Juncos do not molt during the winter. Juvenal outer tail feathers which are plucked during the winter will be succeeded, not by feathers of duplicate design, but by feathers having the color pattern at the time of the next molt, due some months later.

From junco No. 42-169011, banded December 24, 1943, the third right rectrix was plucked and found to have only 16 per cent white; the succeeding feather collected February 7, 1944, measured 70 per cent white. This was another sudden winter transition from juvenal to adult plumage. Another junco, No. 44-14954, with 20 per cent white in the collected third rectrix, had twice that amount six weeks later in the succeeding feather. Junco No. 42-156538, with the two outer feathers entirely white and the third measuring 27 per cent white on January 3, 1943, increased the area in the following feather to 34 per cent white a year later; the next year this area was the same size; this suggests that the adult third rectrix may be only one-third white. This was also shown in junco No. 44-14927 in which the area increased from 13 to 34 per cent and remained there. Another junco of unknown age had 77 per cent white, which increased to 86 per cent. These limits of 34 and 86 per cent white in the probable adult plumage represent individual variations.

Dr. G. Hapgood Parks wrote me that a junco banded in Maine as a nestling, returned a year later, mated with her banded father, and raised a family. This shows that a junco may be sexually mature in one year, although at that time having a "juvenal-type" plumage. The next year she returned and mated with her banded brother, at which time her outer rectrices were entirely white, but the second was "white with a gray area near the base." Her two year old brother "showed outer and second feathers completely white," suggestive that the male develops color patterns more rapidly than does the female or that it normally has more white.

Paired tail feathers in juncos normally are symmetrical in the amount and shape of the white patches, because they are developed at the same time. Where they occasionally are unsymmetrical in the juvenile bird the feather having the more white was developed later. Removal of a feather can apparently advance the preseasonal development of feathers of succeeding molt design.—HAROLD B. WOOD, *3016 North Second St., Harrisburg, Pennsylvania.*

Behavior Responses of the Slate-colored Junco, *Junco hyemalis hyemalis*.—An experiment in which five Slate-colored Juncos were subjected to a series of electrical shocks was recently conducted in the Ornithological Laboratory of Ohio State University. This experiment was designed in such a manner that the birds were given alternate courses to reach food and water without being shocked: (1) they could hop over the shock-wires onto the edges of the trays; (2) they could reach over the wires with a slight stretching of the neck; or (3) they could fly directly to the food and water. A cage 74 inches by 26 inches by 25 inches was used, and the side toward the observer was thoroughly curtained. The curtain was fitted with a small peep hole through which observations were made. Observations were made both before and after shock was applied and extended for one or two hours each time after the food and water were daily placed in the cage. Shock was not applied between the periods of observation. Each bird was marked for individual identification. All of the birds had been held captive six or more months prior to the time of the experiment.

During the first period of observation each bird hopped over the wires after it had received an initial shock experience. The birds continued to hop over the wires without further shock experiences through the remainder of the two-hour period of observation. Likewise, on the second day the birds invariably hopped over the wires after each had received an initial shock experience. On the third day the first

shock was followed with a different pattern of behavior. The first bird to reach the food did so by reaching over the wires, and the other birds did likewise following the initial shock experience of each. This course to the food was not varied further during the third period of observation. On the fourth day the first bird to experience shock gave an alarm call, and all of the birds were immediately flying wildly about the cage. But calm was soon restored, and one of the birds hopped over the wires to food. All of the other birds then did likewise after each had received an initial shock experience, and the pattern of behavior was set for all of the birds during the remainder of that period of observation. On the fifth day each bird again received an initial shock experience. The first bird to reach the food then did so by hopping over the wires, and this became a uniform course to the food through another period of observation.

During every period of observation each of the birds received an initial shock experience. After the initial shock one of the birds hit on a course to food in which no shock was encountered, and this invariably became the route to the food for all of the birds during the remainder of that observation period. Individuals which had not yet received an initial shock experience before one of the birds had established a course to the food and water failed to adopt the course until after the initial shock experience. The response of the group to the alarm call of an individual was somewhat different in that response was simultaneous on the part of all individuals.

These Slate-colored Juncos showed a different pattern of response to the same stimulus in the face of alternate possibilities for expression. The pattern for hopping over the wires was set twice by the same bird and once each by two other birds; the pattern for reaching over the wires was set by one of the above birds which had once earlier set the pattern for hopping over the wires; and the "frenzied" state was initiated by a fourth bird. An appropriate auditory stimulus, expressed by one bird, was immediately effective at inciting a new pattern of behavior in each member of the group or a uniform pattern for the group. The tactile stimulus studied in this experiment seemed to need visual reinforcement before a new pattern of behavior was expressed by successive individuals. After the lapse of 22 hours the birds needed to be "reminded" of the disagreeable effect of the wires, but one shock experience daily caused the birds to avoid the wires through a two-hour period of observation, providing the method of access to the food and water had been established.

Apparently the behavior of these Slate-colored Juncos was a "follow the leader" process. The leader was the first bird in the situation, but the same bird did not always act as leader. This type of response is well adapted to a bird with the gregarious habits of the Slate-colored Junco.—PAUL A. STEWART, *8640 N. State Rd., Westerville, Ohio.*

On Enemy Recognition.—Frequently one finds the statement that when birds attack some other animal it proves they consider it an enemy. This may be the case, though my own rather extensive experiments on enemy recognition in thrashers (Bull. Amer. Mus. Nat. Hist., 78: 213–242, 1941) indicate the matter is more complex.

The invalidity of the general conclusion that attack proves recognition is well illustrated by comparing two notes in 'The Auk' for October, 1950. On page 512, F. C. Cross reports Chimney Swifts, *Chaetura pelagica,* pursuing a Sparrow Hawk, *Falco sparverius;* on page 518, Malcolm Davis records Purple Martins, *Progne subis,* "dive bombing" model airplanes of a particular purple and yellow pattern. Cross' tentative conclusion is that the Chimney Swifts recognized the hawk as an enemy, or had been molested by it; presumably the rather absurd conclusion follows that the