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BANDING RECORDS SUBSTANTIATING THE CHANGED STATUS OF TEN SPECIES OF BIRDS SINCE 1900 IN THE CONNECTICUT VALLEY

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Recent publications have described changes in local avifaunas stretching over 60 to 80 year periods. Regions covered include Toledo, Ohio (Mayfield, 1962), Washington, D. C. (Stabler, 1963) and Springfield, Mass. (Boyd, 1962). The changes have been accounted for by warming climate, and by intervention of man through the introduction of alien birds, the clearance of woodland, excessive hunting practice and the use of insecticides, to cite some examples.

For the Connecticut Valley, a summary of the changes that have taken place from the turn of the century to 1960 includes the addition of 23 new species and a change in status of many others. Now 70 instead of 33 species can occur all year round, 13 having become permanent residents, and some former transients either now wintering-over or tending to do so (Boyd, 1962). These and other changes have involved the extension of breeding ranges, the northward spread of birds and an alteration in abundance and in habit of some species. Boyd deduced these changes solely from a comparison of the data in the 1901 book, "Birds of Springfield and vicinity" (Morris, 1901) with the 1960 "Daily field card of the Springfield region" (Eliot, 1960); other information was gleaned from "Birds of the Connecticut valley (Bagg and Eliot, 1937), and, since 1937, from various sight records in the form of field lists and Christmas counts. References to these sources are here indicated by date only as they are distinguished chronologically; while additional references are specifically cited.

Several of the birds whose altered status was observed in the Springfield vicinity are familiar to varying degrees at bird banding stations. Of the 13 new residents two from the south are now trapped locally. The Carolina Wren, *Thryothorus ludovicianus*, and the Cardinal, *Richmondia cardinalis*, were recorded as accidental in 1901. The former has been seen intermittently from 1918 and more frequently since 1937. The Cardinal was still considered a chance visitor by 1937, and its establishment has been both recent and dramatic with a regular invasion into Massachusetts in late 1957. A further adjunct is the Tufted Titmouse, *Baeolophus bicolor*, which began to extend its range in 1940, has been observed annually and in increasing numbers since 1954 but was still listed in 1960 as accidental or occasional.

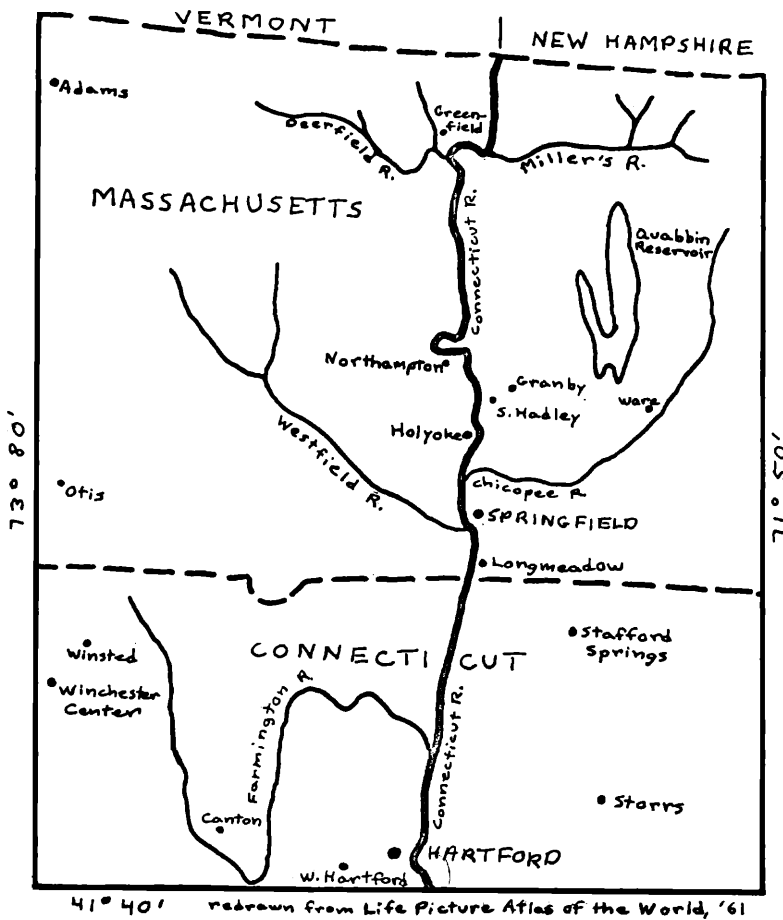
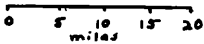
Four other new residents in the 1960 list were classified as sum-

Figure 1. Map of the area of the Connecticut River Valley selected for study of avian population changes since the turn of the century.

Key to large map:

- — state line
- — latitude and longitude
- city or town
- ~~~~~ river

Scale of large map:



mer residents in 1901,— the Mourning Dove, *Zenaidura macroura*; Purple Finch, *Carpodacus purpureus*; the Song Sparrow, *Melospiza fasciata* and the Brown-headed Cowbird, *Molothrus ater*. The first two birds were known to winter-over occasionally in 1901. The Song Sparrow was noted as probably wintering-over more often than was generally supposed, but there was no mention that the Cowbird ever survived a winter; by 1937, however, it was casual in winter. As regards the Purple Finch, Forbush (1929) considered it a resident but noted that it would winter-over only near large supplies of suitable food. Though classified technically as a resident by 1937, it was still highly irregular for the winter months. Similarly by 1937 the Song Sparrow was not rare in the first portion of winter but was generally rare or absent in the area by the late winter.

Of the birds listed as migrants in 1901 which may now be trapped in winter, three were selected for analysis of banding records. One, the Slate-colored Junco or Snowbird, *Junco hyemalis*, at the turn of the century was essentially a transient species, common only during the spring and fall migrations. A few had been known to winter-over, and occasionally they nested on mountain tops. By 1937 it was not only an abundant transient, but also wintered fairly often in the lower parts of the valley. Juncos are classified in the 1960 list as winter residents. The other two migrants, the White-throated Sparrow, *Zonotrichia albicollis* and the Fox Sparrow, *Passerella iliaca*, were not identified as winter residents in 1960 though locally some individuals do winter-over.

The present investigation is an attempt to corroborate the observed new status of the above 10 species by banding data for a selected region, which includes the Connecticut River Valley. This represents a combination of areas studied by Morris (1901) and by Bagg and Eliot (1937) and extends longitudinally between 71°50' and 73°80' and latitudinally from 41°40' to around 42°44' (Fig. 1). This region encircles the townships of Adams and Greenfield in the northwest and north respectively; Ware, Stafford Springs and Storrs in the east; West Hartford in the south and Winchester Center and Otis in the west.

A preliminary study was made with data from the Connecticut Valley volunteered by 10 banders with whom the authors corresponded. However, these results have been omitted since they were confirmed and expanded subsequently through banding information supplied by the Fish and Wildlife Service. The authors requested of this department the number of individual Tufted Titmice, Carolina Wrens and Cardinals banded per year for the five consecutive years, 1956 to 1960, in the selected region representing the Connecticut River Valley. They also requested for the other 7 birds, the totals of each species banded in the months of January and December in this same area for the 5-year period beginning with 1956. Since January and December are the two months in the year when migration never occurs, it was decided to obtain banding records for these months for the 7 selected species which were non-residents in 1901, but have now changed to become permanent residents, winter residents or are wintering-over in increasing numbers.

RESULTS

The submitted records are presented as Table 1 under the three headings: 1) the three non-migratory species which are extending their range north into the area; 2) four former summer residents which have become permanent residents, and 3) three former migrants which winter-over or show a tendency to do so. In the first category it will be noticed that the number of Carolina Wrens banded annually is relatively small and has not increased in the last few years — 10 or less banded in each year 1956 to 1960. In contrast, the number of Cardinals banded each year has grown steadily from 12 in 1956 to 84 in 1960. Banding records for the Tufted Titmouse show graphically that the population is truly expanding for 3 were trapped in 1956, 22 in 1957; 27 in 1958; 41 in 1959 and 67 in 1960.

Under the second heading it will be seen that a total of 101 Mourning Doves has been banded in the two mid-winter months, December and January, between 1956 and 1960, representing 10 months in all. The Purple Finches showed marked fluctuations from 8 in December of 1956 to 752 in January of 1959. In the same 10 months of the 5-year period as many as 330 Song Sparrows have been banded. The number of Cowbirds which have been banded is considerable, ranging from a low of 44 in January 1958 to a high of

TABLE 1. SUMMARY OF BANDING DATA FOR 10 SPECIES OF BIRDS IN THE CONNECTICUT RIVER VALLEY FURNISHED BY THE FISH AND WILDLIFE SERVICE.

a) Birds banded per year:											
Non-migratory species extending their ranges north into the area.											
Species	1956	1957	1958	1959	1960						
Carolina Wren	5	10	7	10	10						
Cardinal	12	29	40	64	84						
Tufted Titmouse	3	22	27	41	67						
b) Birds banded in each of two mid-winter months:											
Species	Jan. '56	Dec. '56	Jan. '57	Dec. '57	Jan. '58	Dec. '58	Jan. '59	Dec. '59	Jan. '60	Dec. '60	
1. Former summer resident species which have become permanent residents:											
Mourning Dove	1	11	19	20	2	8	2	3	27	8	
Purple Finch	274	8	39	206	98	49	752	177	234	29	
Song Sparrow	20	37	52	19	50	29	25	36	29	33	
Cowbird	111	85	431	77	44	459	257	74	172	106	
2. Former transient species which now may winter-over:											
Junco	291	660	954	584	635	431	188	344	345	418	
White-throated Sparrow	39	61	67	65	112	151	55	68	42	61	
Fox Sparrow	13	1	2	31	4	17	0	33	4	10	

459 in December of that year, with a grand total of 1,816 individuals for the period of coverage. The third grouping, which covers former transients, shows that a total of 4,850 Juncos were banded within this selected time, 721 White-throated Sparrows and 115 Fox Sparrows.

DISCUSSION

Some question may be raised as to the quantitative value of data such as that in Table 1. A banding station uses large amounts of food and other attractive devices as bait for the birds. The bander is also likely to clear the area of predators, and thus the station becomes a refuge where large numbers of birds may concentrate, especially in winter. Some species, such as the sparrows, may actually be encouraged to winter-over nearby because of the station's existence. On the other hand, many individuals of the rarer species may remain untrapped; for instance, at least 6 Song Sparrows were observed to be wintering 1962-63 in the Granby-South Hadley area, yet none were trapped in December or January at the banding station in Granby. Surely each bird recorded in Table 1 represents a large number of its kind.

One main drawback to quantitative use of banding data is that a banding station is not usually run on a rigid schedule, and over a period of years major changes occur in the equipment and practices at a station. Data are not directly comparable from year to year. For these reasons quantitative study must usually involve a great bulk of data from many banders, so that individual fluctuations will cancel out. The data in Table 1 has a relatively broad base, and the figures may be taken as an indication of the actual relative numbers of a species present from year to year.

The Connecticut River Valley contains elements from the three life zones, — the Carolinian, Alleghenian and the Canadian zones. Although the concept of biomes has superseded life zones, on a local level the zone terminology may conveniently be used as the isothermal lines tend to coincide with observable ecological differences. The Carolinian zone, the warmest to be found locally, reaches from the coast up the Valley to Middletown, though less strongly into the area defined for this study. It may be found as far north as Longmeadow, and casually beyond it in warm, low areas. Typified by hardwood (white-oak and chestnut), its characteristic avifauna includes the Mockingbird, Tufted Titmouse, Carolina Wren and Cardinal. The Alleghenian flora and fauna are currently dominant in the Valley, with its typical New England beech-maple hardwood forests and some open grass regions. In the last 50 years large areas of scrub forest have replaced fields of abandoned farms (Thomas, 1958), and this has played a large part in modifying animal distribution. The Canadian zone once covered the bulk of the Valley and was principally reduced by man. It still exists in its pure form of coniferous forests (spruce, hemlock etc.) as islands on mountain tops and hill crests, and elements of it may be found in north-sloping glens and cool regions. Birds considered typical of it include the Slate-colored Junco, White-throated Sparrow and Fox Sparrow.

Within this century there has apparently been a blurring of the zonal lines in the valley avifauna, — Carolinian species moving north while some Canadian zone birds have remained behind after the depletion of the conifer forests.

The 10 selected species are either becoming permanent residents by expanding their ranges or are staying during winters. Thus for all, the critical factor in their new status is over-wintering survival. Kendeigh (1934) wrote that, among climatic factors, survival is related to temperature, precipitation, humidity, actual sunshine, wind and hours of daylight per day. By far the most significant of those he found to be temperature and daylight. Since darkness prevents feeding activity, he concluded that the ability of a bird to survive the nights in a given locality depends not alone on the drop of temperature, but on the night temperature combined with the number of dark hours during which the bird must fast. According to Kalela (1949), temperature affects all of the factors in the birth-immigration versus death-emigration equilibrium, which controls the size of a population. In northern Europe, the moderation of winters has brought on an expansion of range among the permanent residents and early spring arrivals, which are favored by the slackening of storms.

Boyd (1962) showed that a definite increase in mean annual temperature in the Valley is found when the periods of 1900-1909 and 1950-1959 are compared and believes that the warmer climate is a principle factor in causing the change in status of several birds. The Mockingbird, *Mimus polyglottos*, was the first of the Carolinian group to venture north, but it is still not established in the Valley and so was not included in the present study. The Carolina Wren, the first to become resident, is apparently vulnerable to winter weather for the number banded has remained low, namely 10, and consistent throughout the 5 consecutive years. Bagg and Eliot (1937) expressed surprise that the hardier Tufted Titmouse and Cardinal had not been the first to move into the Springfield vicinity. However, in the last few years, the latter has outstripped by far the Wren in establishment of residency in the Valley, from 12 in 1956 to eight times the number of Wrens by 1960. Since the Titmouse has gained a foothold in this area, it seems to flourish like the Cardinal, but remains one year behind it in the size of its population. Beginning with 1957, 29, 40, 64 and 84 Cardinals were banded in four successive years; similarly but beginning with 1958, 27, 41 and 67 Titmice have been banded. In comparison with Carolina Wrens, double the number of Titmice were banded in 1957, and this has grown to four and almost 7 times for 1959 and 1960. Thus from banding data the Titmouse could readily be included in the new residents for the Valley.

The figures for the Carolinian species, which cover the entire year, are relatively low in comparison with those in the other two groups. However, some species tend to occur in flocks in winter and haunt banding stations where food is plentiful. Boyd (1962) pointed out that the warmer climate is not the only factor responsible for the change in status of several species which now survive the winters in

the Valley, food abundance being another major factor. Mayfield (1962) argued that the rise in average temperature should be minimized as the cause of the invasion of the Cardinal and Tufted Titmouse, and instead favored various biotic factors such as food and habitat changes, mostly due to the activities of man. This holds true to some extent for the other species that are now wintering in the selected area.

Banding records substantiate the listing of the four former summer species as residents in the 1960 daily field card of the Springfield region. From 10 to 30 Mourning Doves have been banded each of the four winters within the two months, and between 54 to 89 Song Sparrows. Records for the Purple Finches corroborate the numerous observations on their irregular habits; 47 were banded in the two winter months of '56, '57 whereas 801 were banded in '58, '59 two-month period. It is interesting that Cowbirds, which were never seen in winters at the turn of the century, are now banded in great numbers, around 120 to 700 since 1956 in the two-month period. Similarly the records for the Junco, formerly a migrant, indicate without question that it is now a winter resident, since over 600 to 1,600 individuals have been banded in just the two winter months from December 1956. It is noteworthy that over 100 White-throated Sparrows were banded annually during these two months. It is possible that the White-throats might well be the next species to join the ranks of the Juncos and become a winter resident in the Valley. Lagging behind is the Fox Sparrow, where from 3 to 37 individuals have been banded over the same time period and they have exhibited only a slight increase over the years, 38 being the combined figure for Dec. '56-Jan. '58 and again for Dec. '58-Jan. '60.

In summary it may be stated that banding records have substantiated the recognition of the Carolina Wren, Cardinal, Mourning Dove, Cowbird, Purple Finch and Song Sparrow as residents for the Valley and that the Junco is now a winter resident. They would also indicate that the Tufted Titmouse could with justice be classified as a resident, and that locally some White-throated Sparrows do winter-over; possibly in years to come this species may become classified as a winter resident for the vicinity of Springfield.

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**ANALYSIS OF BANDING RECORDS OF LOCAL
POPULATIONS OF BLUE JAYS AND OF REDPOLLS
AT GRANBY, MASS.**

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Such is the fascination of bird-banding that the gathering of data can easily become an end in itself. We must not lose sight of the fact that banding is properly a tool of ornithology; the raw data which accumulate in government or private records are of potential rather than real value until studied and shared with others.

Scientific analysis of banding data sounds like a formidable job beyond the reach of most individuals, yet that is far from the truth. Ornithology contains a body of multitudinous small questions of a specific nature which can be answered only by the detailed information in banders' personal files. The data reported to the Fish and Wildlife Service are not necessarily the most fruitful source of answers. Of great value are the repeats and other notes from a single avian community season after season. By their very nature these data are so massive that condensation and analysis must be done by the individual.

Two examples of this form of investigation are offered in the present paper; the one deals with the population of Blue Jays over a two to three-year period at a banding station at Granby, Mass., and the other refers to the appearance of a flock of Redpolls at the same station in the early spring of 1962; the first part is of a qualitative and the second of a quantitative nature. In the course of this study a number of questions have been formulated and partially answered about these two species in the Connecticut Valley.