



Fig. 1. Device for holding and spreading bird bands.

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| 1st line: | Belt snap and clip. |
| 2nd line: | Completed device. |
| 3rd line: | Ring and nipple. The completed brass cone. |
| 4th line: | Bicycle spoke straightened. |
| 5th line: | Bicycle spoke, normal, as purchased. |

Without removing the bands from the wire upon which they are threaded, the spoke, with its handle or ring detached, is slipped through as many bands as possible. The handle or ring then is screwed on and the original wire withdrawn. The bands now are in proper sequence and cannot be lost. As needed, a band is forced manually down over the cone, which opens it just enough so that it can be placed over the bird's leg.

Brass was used for the original cone because it is easy to machine, but stainless steel or some other hard metal capable of a high polish would be better. The smoother the cone, the easier it is to remove the bands; a little graphite sprinkled on the bands and holder will help in this operation. — Albert W. Spencer, Wildlife Research Center, Bureau of Sport Fisheries and Wildlife, Denver, Colo. (presently, Colorado State University, Fort Collins, Colo.)

Wing Length of Slate-colored Junco.—The Slate-colored Junco (*Junco hyemalis*) has always been a perplexing species. The plumage appears to show no clear distinctions of age or sex. The gray color varies from rather pale to very dark. The amount of brown varies roughly inversely with depth of the gray. The extent of the white in the outer rectrices shows great variation. The variation in these characters appears to be regular and continuous from one extreme to the other. The only character on which reliance may be placed for age determination is iris color. This varies in immatures from gray through gray-brown and brown to the distinctly reddish-brown of the adult. However, the sequence of changes is essentially complete by 1 December of the year of hatching and often earlier as shown by the fact that only a few birds show clearly immature iris colors after the end of October.

From my rather extensive banding of this species I have selected five samples of individuals for a detailed statistical examination. The entities are shown in Table 1. "Immatures" are birds banded at Lincoln, Mass. whose eye color was clearly not that of adults. Since the remaining samples are all from Hillsboro, N. C., it would have been desirable to have had the immature sample from the latter place. Very few juncos arrive there before the last week in October so almost none show immature iris color. "Returning birds at banding" comprises birds which reappeared

Table 1. *Wing lengths of Slate-colored Junco*

Wing Length	Immatures	Returning Birds at Banding	Returning Birds at Return	Birds without Brown	Birds with White Covert Tips
69	2				
70	5	2	1		
71	7	6			
72	11	10	9		
73	4	4	5		1
74	15	8	6	1	
75	13	7	3		5
76	9	10	10	7	7
77	4	5	5	4	2
78	2	13	13	9	5
79	1	10	13	10	2
80		7	13	9	4
81		3	6	1	
82			2		1
No. birds	73	85	85	41	27
Mean	73.7	75.8	77.0	78.2	77.2
Stand. Deviation	2.3	3.2	3.0	1.6	1.5
Skewness	-.0081	-.0340	-.0793	-.700	+.106
Kurtosis	2.30	1.84	2.29	2.99	2.49

in a subsequent winter. This sample is undoubtedly mixed as to age. "Returning birds at return" consists of the same birds as the preceding but all are now provably adult. "Birds without brown" are those with no detectable admixture of brown in the general gray plumage. From inspection birds with only a trace of brown are essentially the same as to wing length. It involves less risk of error in defining the color to consider only the extreme condition. The "Birds with white covert tips" showed some indication of one or two white wing bars. Such birds are often quite dark gray in general color. This contrasts with the rather pale gray of *Junco aikeni*.

In Table 1 the items: Number of birds, Mean, and Standard Deviation are familiar. In a theoretical Gaussian distribution the frequency curve is symmetrical about the mean (and mode) and the value of the skewness is zero. When the skewness is negative too many variates are shorter than the modal variate and conversely when the skewness is positive.

The theoretical Gaussian distribution is called mesokurtic. Its kurtosis, which may be Englished as peakedness, has the numerical value of three. If the observed curve is flatter than normal (platykurtic) the kurtosis is less than three and conversely when the curve is more peaked than normal (leptokurtic). For the method of calculating these quantities and assessing their significance, see Croxton (1959, p. 93-106, 341, 342).

Looking again at the table it will be seen that the greatest difference of the means is only 4.5 mm. This is a measure of the greatest possible average increase in wing length with age. As it is not unlikely that this represents the increase from a population of immatures to one mostly of adult males it is probably an excessive increase. A better estimate is derived from the difference between the immatures and the birds at return. Both samples almost certainly include both sexes and the difference is 3.3 mm. The disappointing fact is that only three of the possible pairs of samples have significantly different means. These are: immatures and birds without brown, immatures and birds with white covert tips, and returning birds at banding and the same at return. We may conclude that there is a small increase in wing length with age and that it is not less than 1.2 mm. and probably less than 4.5.

The only distribution which is significantly skewed is that of birds without brown. A possible explanation is that this is the only one composed mostly of birds of one sex (? males) but with a small admixture of the other sex.

The kurtosis is perhaps a better indicator of homogeneity of the components of the distribution than is the skewness. The latter gives the greatest weight to the tails of the distribution even when these contain very few individuals. The former places the weight on the grouping of variates close about the center. If the various components have rather similar means and variability, which certainly appears to be

true in this species, then we expect any mixed distribution to approach the normal in form. The only sample whose distribution is significantly platykurtic is that of returning birds at banding. This sample is certain to contain adults and young of both sexes. The samples called "immature" and "returning birds at return" may each be considered uniform as to its age composition but composed of both sexes. There is no feasible way at present of analyzing these samples to find a distribution for each sex. I will hazard a guess that the difference between the average wing lengths of males and females does not exceed 2 mm.

At Hillsboro, N. C., I have not handled more than three out of over 1400 juncos that could be alleged to be *J. b. carolinensis*. The samples are taxonomically uniform.

I conclude that the mean difference in wing length between immature and adult *J. b. hyemalis* is about $3\frac{1}{2}$ mm. and the sexual difference about 2 mm., and that lack of brown and the presence of white covert tips are both marks of old adults.

REFERENCE

- Croxton, F. E. 1959. Elementary Statistics with Applications in Medicine and the Biological Sciences. Dover, pp. vii & 376.
— Charles H. Blake, Museum of Comparative Zoology, Cambridge, Mass.

Reverse Migration by Cowbirds.—On April 12, 1961, I caught and released an adult male Brown-headed Cowbird (*Molothrus ater*) at Brooks School, North Andover, Massachusetts, coordinates 4242-7106. The bird was banded 59-171302 on April 4, 1961, by F. Burton Whitman, Jr., at Merepoint, Maine, on Casco Bay, six miles due south of Brunswick, Maine. North Andover is approximately 95 miles southwest of Merepoint. In a letter dated October 4, 1961, Mr. Whitman told me of a female Cowbird caught at Merepoint on May 3, 1961, that had been banded by Minot Morse, Jr., on April 22, 1961, at Castine, Hancock County, Belfast Bay, Maine, about 70 miles northeast of Merepoint.

These two instances of reverse migration may corroborate radar observations. William H. Drury (*Natural History*, 70: 11-17, 1961) reports that on May 8/9, 14/15, and 22/23, 1959, radar showed a steady southward movement following the spring arrival of cold fronts. Aaron M. Bagg informed me, in a letter dated October 11, 1961, that there was a considerable amount of cool, northerly weather in both periods that I mentioned, between bandings and recoveries. He also stated that on both April 12 and May 3, 1961, a coastal type of storm was passing through New England, northeastward, or just had passed, and that the two Cowbirds may have backtracked in the counter-clockwise airflow around these lows. — Oscar M. Root, Brooks School, North Andover, Massachusetts.

Brown Thrasher Life History Data.—Information of more than usual value was obtained from a set of records compiled at the Massachusetts Audubon Society's Arcadia Wildlife Sanctuary in Northampton and Easthampton, Massachusetts. The coordinates of the Station are 4217-7238. The series comprise the 34 return records from a total of 126 Brown Thrashers (*Toxostoma rufum*) banded in the period 1945-1960. No recoveries from distant points were recorded.

The series of return records on one particular individual Brown Thrasher are especially interesting. This Thrasher was first banded as an adult male on May 1, 1953, with a single red celluloid band. The color band was applied alone because the Station temporarily did not have size 3 numbered aluminum bands in stock. On the basis of the red band, repeat records were made on May 2, 4, 8, 1953. When the bird repeated on July 6, 1953, regular numbered aluminum band 543-99501 was applied. It then repeated on July 7, 9, 15, 16, 17, 22, 1953.

Return records, and the information obtained on this bird, are as follows:—

R.1	May 6, 1954	Repeated May 11, 12, 18, 19.
R.2	May 2, 1955	Repeated May 4, 11, 12, 17, 19, 24, 25, 31, June 2, 3.
R.3	May 4, 1956	Repeated May 21, July 4.
R.4	May 7, 1957	Repeated May 7, 8, 10, 12, 15, 26, June 14, July 3, July 5*, July 9, 11, 12, 15, 16, 17, 18, August 5*, August 6, 7, 12, 14, 15, 19, 20, September 9*, September 20.