GENERAL NOTES

Additional notes on the plumages of the Redhead (*Aythya americana*).[1]— During my study of the plumages of Redheads (Weller, Wilson Bull, 69:5–38, 1957), several confusing observations were made on the plumages of young males in the fall. These probably were not properly interpreted, and this note is a re-evaluation of my earlier study in the light of observations by Humphrey and Parkes (Auk, 76:1–31, 1959), and a report of a brief experiment designed to better appraise the early plumages of male Redheads.

My earlier comments on the young male (1957:23) were: "Many males have brownish-red feathers in their lores and cheeks at eight weeks of age; these are present in all males at nine weeks". . . . "At 14 weeks, the male's head is more chestnut than buffy brown. . . ." The latter plumage is illustrated in the color plate facing page 5, which also shows the acquisition of post-juvenal male plumage in the chest, sides and scapulars. The color of the head in this plumage more nearly resembles that of adult males in "eclipse" plumage than of adult males in nuptial plumage.

At that time I assumed that the early feathers of the nuptial plumage merely were less definitive in color and size. Because I was unable to observe these changes throughout the winter, the transition was less noticeable. A comparison of skins from birds taken in fall and spring shows a rather marked difference in brilliance of the red color, purplish iridescence and length of the head feathers.

In an attempt to better analyze the transition from the tan-headed juvenile to the red-headed adult plumage and to determine the status of intermediate plumages in females, detailed observations were made on eight captives during the fall of 1966; five were males, three were females. These birds were obtained from the Northern Prairie Wildlife Center of the Bureau of Sport Fisheries and Wildlife for which I am indebted to Harvey Nelson, Director, and Charles Dane, Wildlife Biologist. Arnold O. Haugen transported the birds from Jamestown, North Dakota, to Ames, Iowa, where the birds were housed outdoors. Thanks are due Eldon Greij, Loren Bates, and Robert Bergman for assistance in care of birds and in recording data.

On receipt on 8 October, birds were about 13 weeks old. All were examined for plumage status and molt, and selected feathers or tracts were clipped for identification. Although clipping did not permit identification of all feathers of a particular tract, the presence or absence of these feathers aided in determining the number of plumages involved. To quantify the degree of molt, intensity was scored on a scale of: 0 (none), 1 (little) or 2 (much). Each feather tract was examined by lifting the feathers with a forceps. When less than one fourth of these probes showed new feathers, molt was recorded as little. When more than one fourth showed new feathers, it was termed much. Tracts were examined approximately monthly from 8 October 1966 to 27 May 1967. Data from one male are deleted because its chronology of molt was markedly delayed.

All birds received were in dominantly juvenal plumage but were involved in a post-juvenal molt of the entire head and much of the body. This molt continued through December, but there was little or no molt in most birds in January (Fig. 1). Another molt from late February through March involved both the head and body of females but mainly the body of males. Then the eclipse plumage started to develop in males in early

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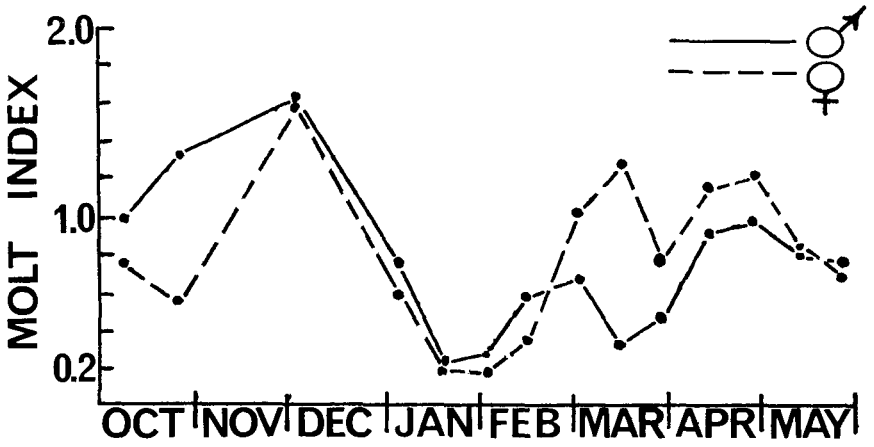

FIG. 1. Postjuvenal molt indices for four male and three female Redheads.

to mid-April, presumably because of the lack of conditions that would produce a normal breeding cycle. In addition, some infrared lights used in January may have induced early plumage development. This early molt in males made it difficult to interpret the third plumage acquired in early spring by females.

Clipping was done either when birds were received in October or during mid-January when their first molt ceased. The most significant results were from birds mass-clipped with a scissors in each feather tract. The following individual examples help to explain the curves that show an average of all molt of males and females (Fig. 1) and the curves for selected areas (Fig. 2).

Males.—It appears that males actually have two head molts following the juvenal plumage and that both are completed by early January concurrent with the body molt. The first head molt occurs in October and produces brownish-red head feathers longer than those of the juvenal plumage but which lack the length, color, and iridescence of those that develop in late November and early December. Male No. 86 was clipped on 8 October, and all clippings on the head were gone by 3 December. Head molt continued in January. These molts are so continuous that no stopping points are available to use as a base to appraise the extent of the molt or number of plumages. Males Nos. 78 and 92 both were mass-clipped on 29 January following completion of the extensive double head molt. Both still had evidence of clipping on the head in early April suggesting that few additional red feathers developed. Thereafter, brown feathers of the eclipse plumage developed on the head and body and molt continued through May.

The juvenal body plumage and tail were replaced with a somewhat dull but adult-like plumage by late December during the period when two head molts occurred. Some clipped body feathers of male No. 86 were retained from 8 October until 18 February and clipped mantle feathers existed until late May, but these could have been feathers of the first non-nuptial plumage.

The second period of body molt in late February and March was much less widespread than in females and involved mostly the scapulars and side (Fig. 2). Whether this was a complete renewal of the body plumage (into nuptial) or a partial body molt

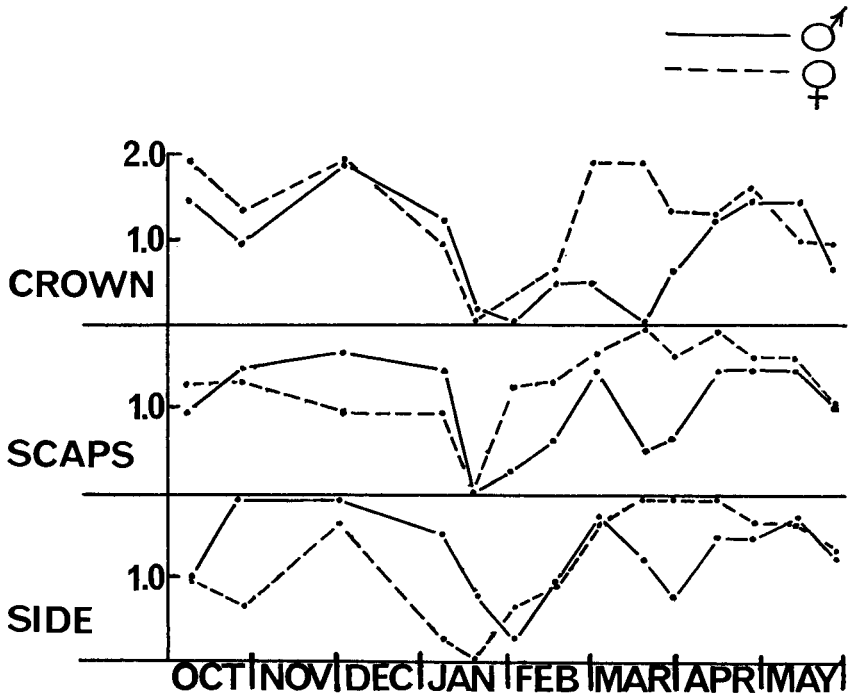

FIG. 2. Molt indices for selected feather tracts of four male and three female Redheads.

started in fall and finished in the spring is uncertain but there is no conspicuous change in body color during this period.

Females.—All feather tracts of female No. 77 were clipped on 8 October. By 3 December, all clipped feathers had been replaced on the head, chest and side but a few were present in the scapulars. All were gone by 21 January, but the posterior one-third of the belly still appeared to be dominantly juvenal.

A few feathers on all tracts of female No. 93 were marked and clipped on 8 October. These were gone by 3 December, and she completed a major molt on the head, neck and entire body by 7 January; at that time she was clipped again. Another molt started subsequently and the clipped head feathers were gone by 17 March; most clipped body feathers were replaced by 1 April except those of the mantle.

These two observations and Figures 1 and 2 suggest the following pattern in females: The juvenal head and body plumage is replaced by the first non-nuptial plumage by early January but some juvenal feathers may persist on the lower belly and venter. Possibly the timing of these plumages was influenced by captivity. A second molt occurred in late February and early March and presumably represents the pre-nuptial molt of the head, side and scapulars. The female became more rufous brown at this time as noted in wild birds (Weller, 1957:26). Subsequent molt in April and May was assumed to be the non-nuptial plumage but modifications of timing make the normality of this uncertain.

This sequence needs further study in both young and adult females. It is possible that a transient plumage occurs in females as it does in males but it could not be discerned from feather colors. Oring (Auk, 85:355–380, 1968) found a brief first non-nuptial (basic) plumage in autumn, nuptial (alternate) in winter and early spring, and a second non-nuptial in the early summer pre-nesting period of hen Gadwalls (*Anas strepera*). This would subsequently result in a pattern in adult females which is comparable to males except that females acquire the non-nuptial prior to nesting whereas males acquire it after breeding (R. Palmer, pers. comm.).

Too little data are available in this study to draw conclusions on complete sequences of plumages, but there is little question that the first non-nuptial plumage is present in both sexes. New techniques are needed to study the extent of these plumages in different tracts (and perhaps within tracts), the apparent inconsistency in number of feather generations per follicle, and the overlap of these plumages.—MILTON W. WELLER, *Department of Zoology and Entomology, Iowa State University, Ames, Iowa 50010, 20 January 1969.*

Observations on premigratory movements of hand-reared Mallards.—In July and August of 1968 a total of 301 four to five-week old Mallard (*Anas platyrhynchos*) ducklings were released in southern Wisconsin. These birds were hatched at the Delta Waterfowl Research Station in Manitoba, Canada from eggs collected from a captive wild flock of Mallards.

An analysis of the first fall band returns of these released juveniles shows that 18 were shot between 5 October and 26 October. During this premigratory period 15 of the recoveries were north of the release site and only three south of it (Fig. 1). This northward movement must have taken place sometime between the onset of flying in these young birds (about the second or third week in August) and the time when they

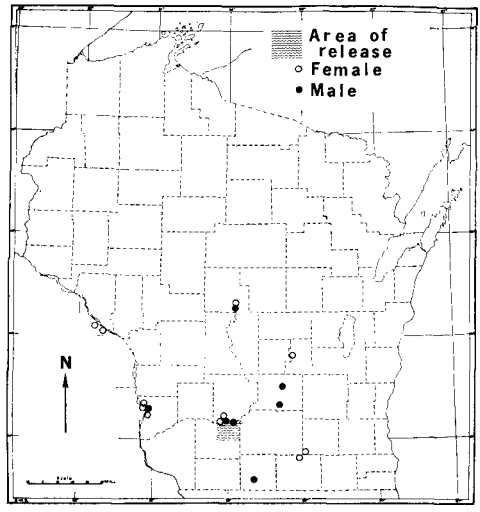

FIG. 1.