery is surprisingly early, for the young of the North Eastham colony (Tables I and II) did not leave the swamp until twelve days later.

It is worthy of remark that not one of the eighty-seven Truro birds made an appearance at the station proper during the succeeding fourteen months. The station trap-line extends about one third of the way across the Cape at North Eastham; and as the freshwater swamp on the property is the largest in the vicinity, food is ever abundant. It is reasonable to suppose that most of the Red-wings of the outer Cape visit the property, and that a large majority are captured at least once. If the colonies migrated as units, a restricted route along the ocean shore of the Cape might be postulated to explain the dearth of reports of the Truro birds. However, it has been shown that the members of one colony leave in small unorganized groups rather than as a unit. Further banding of the colony at Truro is needed in order to determine the true solution; definite conclusions cannot be based upon a single report.

THE EASTHAM COLONY

In 1932 twelve nestlings were banded in nests at Minister's Pond, Eastham, three miles south of the station proper, on June 14th, 16th, and 25th. None of these appeared at the headquarters station in 1932, and seven were never heard of again. However, the other five were caught at the station in April and early May, 1933; and two in April, 1934. It is noteworthy that of twelve birds banded *south* of the station in 1932, five (or 43 per cent) were recovered at the station the next year; while not one of eighty-seven birds banded a little farther *north* of the station in 1933 was ever retaken on Cape Cod.

The paucity of repeats from the Minister's Pond birdsl eads to the conclusion that none of these birds which appeared at the station nested there. The question arises whether there may not be a tendency among the returning migrants to wander a distance north of the subsequent breeding-grounds before selecting a nesting-territory. This theory is supported by the notes of N. L. Hackett,

who observed (1913) that when the Red-wings of a small colony in Iowa arrived in March, they stayed in the locality for a week, frequenting the tree-tops, and then disappeared. They returned on May 1st, and sought the meadows, to stake out territory and to mate. All the Austin spring records show that this early foraging is a regular practice, and occurs generally among birds of all ages.

The spring birds may be divided into three groups: those which pass through the property on their way to other localities and do not reappear until after the nesting-season, if at all; those which arrive before the nesting-season, disappear for a period varying from ten days to over a month, and then return to the vicinity to breed; and those very few which remain near the banding-site during the whole spring. It may be concluded, then, that the individuals of a colony are associated with that colony each spring, if there is room, no matter how widely they may be scattered during the winter. The returning birds appear to forage some distance north of the colony's breeding-ground before returning there to nest.

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