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TEN YEARS AND 10,000 BIRDS (concluded)

By H. ELLIOTT McCLURE

Black-headed Grosbeak, *Pheucticus melanocephalus.* A total of 36 were banded, three of which repeated in the same season. They were all captured at Hart Park and one was retaken there 385 days after banding, and a second 955 days after banding. They were caught with Rogers 8-cell traps using grain or peanut hearts as bait. Since this species is a summer resident only, its first and last appearance in the traps is of some interest. In 1946, '47 and '49, first birds were taken between June 19 and 29th. In 1948 and 1950 they were first taken on April 29. Latest individuals were captured between August 7 and 20, 1947, '48 and '49.

House Finch, *Carpodacus mexicanus.* In Kern County, the House Finch appeared to be three-brooded, but loss of nests through environmental pressures and those from which young were fledged were quickly replaced by new construction. This activity obscured the presence of definite broods of young. The bulk of young of the first brood was fledged around May 20, second brood June 30, and third about the last week of July.

Finches presented the same difficulties of trapping as did the English Sparrow. They appeared to be readily captured only when there were many juveniles in the area, which was at variance with experiences of banders (Michener & Michener, 1933) in Los Angeles County where House Finches were trapped the year round. None was captured earlier than April nor later than September, yet they were abundant in trapping localities all through the year. Peak catches were in July (Michener & Michener, 1926), coinciding with the proportion of juveniles in the population. In three years 1,336 finches were banded, 560 as nestlings. Only 18 of these nestlings were recaptured as juveniles, suggesting a rapid dispersal from the breeding grounds. Adults and juveniles were not readily recaptured, but 66 repeated and two-thirds of these were in July. Fifteen were taken a year after being banded, and one was caught two years later. Known mortality determined from recovery of dead individuals within a few months of the time they were banded was 3.8 percent. Other recovery records as shown in Table 11.

Those birds which were taken at the point of banding in following years were all trapped, while those at a distance were shot or found dead. The one moving a mile west in a year had been trapped at the Olive Grove and released at the Cabin, but had gone only a mile from the Cabin, not returned to the Olive Grove. An adult female was kept in captivity for a year and was then released at Hart Park. A year later it was retrapped in the Park. Both of the birds moving 10 and 12 miles from their birthplace, Hart Park, were banded there as juveniles. These data would suggest that juvenile House Finches wander from their place of birth, and that adults are more tenacious to their breeding territories. Field studies of population movements showed an influx of finches into the oak-grass foothills in September and October where they gleaned ripening grass seeds. Since this habitat was several miles above the usual breeding places of the valley and there were many times more birds present than bred there, it was assumed that the movement was from the valley floor. This indicates a much greater range than band recoveries would suggest.

The Bakersfield study was not of long enough duration to give data concerning longevity in this species, but Michener and Michener (1933) in Pasadena found birds surviving for eight or more years. Their survival records indicated that for every 100 birds that reached one year of age, 42 reached two years, 23 three years, 15 four years, 5 five years, 3 six years, and 1 eight years.

TABLE 11

RECOVERY OF HOUSE FINCHES BANDED IN KERN COUNTY

Number of Birds	Distance from Place of Banding	Direction	Average Age Since Banded	Age When Banded
14	0 miles	O	353 days	12 Ad., 2 Juv.
1	½	W	240	Juv.
1	1	W	338	Ad.
2	0	O	713	Ad.
1	12	S	833	Juv.
1	10	W	1297	Juv.
1	0	O	1377	Ad.

The number of finches with evidence of old injuries was much greater than that of any other species handled (Michener and Michener, 1936). Commonest of the injuries was the absence of phalanges from one or both feet. Over 800 birds were examined and 13.3 percent had missing phalanges. Preponderance of the losses were among adult birds, 37 percent males, 43 percent females, 20 percent juveniles. The losses were distributed equally, 32 percent being on the left, 37 percent on the right, and 31 percent on both feet. The number of birds noted with damaged feet decreased each year, 16.2 percent in 1946, 10.3 percent in 1947, and 5.1 percent in 1948. In 1946, 19 of 23 nests examined contained larvae of *Apaulina sp.* (*Protocalliphora*) with an average of 30 per nest. In 1947 and 1948, very few larvae were found and but few infested nests. These larvae commonly suck blood from lacerations that they make upon the feet, ears and nostrils, and sometimes were lifted with the bird as it was removed from the nest. It was assumed that this habit of feeding on the toes produced injuries which led to subsequent loss of phalanges after fledging. *Apaulina* larvae also fed in the nostrils damaging the tissues producing the deutrum causing a suspension of growth, with the result that the upper mandible was foreshortened and the lower greatly elongated. The bill grows continuously and without the wear of opposing surfaces the lower mandible extends into a "shovel-nosed" condition. One nestling was under observation while this condition developed and the growth of the upper mandible had stopped by the time it was six days old. Such an injured bird survives in the wild and one was kept in captivity more than a year. It picked up its food with the side of the bill. Of the 800 examined, 1.7 percent were shovel-nosed.

Other injuries or abnormalities noted were: one pure albino, one female with five toes on the right foot, one bird with a leg missing, and another with a blind eye.

American Goldfinch, *Spinus tristis.* Although a few remain to nest each year the bulk of the population is winter resident or transient between December 23 and March 18. None was trapped outside of these dates. At Hart Park a total of 65 adults were banded, 21 of which were recaptured the same season at an average of 23 days. Six others returned the following season at an average date of 323 days since banded. With this species came one of the amusing mistakes that can arise from a misread number. A band report stated that one was shot near Shafter when three years old and was listed as a Coot.

Four nestlings and one juvenile were banded in Hart Park in June 1946.

Lesser Goldfinch, *Spinus psaltria.* One nestling was banded at Hart Park in 1946 and one juvenile in 1947.

Lawrence's Goldfinch, *Spinus lawrencei.* The Lawrence's Goldfinch nested early at Hart Park, avoided parasitism by the Cowbird, and had a very high nesting success. Sixteen young were banded in 5 nests between April 27 and May 21, 1946, 25 young in 10 nests between April 14 and May 8, 1947, 9 young in 3 nests between April 29 and May 9, 1949, and 16 young in 7 nests found on April 17, 1950. No nestlings were subsequently found dead about the nests and there were no recoveries. No nestlings were banded in 1948 because the species did not come to Hart Park that year.

Rufous-sided Towhee, *Pipilo erythrophthalmus.* A thinly populated permanent resident of the brush habitats along streams, a few were captured each year at Hart Park, with a four-year total of 59. Only eight of these were in immature plumage when captured. The population pattern was not evident since no birds were taken more than one year after banding, yet some repeated regularly, 14 repeating 24 times. The distribution of repeats was as follows:

Month after Banding	No. Repeats	Month after Banding	No. Repeats
1	7	7	1
2	3	8	1
3	1	9	3
4	2	10	0
5	1	11	1
6	1	12	1

This would suggest that the population at Hart Park was unstable with little or no residency and breeding. Half of the birds that were recaptured were taken before and following winter so that they have remained in the Park for the winter season. The average interval at which towhees were recaptured was 122 days.

Based on plumage characters the sex ratio was 29 males to 22 females.

On June 10, 1949, a male that had no upper mandible and the nostrils covered with scar tissue was trapped. It could breathe only through its mouth, yet it was in good flesh and plumage, and was retained in captivity until June 8, 1950, when released, still in good plumage and flesh, having undergone one complete moult. Food was picked up by turning the head and grasping the food from the side. Although there was the further problem of the exposed tip of the tongue becoming dry and shrivelled, the bird was an excellent singer.

Savannah Sparrow, *Passerculus sandwichensis.* Three adults were banded at the Camp stock farm in March 1948 and March 1949.

Lark Sparrow, *Chondestes grammacus.* Although a permanent resident in Kern County, Lark Sparrows did not seek the riparian habitats like those of Hart Park except during the summer. At other seasons they were in flocks foraging over the dry hills and grasslands. The 266 adult birds that were banded were trapped between May 14 and September 10. The nests in Hart Park were heavily parasitized by Cowbirds and only 17 nestlings were ringed. Thirty-eight individuals were captured 52 times and those that repeated the season they were banded did so at an average interval of 17 days. The distribution of these retakes was as follows:

Time After Banding	Number Birds	Time After Banding	Number Birds
Within 1st Month	21	Within 13th Month	1
2	3	14	
3		15	
4		16	
5		17	
6		18	
7		19	
8	1	20	1
9	1	21	2
10		22	
11		23	1
12	7	24	

As with most of these species that wandered in and out of Hart Park, ascribing age classes to the population is difficult. Of the 112 banded in 1946, 7 repeated at an average period of 18 days. However only one of these 7 was known to be alive a year later. Nine of the 112 were alive 1 year later and 2 the second year. In 1947, 147 birds were marked and 19 repeated at an average interval of 15 days. Of these 19, two were alive the following 2 years, and of the total, 5 were alive one year and 2 the second year. Fourteen birds survived one or more years and 4 for 2 or more years. If the survival rate was uniform, then the age ratio was: Birds 1+ years 52, 2+ years 14, 3+ years 4.

No birds were recovered at a distance. Two injuries were noted, one adult with a blind left eye, and one other adult with the bill deformed; the lower mandible bent above the maxilla.

Oregon Junco, *Junco oreganus.* The number of individuals marked was 153 with a sex ratio of males to females, 1946-47, 9:13; 1947-48, 29:31; 1948-49, 17:19; 1949-50, 16:18. Fifty-one birds repeated 77 times the winter they were captured, at an average interval of 32 days. Their time of arrival as indicated by first birds caught was between November 11 and 26 in 1946, 48 and 49, but in 1947 none was caught until December 19. Last birds were trapped on April 2 in 1948 and 49, and on May 19, 1947. Six percent returned in following years suggesting either a very high mortality or a tendency not to return to the same locale each winter. Nine birds were taken the following year, 3 of which were among the 51 that repeated the previous year. One bird returned 707 and 1008 days after being banded. Two of 24 birds in 1946-47 were alive a year later and one lived at least until its third year. Two of the 60 birds banded in 1947-48 were known to be alive the following year, while 5 of the 36 banded in 1948-49 were known to survive a year.

Harris' Sparrow, *Zonotrichia guerula.* An immature was banded in November 1946 and repeated seven times during the next week. It was retained as an exhibit and died three months later.

White-crowned Sparrow, *Zonotrichia leucophrys.* This is one of the most commonly banded birds of the west. It was intensively studied by Blanchard (1941) and Blanchard and Erickson (1949), Michener and Michener (1943) and banding results have been regularly reported in the mimeographed "News From the Banders" publication of the Western Bird-Banding Association. Between 1924 and 1949 more than 64,500 were banded in California and the adjoining states.

A total of 2950 different birds were banded over a period of 4 winters and 282 trap days (Table 12). This was an average of more than 10 new birds per trap day. They were handled 8108 times or 2.7 times per bird. Table 13 summarizes the data by location and year, and indicates that the take reflected the desirability of the habitat in which trapping was done. The number of traps in operation was not uniform depending upon their availability, state of repair, etc. In 1946-47 traps were set at the Cabin, one mile west of the Cabin and at Hart Park. During this season almost continuous trapping at the Cabin raised the percentage of days when traps were in operation to 60. The average number of birds per trap

TABLE 12

SUMMARY OF WHITE-CROWNED SPARROW TRAPPING RESULTS BY YEAR

	Trapping Dates				
	Oct. 19, 1946 to April 26, 1947	Oct. 10, 1947 to May 7, 1948	Oct. 8, 1948 to April 29, 1949	Sept. 30, 1949 to April 7, 1950	Total
Total Days	189	209	203	190	791
Total Trap Days	114	91	49	28	282
% of Days Trapped	60	43	24	15	35
Birds per Trap Day	20	25	51	30	28
New Birds:					
Juvenile	417	480	479	100	1476
Adult	372	592	401	109	1474
Total Repeats	1513	1129	1407	345	4207
Repeats per Bird	1.9	1.0	1.0	.6	1.1
Number Returns		107	337	319	763
% Returns		9	27	60	20
Total Birds Handled	2302	2308	2625	873	8108

TABLE 13

SUMMARY OF WHITE-CROWNED SPARROW TRAPPING RESULTS BY LOCATION

			New Birds		Repeats		Total Birds	Av. Birds Per	Returnees	
Location	Year	No. Trap Days	Juv.	Ad.	No.	Av.	Handled	Trap Day	No.	%
Cabin	1946-47	81	174	161	1286	3.8	1612	20		
	1947-48	21	124	111	115	.5	364	17	14	6
1 mi. W.	1946-47	23	236	184	220	.5	640	28		
Cabin	1947-48	23	197	169	464	1.0	904	39	74	17
Hart Park	1946-47	10	7	27	7	.2	41	4		
	1947-48	29	124	247	301	.8	695	24	19	5
	1948-49	30	448	324	1089	1.0	2155	72	294	27
	1949-50	28	100	109	310	.6	838	30	319	60
Froese	1947-48	17	35	65	244	2.4	344	20		
	1948-49	19	31	78	168	1.1	320	16	43	28

day for all traps was 20. Because of the permanent location of the traps at the cabin the number of repeats was highest here.

In 1947-48 the trapping was almost equally divided among the four locations listed, but operations were only on 43 percent of the available days. Many of the trap sites were the same as the previous year and the take per trap day increased. Nine percent of the birds caught had been banded the previous season.

In 1948-49 trapping was limited to Hart Park and Froese locations. Trap locations were not altered at Hart Park and the trap at Froese was a large house trap built originally to catch English Sparrows. The number of trap days was less this year but the take per day greatly increased. Fifty-one birds, 27 percent, were returnees.

In 1949-50 only 15 percent of the days were spent in trapping and these were at Hart Park. The take was still high, 30 birds per trap day; however, new birds were fewer than returnees, which made up 60 percent of the total.

At Froese the trap took an average of 18 birds per day and, since it was sampling a local and limited population, the number of repeats was above average. Even though it was in operation for only two years the number of returnees made up 28 percent of the take in the second year.

Traps at the Cabin were placed in fence rows and along the borders of stream-side thickets, and the number of repeats was directly proportional to the number of trap days while the number of birds per trap day was nearly equal each year.

Traps at the location a mile west of the cabin were placed among shrubs near the bank of the Kern River. Although the number of days and traps in action were the same each year, the take went up in 1947-48, indicating a greater population or that more birds became familiar with the bait.

Trapping was done all four years at Hart Park usually with eight traps, and as more and more birds were banded the percent of each succeeding year's take that was made up of returnees increased. This may have been a result of the increasing proportion of the population that was wearing bands or a greater familiarity with the feed location by banded birds. Judging by the daily take, 1948-49 appeared to be a peak population year.

The age ratio of one young to .9 adult at the Cabin indicated a mixed population of juveniles and adults each year. At the location one mile west of the Cabin the 1946-47 population was high in juveniles and that of 1947-48 high in adults. The population sampled at Hart Park was definitely made of a preponderance of adults. In the small sample of 1946-47 the ratio was one juvenile to four adults, that of 1947-48 was 1:2, and in 1948-49 with an adequate sample of more than a thousand birds it was

TABLE 14

RATIO OF JUVENILE TO ADULT WHITE-CROWNED SPARROWS BY LOCATION

Year	Cabin	1 Mile W. Cabin	Hart Park	Froese	Average
1946-47	1:.9	1:.8	1:4		1:9
1947-48	1:1	1:1.2	1:2	1:2	1:1.4
1948-49			1:1.4	1:4	1:1.5
1949-50			1:4		1:4

1:1.4, while in 1949-50 with a sample of 500 birds it was again 1:4. At Froese the population was predominantly adults, 1:2 in 1947-48 and 1:4 in 1948-49. It is doubtful if these data indicate success or failure in nesting the previous summer. More probably they show a segregation of overwintering juvenile and adult populations, Table 14. If we assume that the age ratios as indicated by trapped birds are indications of nesting success then 1946-47 was a good year in the breeding grounds, 1947-48 and 48-49 about average, and 1949-50 was a poor year.

In the 1946-47 trapping 417 juveniles and 372 adults were banded, a young/adult ratio of 417/372, 1.12:1 or 53 percent juvenile. In 1947-48, 56 of these juvenile banded birds returned, 13.4 percent, and 64 of the 372 adults, 17.2 percent. In 1947-48 new banded birds included 480 juveniles and 592 adults. To these adults must be added the returned birds, 120, or a total of 712 adults. The young/adult ratio then becomes 480/712 or .67:1 which equals 40 percent juveniles. In 1948-49, 15 of the original 417 1946-47 juveniles returned, 3.6 percent, while of the original 372 adults 18 returned, 4.8 percent. In addition there were 35 of the 480 1947-48 juveniles returning, 7.3 percent, and 58 of the 592 adults, 9.8 percent. We have then the 1948-49 adults including 401 new birds, 93 of 1947-48 and 33 of 1946-47, a total of 527. These were with 479 new juveniles, therefore the young/adult ratio was 479/527 or .9:1 or 47.6 percent juveniles. In 1949-50 there were 100 new juveniles caught. In addition there were two adults from the 417 1946-47 juveniles (.5 percent) and five from the 372 adults (1.3 percent), of the 480 1947-48 juveniles 20 were taken (4.1 percent) and 28 of 589 adults (4.8 percent), and 57 of the 479 1948-49 juveniles (11.9 percent) and 20 of the 402 adults (5 percent). A total of 241 included 109 new adults plus seven from 1946-47, 48 from 1947-48, 77 from 1948-49, a young/adult ratio of 100/241 or .41:1, 29.3 percent juveniles.

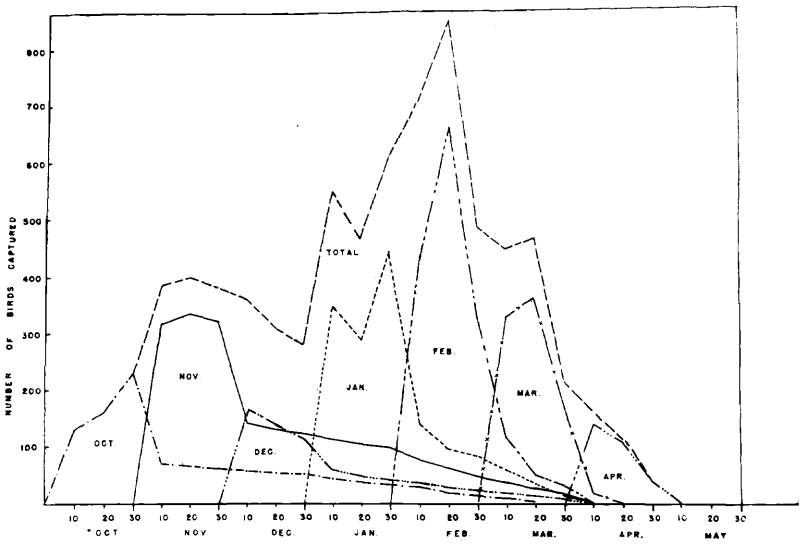
Having equal opportunity to the traps with new birds each year, old birds familiar with the location would be expected to show a greater number of repeats than the new birds. This is not borne out by the data in Table 15. During the period October 1946 to April 1950, 8108 birds were handled. Over half of these were birds taken during only one year. Not considering those captured for the first time in April and thereby not having opportunity for recapture, 59.7 percent of all birds taken were recaptured during the first season that they were present. These birds were captured an average of 3.9 times. Those individuals returning one year later were captured 3.0 times during the second season. Those returning the second year were captured 2.4 times, and those returning three years later were taken only 1.3 times. Familiarity with the trapping site obviously did not increase their susceptibility to capture. It may well have produced the opposite effect.

First year birds captured in October showed the greatest number of times handled, and as the months of winter progressed the number of repeats per new bird decreased, obviously because there were fewer trapping days remaining in which to be caught. This pattern was not followed by birds returning one, two, and three years later.

Tables 16 and 17 show the repeat data for birds captured as juveniles and those captured as adults. Juveniles were captured an average of 4.2 times during the season of their first capture. When returning as adults the following year they were captured 3.8 times and in the second year

2.6 times. Adults were captured an average of 3.7 times during the first season, 3.2 times one year later, and 3.0 times the second year.

Was the population represented by trapping collections at the Kern River sites a static one each winter or was it dynamic? Figure 1 illustrates the data accumulated on four seasons of trapping.



WAVE ACTION OF WHITE-CROWNED SPARROWS AT BAKERSFIELD, BASED UPON THE CAPTURE FOR 10 DAY PERIODS, OCT. THROUGH MAY, 1946 THROUGH 1950.

Peak number of birds that had not been handled previously was taken in February, and fewest new ones were caught in December. A wave of birds appeared to enter the area in October, increase in November, and decrease in December. This was followed by another increased flow through January and February which then decreased in March and April.

The assumption was made that a bird retrapped after a period of several weeks had not left the area during that time. About one-fourth of the October birds remained into November and then the number slowly decreased for the remainder of the winter. Half the November birds remained into December and then decreased in numbers each month. One third of the December birds remained into January, one third of the January birds remained into February, one sixth the February birds remained into March, and one ninth the March birds remained into April. In each instance the numbers decreased slowly after the initial reduction. Sargent's (1959) work with Tree Sparrows suggests that they may follow a similar pattern.

Several explanations offer themselves. 1) A wave moved through going south in the fall (Oct., Nov., Dec.) 2) A second wave moved back north in the spring (Jan., Feb., Mar., Apr.) with peak movement in February. 3) Peak concentration in the habitat came in February which might have been the result of populations moving down from higher altitudes to escape cold. 4) Peak trapping numbers in late winter (Feb., Mar.) may not have indicated mass movements, but only wider ranging of local residents as natural food depleted. These wandering birds then discovered the

TABLE 15

RECORDS OF TOTAL WHITE-CROWNED SPARROWS HANDLED OCT. 1946 TO APR. 1950.

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
Number Banded	227	426	185	477	813	556	263	2947
Number Repeating	127	273	112	274	361	216	30	1393
Total Times Captured	867	1409	518	947	1103	575	64	5483
% of Birds Repeating	55.9	64.0	60.5	57.4	44.4	38.8	11.4	47.2
No. Times Bird Captured	6.8	5.2	4.6	4.4	3.0	2.7	2.1	3.9
No. Birds Returning 1 Year Later	16	40	19	73	85	40	17	290
% of 1 yr. Returns	7.0	9.3	10.2	15.3	10.4	7.1	6.4	9.8
Total Times Captured	33	131	53	239	264	106	41	867
No. Times Returnee Captured	2.1	3.3	2.8	3.3	3.1	2.6	2.4	3.0
No. Birds Returning 2 yrs. Later	1	12	6	27	21	9	5	81
% of 2 yr. Returns	.4	2.8	3.2	5.6	2.5	1.6	1.9	2.7
Total Times Captured	4	27	26	52	44	28	14	195
No. Times Returnee Captured	4.0	2.2	4.3	2.9	2.1	3.1	2.8	2.4
No. 3 yr. Returns				2	4		1	7
% of 3 yr. Returns				.4	.4		.3	.2
Total Times Captured				3	5		1	9
No. Times Returnee Captured				1.5	1.2		1.0	1.3
TOTAL TIMES BIRDS HANDLED	1004	1720	670	1444	1868	1049	353	8108

TABLE 16

RECORDS OF WHITE-CROWNED SPARROWS BANDED AS JUVENILES FROM OCT. 1946 TO APR. 1950

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
Number Banded	112	223	93	217	452	319	60	1476
Number Repeating	68	146	61	212	212	122	16	759
Total Times Captured	532	830	338	457	654	315	33	3159
% of Birds Repeating	60.7	65	65	62	47	38	27	51
No. of Times Birds Captured	7.8	5.7	5.5	3.5	3.1	2.6	2.0	4.2
No. Birds Returning 1 Year Later	9	20	8	35	49	26	1	148
% of 1 yr. Returns	8	9	9	16	11	8	2	10
No. Times Returnees Captured	2.4	3.2	3.6	4.2	4.4	3.9	2.0	3.8
No. Birds Returning 2 yrs. Later	1	5	1	11	12	5		35
No. Repeats per 2 yr. Returnee	5.0	4.4	2.0	1.9	1.8	3.8		2.6

TABLE 17

RECORDS OF WHITE-CROWNED SPARROWS BANDED AS ADULTS FROM OCT. 1946 TO APR. 1950

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
Number Banded	115	203	92	260	361	237	203	1471
Number Repeating	59	127	51	140	149	94	14	634
Total Times Captured	335	579	180	490	449	260	31	2324
% of Birds Repeating	51.3	62	55	54	41	40	7.0	43
No. of Times Birds Captured	5.7	4.5	3.5	3.5	3.0	2.8	2.2	3.7
No. Birds Returning 1 Year Later	7	20	11	38	36	14	16	142
% of 1 yr. Returns	6	9	11	14	10	5	7	9
No. Times Returnees Captured	2.8	4.3	3.0	3.3	3.1	2.2	2.5	3.2
No. Birds Returning 2 yrs. Later		7	5	16	9	4	5	46
No. Times 2 yr. Returnee Captured		1.4	5.0	2.6	3.8	3.5	2.8	3.0

feeding stations. This was not supported by the fact that usually less than one third remained the following month and there was no increase of previously banded birds which returned to find food. 5) The wave action of these birds seems inescapable, both going south and returning north, and the mass of birds moving was great enough that unmarked ones were constantly entering the vicinity of the traps. Linsdale (1949), working with White-crowns at Hastings Reservation about 150 miles north of Bakersfield and in the coastal range, found a similar wave action but with different distribution during the winter months.

TABLE 18

THE AGE OF WHITE-CROWNED SPARROWS AS DETERMINED FROM BAND RECORDS

	Juvenile Birds			
Date	— 1 yr.	1 yr.	2 yr.	3 yr.
1946-47	417	56	15	2
1947-48	480	35	20	
1948-49	479	57		
TOTAL	1376	148	35	2

	Adult Birds			
	x + 1 yr.	x + 2 yr.	x + 3 yr.	x + 4 yr.
1946-47	372	64	18	5
1947-48	592	58	28	
1948-49	401	20		
TOTAL	1365	142	46	5

Table 18 presents the data that have accumulated concerning survival of White-crowns at Bakersfield. Over a three year period, almost equal numbers of juveniles and adults were captured. The juveniles were, of course, less than one year old at the time of capture. The adults could have been any age from one year to the limit of survival (Linsdale, eight or nine years). The assumption is usually made that environmental pressures are not equal upon adults and juveniles, being greater on the inexperienced juvenile (Hickey 1952, Farner 1955 etc.). In the present studies it appears that environmental pressures, or the opportunities to return and be recaptured were unrelated to age. Only 10.7 percent of the juveniles were known to have returned a year after their first capture, but also only 10.4 percent of the adults returned the following year and they were in their second or more years of life. The following year when original juveniles were now two years old 38.4 percent of those returning when one year old were again taken. The percentage of adults now in their third or greater years that were recaptured was 37.0 percent. Only 13.3 percent of the original juveniles making their second year returned the third year, while 27.7 percent of the adults were back. Expressed as percentage of loss each year we have the following:

	<1 yr.	>1 yr.	>2 yr.	>3 yr.	>4 yr.
Juveniles		89.3	61.6	86.7	
Adults			89.6	63.0	82.7

These data lead to the conclusion that the trapping demonstrated not survival, but rather a function of the trapping technique itself.

Golden-crowned Sparrow, *Zonotrichia atricapilla.* This is a winter resident of the San Joaquin valley, first arrivals of which were trapped at Hart

TABLE 19

THE NUMBER OF GOLDEN-CROWNED SPARROWS REPEATING IN THE TRAPS FOLLOWING THEIR INITIAL CAPTURE BASED ON RECORDS OVER FOUR WINTER SEASONS

Month	Total Banded	Total Repeated	% Repeated	Ave. No. Times	Ave. No. Days Between 1st and Last Capture
Oct.	12	7	58	9.7	48.6
Nov.	60	44	73	9.8	28.2
Dec.	32	19	60	4.8	17.7
Jan.	20	16	80	2.8	56.1
Feb.	19	7	31	1.7	13.0
Mar.	10	3	30	1.0	14.0
Apr.	11	0	0	0	0
Total	164	96	58.5	6.7	29.6

Park between October 15 and 28 each year, and last migrants of which passed through between April 26 and 30. A total of 177 were captured and ringed and these were handled 753 times, but the bulk of repeats was made by 96 birds, 54 percent of the total, which were handled 647 times, an average retake of 6.7 per bird. The average period during which birds repeated was 30 days. Obviously this figure has little meaning for the later in the season a bird was banded, the shorter a period it had to be recaptured, Table 19. This held true except for January birds which apparently remained in the area longer than did those captured in earlier months. If this is not simply an artifact in the data it would suggest that birds moving into the area so late in the season (Jan.) are probably more rigidly attached to their winter territory than the earlier or later birds which are actively migrating.

Distribution of recaptured birds by month following initial capture was as follows:

Month	No. Birds	Month	No. Birds
Less than 1	55	6-12	3
1-2	14	12-18	5
2-3	9	18-24	0
3-4	7	24-30	2
4-5	1	30-36	0
5-6	0		

As readily as this species repeated it would be expected that a good survival table would result; however this was not the case. Considering only the 96 that repeated the first year as residents, the number surviving (or returning) the following year was six, and of these six, two returned the second year. Such a low survival rate was incompatible with known production of young in other species of this group (Blanchard 1941).

Immature individuals had not developed the yellow cranial stripe when they first arrived, and in general did not do so until late in the winter or at the spring moult. Considering only the new birds taken between October and January 1 the age ratio was:

1946-47	53 immature	20 adult	2.7:1
1947-48	8 immature	7 adult	1.1:1
1948-49	5 immature	5 adult	1:1
1949-50	7 immature	1 adult	7:1
TOTAL	73 immature	23 adult	3.1:1

These data suggest that at Hart Park the Golden-crowned Sparrows were closely restricted to their winter territories, that they did not always return to their territories the following year, and that the mortality rate was probably not over 30 percent a year.

White-throated Sparrow?, *Zonotrichia albicollis.* On October 29, 1948 this immature bird with a white throat was captured at Hart Park in company of White-crowned Sparrows. It was banded as a White-throated Sparrow and repeated in November and on December 10. It did not return the following year and may only have been an oddly colored White-crown.

Fox Sparrow, *Passerella iliaca.* Thirteen adults of this winter resident were banded at Hart Park over the three years, but they remained close to the point where they were banded and repeated often. Six were recaptured 23 times, and one repeated six times over a period of 1509 days (4 years and 48 days). By this time its band was worn so thin that it had to be replaced. The average length of time, excluding the long lived one, over which they were retaken was 17 days.

Lincoln Sparrow, *Melospiza lincolnii.* A winter resident, 14 adults were trapped at Hart Park between the dates of January 6 and April 8. It may be significant that none was taken before January; and, although they readily repeated, none was taken over a period greater than 63 days nor in subsequent years. This would suggest that the population was transitory and that the birds did not return over the same route. Nine repeated 19 times at an average maximum of 25 days.

Song Sparrow, *Melospiza melodia.* Although this was a permanent resident of the valley and nested at Lerdo Slough, no nestlings were banded. Twenty-four were banded at Hart Park as juveniles or adults. Six repeated at an average interval of 308 days and three were known to live more than a year, while one of these was recaptured two years after banding. None of the five juveniles was taken the following year. The adult survival was 18 at least one year old, three at least two years, and one at least three years.

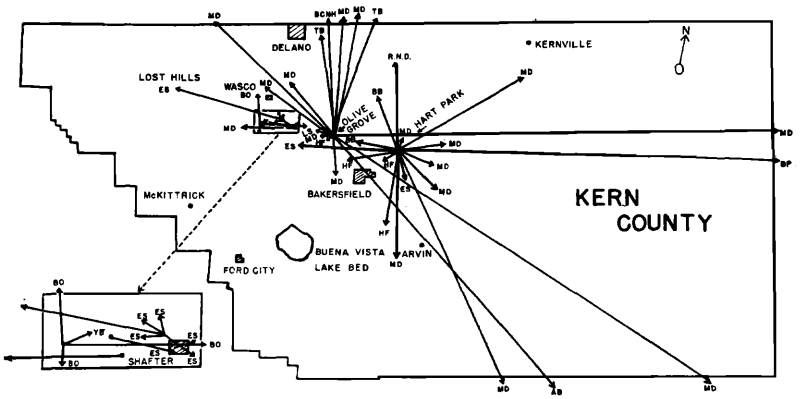


Fig. 2
Dispersal of banded birds in Kern County.
BCNH — Black-crowned Night Heron, MD — Mourning Dove,
TB — Tricolored Blackbird, RND — Ringed Turtle Dove,
BB — Brewer's Blackbird, BP — Black Phoebe, HF — House Finch,
ES — English Sparrow, AB — American Bittern, BO — Barn Owl,
YB — Yellow-headed Blackbird, LS — Logger-head Shrike.

TABLE 20

AGE, DISTANCE AND DIRECTION AT WHICH BIRDS BANDED IN THE VICINITY OF BAKERSFIELD WERE RECOVERED.

Species	Days Since Banded	Distance in Miles	Direction
Black-crowned Night Heron	288	29	N
American Bittern	286	80	SE
Ringed Turtle Dove	90	15	N
Mourning Dove	2	1	W
" "	24	7	S
" "	47	7	E
" "	53	15	NW
" "	82	18	NW
" "	106	20	S
" "	371	300	SE
" "	420	45	NE
" "	662	190	E
" "	792	5	W
" "	805	10	SE
" "	831	1	N
" "	1137	250	N
" "	1178	8	E
" "	1494	330	NW
" "	1894	40	N
" "	2050	1400	SE
Barn Owl	30	½	S
" "	56	6	N
" "	52	10	E
Black Phoebe	154	360	E
Logger-head Shrike	115	3	NW
English Sparrow	28	2	N
" "	30	1	E
" "	91	1	E
" "	95	½	S
" "	117	1	E
" "	122	2	N
" "	158	1	W
" "	200	20	NW
" "	200	1	W
" "	202	1	W
" "	212	1	W
" "	240	1	W
" "	236	1	E
" "	261	1	W
" "	336	1	W
" "	448	1	E
" "	584	48	W
" "	1305	4	E
" "	2229	6	S
Yellow-headed Blackbird	772	1	E
Tricolored Blackbird	55	33	N
" "	372	20	N
Brewer's Blackbird	341	10	N
" "	281	9	W
House Finch	240	½	W
" "	338	1	W
" "	833	12	S
" "	1297	10	W

TOTAL 53

In addition, 32 species were banded but no recoveries received. They were as follows: Great Blue Heron, 1; Green Heron, 13; American Bittern, 1; Whistling Swan, 1; Red-tailed Hawk, 1; Red-bellied Red-shouldered Hawk, 1; Golden Eagle, 1; Ring-necked Pheasant, 10; Killdeer, 69; Black-necked Stilt, 14; Band-tailed Pigeon, 1; Spotted Dove, 7; Yellow-billed Cuckoo, 1; Screech Owl, 4; Great Horned Owl, 3; Lesser Nighthawk, 2; Red-shafted Flicker, 26; Western Kingbird, 33; Ash-throated Flycatcher, 12; Say's Phoebe, 46; Horned Lark, 7; Cliff Swallow, 65; Plain Titmouse, 1; Varied Thrush, 2; Hermit Thrush, 1; Western Bluebird, 2; Orange-crowned Warbler, 2; Audubon's Warbler, 3; Yellow-breasted Chat, 8; Western Meadowlark, 7; Hooded Oriole, 4; and Western Tanager, 4.

SUMMARY OF RECOVERIES

Aside from the two hunted species, Mourning Dove and English Sparrow, all other recoveries were by chance which accounts for the apparent lack of relationship between numbers banded and numbers reported. The 53 recoveries listed in Table 20 demonstrate the phenomenon of mixing in bird populations which is well known. Bird populations like a large city are a complex maze of individuals living in one place and working at or going to another. Viewed from outer space a city would appear as an uncontrolled madhouse of activity and viewed subjectively the birds of a region would appear the same way. It is this very shifting that keeps a population dispersed to fill ecological gaps, prevents localization and interbreeding, reduces disease from overcrowding, utilizes food supplies, permits dispersion of parasites, and probably increases survival.

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