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# The Neck Band of the Blue Jay

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FEATURES:

# THE NECK BAND OF THE BLUE JAY, Cyanocitta cristata

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In many species of animals, individuals wear markers or make sounds which permit them to be identified as individuals. Primate researchers often comment on the ease with which their subjects, particularly adult males, can be told apart in the field. Ornithologists have likewise been struck by the fact that individual birds can often be reliably identified by their songs. It was in this connection that we originally took an interest in the neck band of the Blue Jay. The Blue Jay has black markings that extend across the top of the bill under the throat and up the side of the head to a point behind the crest. Observed closely on birds in the field, these markers appear to vary greatly from individual to individual, particularly those on the side of the head. The Blue Jay is a social bird and we thought, therefore, that his variable feature might provide the basis for individual identification, either by ornithologists or by other Blue Jays or both.

Consequently, a study was undertaken of the band of the Blue Jay in order to determine its form and the extent of its variation. Two techniques of study were used to describe and quantify the differences between the bands of different individuals. (1) Photographs of captive individuals. Close-up photographs were made of the Blue Jays maintained in the laboratory of the Psychology Department of the University of Massachusetts at Amherst, using a Mamiya-Sekor DTL 1000 camera and 35 mm Ektochrome film.

(2) Computer analysis of Photographs of preserved specimens. Fifty-seven of the preserved specimens were photographed in a standardized manner from the left, right, ventral, and dorsal aspects. The photographs of the two lateral aspects of the band were encoded for computer analysis in the following way: the photographs were projected onto graph paper and a tracing made of the outlines of the band. The graph paper was oriented with the origin at a point midway along the ventral edge of the band and

the Y-axis rotated until approximately one-half the band was on either side of the axis. The projection was varied until the band was 5" high measured along the Y-axis. This procedure gave a standardized grid by marking off all squares in the grid into which the image of the projected band entered. Each gridded version was then entered on computer cards. The computer compared the bands of different sizes, of different sexes, and of different regions giving an average agreement percentage between pairs of bands. The agreement percentages consisted of:

$$AP = \frac{\text{the number of squares in both bands}}{\text{(the number of squares in both bands) + (the number of squares in one band but not in the other)}}$$

## RESULTS

The results indicate striking variations in the form of the Blue Jay's band. For the most part, these variations do not appear to correlate with the sex, locality, or individuality of the birds.

(1) Photographs of live specimens. The photographs of live specimens confirm that the variations seen in casual observations are seen also in careful study of photographs. Figure 1 presents a sample of these photographs. Note that about the only generalization that can be made on these live specimens is that the band is a jagged line making its way from the dorsal aspect of the neck region beneath the crest to the ventral region under the throat. Some neck bands are continuous, others not, some are wider near the top, others are wider near the bottom.

(2) Direct measurements of preserved specimens. The preserved specimens were no less variable. Some measure of the degree of these variations can be obtained by measuring some features of the neck band and comparing the variability of these measurements with the variability of such fundamental biological measurements as total length and bill length. For instance, the distance of the beginning of the band from the top of the bill measured on the ventral aspect averages 6.33 cm. with a standard deviation of 0.51 cm. The distance from the rear of the eye to the rear of the band measured on the lateral aspect of the bird's head

averaged 1.99 cm. with a standard deviation of .30 cm. The thickness of the band at this same point averages 0.74 cm. with a standard deviation of 0.32 cm. For comparison, the bill length averages 2.11 cm. with a standard deviation of 0.12 cm. and the overall length of the bird averaged 26.3 with a standard deviation of 1.32 cm. Thus, the coefficients of variation of the three band measurements are 0.09, 0.45, and 0.15, whereas the coefficients of variation of the two non-band measurements are 0.06 and 0.05.

Comparisons of the band measurements of birds of different sex and birds from different regions reveals no significant differences. Thus, these measurements are not specific to a particular region or sex. One of the band-related measurements gave evidence of consistency within individuals. The distances from the eye to the posterior margin of the band on the left and right side were highly correlated ($r = 0.71$, $p < .001$). Among the non-band measurements, the overall length of the specimens did prove to be region-specific; the specimens collected from northernly locations averaged 0.9 cm. longer than those from southern locations.

(3) Computer analysis. The computer analysis further strengthens the impression of great variation in the form of the bands on the preserved specimens. The computer analysis permits a measure of the degree of overlap between any bands. When every band is compared with every other band, the range of overlap extends from 40 percent up to 80 percent with a mean around 60 percent. Comparison of bands within sex and region, sex, region or time groupings does not substantially alter either the mean value of overlap or the variability around these mean values. Moreover, the computer analysis suggests that reliable individual differences in the form of the band do not exist. The mean overlap percentages between the bands on opposite sides of the same bird's neck are not substantially different from the mean overlap overall. This fact is illustrated in Figure 1 which shows the striking differences in the form of the band on the two sides of the same bird.

In conclusion, the measurements indicate prominent variation in the form of the neck band of the Blue Jay.

These variations include not only differences in the relative size of elements of the band, but also differences in its essential form: the number of forward and backward points, the number and location of narrow places, the presence and absence of breaks, and so forth. The data give no clue to the function, if any, of these variations. The data do suggest, however, that the variations are prominent enough to perhaps serve for the day to day identification of familiar individual Blue Jays by ornithologists, and/or by other Blud Jays.

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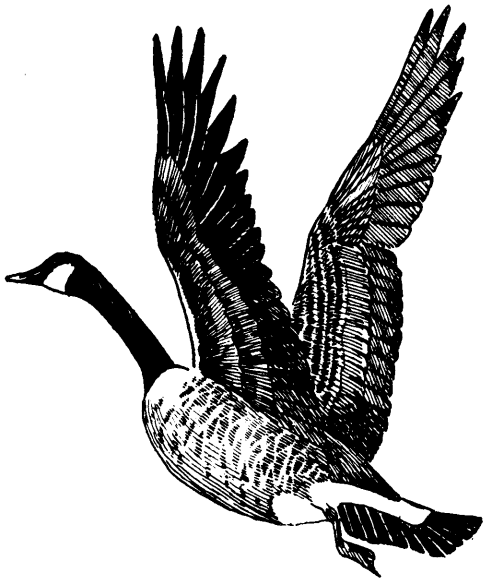

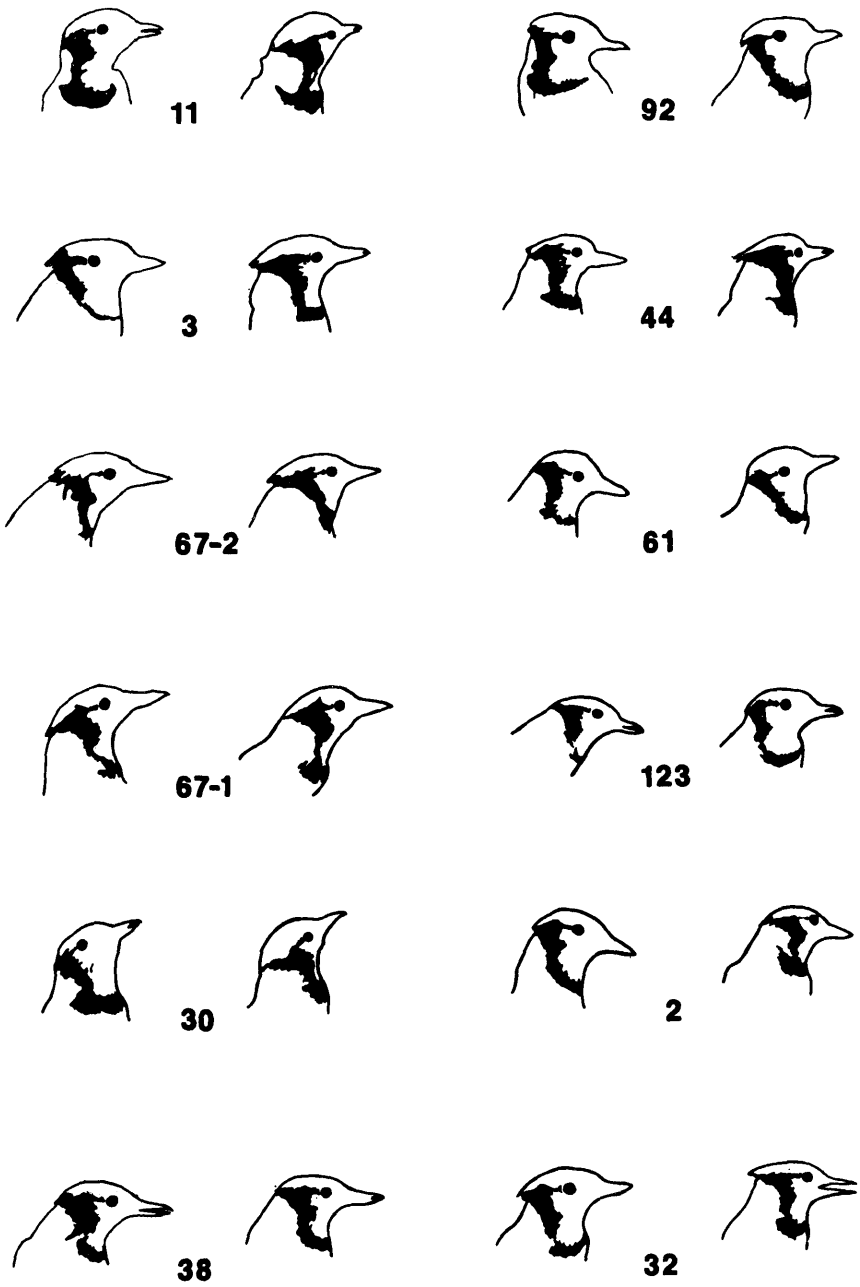


Figure 1. Illustration of the right and left neck bands of 12 Blue Jays, Cyanocitta cristata.