THE HOMING OF COWBIRDS

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PERHAPS the most remarkable aspect of bird behavior is the ability of many species to return to a restricted familiar territory after liberation from relatively great distances. This is an ability distinct from migration, although it must depend on use of the same mechanisms of orientation, whatever these may be. This ability has been known for species such as the pigeon since ancient times, but it is only in recent years that experiments have revealed the great differences in homing ability among species.

The experiments reported herein on cowbirds, *Molothrus ater ater,* were begun in 1947. Although the primary purpose in trapping these birds was a study of their blood parasites, it was soon observed that the retrapped fraction was substantial. Since then groups have been taken to various localities as recorded in Table 2, and liberated in order to ascertain the percentage of returns, possible differences in the homing abilities of the sexes, possible influences of age and seasonal factors, differences in the homing ability of individuals, speed of travel, and longevity. Transportation was by automobile, the maximum distance of the release point being determined by the ability of the birds to endure confinement in closed containers. Liberation was usually late in the day or at night, and when possible, in the countryside near a body of water. Fortunately cowbirds endure temporary lack of food and water much better than many species.

That cowbirds have considerable homing ability has been known for some time. Table 1 summarizes six reports in the literature. Matthews (1955) has cited experiments by Lyon in which liberated cowbirds returned from distances as great as 1,900 km (1,200 miles), but in the original reference (Lyon, 1935) the maximum distance given is only 40 km (25 miles), and Lyon himself mentions no other experiments. Nevertheless, according to Griffin (1944), Grosvenor and Wetmore (1932) also credit Lyon with liberating cowbirds that returned from this great distance. Wallace (1955) also states, but without mentioning the investigator, that cowbirds shipped to Denver, New Orleans, and Washington, D.C., were able to find their way to Waukegan, Illinois.

Cowbirds used in the present study were trapped in Fayetteville, New York, about 15 km (9 miles) east of Syracuse, usually with a four-funnel house trap. They were then taken to the biological laboratories of Syracuse University for examination. Blood films were made, government bands applied, and, unless the bird showed parasites of such a nature that post-mortem study was desirable, it was then liberated. The number of cowbirds so studied was 875, the number released 738, and the number re-

TABLE 1
HOMING EXPERIMENTS WITH COWBIRDS*

Reported by:	*Number birds liberated*	*Number returning*	*Distance returned*		*Time required to return*
			km	*miles*	
Gillespie, A. 1930	1	1	32	20	4 hours
Lyon, W. I.	10	"most"	4.7	3	"few days"
1935	7	1	5.6	3.5	8 hours
	1	1	9.7	6	"next day"
	1	1	40	25	"next day"
Fox, A. C.	1	1	300	184	5 days
1940	1	1	170	107	18 days
	1	1	130	80	5 days
Neff, J. A.	84	60	16 or less	" 10 or less"	1 to 65 days
1943	60	19	16 to 128	"10 to 80"**	1 to 52 days
Stoner, E. A. 1952	1	1	97	60	2 days
Wood, H. B.	2	1	35	22	2 days
1952	1	1	90	56	5 days
	1	1	160	100	4 days

* Except in Neff's study, in which *Molothrus ater obscurus* was used, the subspecies seems to have been *Molothrus ater ater.*

** The single bird, a male, returning a distance of 128 km, required six days for the trip.

leased prior to 1961, 656. Of these, 217 have been recaught at the original trapping point, about 15 km (9 miles) distant at least once, or slightly less than one in every three. Although the proportion of males to females caught is almost exactly two to one (534 to 271, after 52 immatures of uncertain sex are deducted from the total), a disproportion that Friedmann (1929) states always exists, it is of interest that the ratio recaught is approximately three males to every female (158 to 59).

The description and data concerning liberations are recorded in Table 2. There were 52 recoveries involving 46 birds of which 38 were males. Student's test applied to the two sets of figures for recoveries shows both to be significant at a level of confidence greater than 0.01. In other words, the fractions 59/158 and 8/38 are both significantly larger than 271/534. Thus the percentage of males was 76, and the ratio almost exactly the same between the sexes as when only the distance from the university to the trap was involved. The maximum speed travelled was 140 km (90 miles) per day; this was by a bird returning from Edinboro, Pennsylvania. This trip of 440 km (275 miles) was completed in two days and three nights. It is also of interest that a bird released in Binghamton, New York, early in the evening of 23 April 1961, was recaptured on the morning of the 26th. The distance travelled was in this case only 140 km (87 miles), but the weather was heavily overcast for the whole period and reliance on celestial navigation must have posed difficulties. On several

TABLE 2
HOMING PERFORMANCE OF COWBIRDS CAPTURED AT FAYETTEVILLE AND TRANSPORTED FROM SYRACUSE TO SELECTED RELEASE POINTS

Date	*Place where liberated*	*From Syracuse:*			*Number released*	*Number recaught*	*Time between release and recapture*
		direction	*km*	*miles*			
7 June 1958	So. Amherst, Mass.	E	350	218	6	3	1, 10.5, 12 months
12 June 1959	"	E	350	218	3	1	10 months
8 June 1950	Ayer, Mass.	E	470	290	8	1	10 months
26 June 1960	Barneveldt, N.Y.	ENE	97	60	4	3	2, 7, 14 days
1 May 1960	Beekmantown, N.Y.	NE	390	242	20	5	6, 7, 7, 12, 16 days
23 April 1961	Binghamton, N.Y.	S	126	78	15	5	2.5, 4, 4, 6, 6 days
18 May 1951	Canton, N.Y.	N	210	130	16	0	——
24 April 1957	" "	N	210	130	7	1	29 days
20 May 1960	Chelmsford, Mass.	E	550	340	7	2	34 days, 11 months
8 May 1948	Conway, Mass.	E	350	215	3	1	11 months
3 June 1959	Deerfield, Mass	E	350	215	7	1	13 days
8 June 1960	" "	N	350	215	2	1	20 days
5 May 1959	Edinboro, Pa.	W	440	275	15	3	4, 8, 8 days
29 May 1957	Hamilton, N.Y.	E	66	41	6	1	11 months
5 May 1951	Hudson, Ohio	W	560	350	11	0	——
6 August 1951	" "	W	560	350	3	0	——
4 May 1951	Ithaca, N.Y.	S	100	62	15	3	5, 6, 7 days
7 May 1959	" "	S	100	62	6	3	3, 23, 28 days
23 May 1960	Lewiston, Me.	NE	490	305	23	2	12, 15 days
22 June 1959	Perinton, N.Y.	W	150	95	2	1	11 months
3 May 1959	Plattsburgh, N.Y.	NE	380	234	11	5	5, 7, 17 days; 11.5, 12.5 months
5 May 1956	Rochester, N.Y.	W	155	97	1	1	11 days
12 May 1960	Washington, D.C.	S	610	380	4	0	——
7 April 1960	"	S	610	380	6	1	9 months
24 April 1959	Westboro, Mass.	E	470	290	23	6	8, 9, 11, 11, 16, 22 days
28 May 1947	Williamsburg, Mass.	E	320	200	2	1	11 months

occasions birds released at the laboratory were found in the trap at the original trapping point in less than three hours, indicating the use of a rather direct course. Although there are other banding stations on the way and in the neighborhood, there are no reports that any of these birds have been caught in them. Of further interest is the fact that no immatures have been recaught in the season when banded after liberation at the university or more distant points. Of course, there is no way of knowing the precise time required for return, since it is not known whether the trap is the first place revisited; nor can one usually know the exact time of recapture. The greatest number of recaptures of an individual was 32. Of the birds liberated at a distance, two were recaptured after two trips, one after three trips, and one after four: the last was a male that returned from South Amherst, Massachusetts, in June 1958; from Westboro, Massachusetts, in May 1959; from Plattsburgh, New York, in May 1960; and from Chelmsford, Massachusetts, where it was liberated later that month although not recaptured until April 1961. The first of these return trips required about 10 months, as did the return from Plattsburgh; but only nine days elapsed between release at Westboro and recapture in Fayetteville. Male No. 141446, which was recaptured after each of three such trips, required much less time for its returns. It was first released in Beekmantown, New York (near Plattsburgh), recaught 13 days later, then released in Chelmsford, coming back in seven weeks, and finally taken to Binghamton, New York, reappearing in the trap just four days later. It is worth noting that these three points of release are each in a different direction: northeast, east, and south of Fayetteville.

The banding experience with cowbirds also seems to shed some light on natural longevity. Twenty-seven have been recaught one year after the original banding, 12 after two years, three after three years, and one after four years, but none of birds banded longer ago than this. Since there is nothing to indicate that cowbirds are easier to trap at any particular age, and since Friedmann (1929) gives their life span as from 12 to 15 years, it seems likely that few of them die of old age, at least in central New York. If their mortality approximates that of other passerine birds it probably amounts to between 30 and 40 per cent annually (Gibb, 1961). The fact that of 10 immatures trapped in 1960 none was recaptured in 1961 and of 12 caught in 1959 only one was recaught in either of the two following years may be further evidence; it may, of course, also indicate considerable scattering after returning from migration.

DISCUSSION

That many species of birds have a strong homing instinct is well known, some (such as shearwaters, terns, and gulls) being able to return to the

place of original capture from distances of many hundreds and even several thousand of kilometers. However, little is yet known about the homing abilities of the great majority of passerine species, although probably most are incapable of repeated and sustained flight over distances such as those covered by shearwaters.

Many of the best investigations with passerine species have been done by Rüppell. Of the more than 800 Starlings, *Sturnus vulgaris vulgaris,* liberated in a series of experiments, more than a quarter were recovered, and some returned from distances as great as 1,845 km (1,160 miles). Swallows of several species also proved to be good homers.

As compared with Red-winged Blackbirds, *Agelaius phoeniceus phoeniceus* (Manwell, 1941), cowbirds seem to be about equally good homers. Certain individuals of each species are repeatedly recaught, even after liberation at distant points, although about two thirds are never seen again. A few Red-winged Blackbirds have been recaught after release at Chicago and Washington, D. C., to which the author shipped them by air, and numerous individuals have returned from distances up to 340 km (210 miles). In this case it is impossible to compare the sexes, since the great majority of the birds trapped have been males. A few experiments have also been done with the Purple Grackle, *Quiscalus quiscula,* although it does not stand transportation as well as Red-winged Blackbirds and cowbirds. One, however, was recaptured after being released at Ithaca, 100 km (62 miles) away, six weeks earlier. Song Sparrows, *Melospiza melodia melodia,* although weak fliers compared with the larger blackbirds, have been found to return from limited distances. One liberated at Cortland, New York, about 60 km (35 miles) from Syracuse, was recaught six days later (Manwell, 1936), and others returned after shorter trips.

When the speed of return of liberated birds is considered, it seems likely that weather and familiarity with neighboring territory are important factors. Matthews (1955) speaks of "sunny weather from mid-May to mid-June, conditions shown to be conducive to good homing" and mentions the better homing of pigeons and Starlings with "migratory experience." In the experiments herein reported, however, only the former could have operated, since a given bird was not released twice at the same distant point, unless, of course, the return route may have coincided to some degree with the migration flightways. It seems unlikely that this could often have been the case.

SUMMARY

It appears that the Brown-headed Cowbird, *Molothrus ater ater,* has a strong homing instinct, and that this may be better developed in the male than in the female. It seems likely that the peculiar breeding habits

of this species may be responsible for this, since the female has no special breeding site, whereas the male has a preempted territory, and often even his own preferred "singing tree" therein (Friedmann, 1929). Perhaps the smaller female is less able to survive the longer flights. This may even be the reason for the large excess of males in populations of mature birds that have returned from at least one southward migration to winter quarters in Mexico. Another possible reason for the inequality of recaptures of the sexes could be that the female is more wary of traps, although there is no evidence of this. Finally, experience in banding cowbirds over a period of years suggests that under natural conditions, although a few may survive as long as four or five years, the great majority die much sooner.

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