GENERAL NOTES

Colors of Stomach Linings of Certain Passerines.—In the fall of 1957 I examined several hundred bird specimens which had been killed in nocturnal migration at a television tower near Aiken, Aiken County, South Carolina. From these birds various kinds of mensural data were obtained, including quantitative estimates of color of stomach (gizzard) linings of 90 specimens representing 39 passerine species. None of the stomachs contained food. The stomach linings, which were flattened, stretched somewhat, and blotted until almost dry, were compared with color tabs on Munsell charts (Munsell Color Co., Inc., Baltimore). Color determinations were made in terms of hue (the name of a color, as red, yellow-red, yellow, etc.), value (the amount of light in a color), and chroma (the degree of strength, or intensity, in a color). A particular color reading (such as that for a Black-and-white Warbler) is as follows: 5 YR 4.7/6, the three numerical values referring, respectively, to hue, value, and chroma. Quantitative readings such as this, involving three color dimensions, were converted into color names through use of overlay charts based on the Munsell system (Kelly and Judd, 1955. The ISCC-NBS Method of Designating Colors and a Dictionary of Color Names, Natl. Bureau of Standards Circular 553). Names applying to the specimens in question appear in Tables 1 and 2. Here the sequence of names is based on the sequence of hues, which range from "R" or reddish hues to "Y" or yellowish ones in the first table, and from "P" or purplish hues to "YR" or yellow-red ones in the second. For full descriptions of the Munsell color system, see Cooper (1941. Munsell Manual of Color, Munsell Color Co., Inc., Baltimore) or Kelly and Judd (op. cit.). For an example of a study in which this system is employed, see Bowers (*Syst. Zool.*, 5: 147 – 160 + 182, 1956).

The data on stomach-lining color for members of the wood warbler family, Parulidae, and the family of sparrowlike birds, Fringillidae (Table 1), are rather similar as far as range of hues is concerned. The hue class containing the greatest number of determinations for the parulids is in the neighborhood of 4YR, where the red component is a little greater than the yellow component. For this group the most prevalent color is "strong brown," with "brownish orange" ranking second. In the sample of fringillids the yellow component tends to exceed the red, the hue class having the greatest number of determinations being approximately 8 YR. Here "strong yellowish brown" is the most frequent color, with "brownish orange," again, ranking second. Considerable intraspecific variability is suggested by the tables. It is possible that some of the stomach linings were stained by previously ingested food, but it is doubtful that this contributed appreciably to the variability in either the warblers or the sparrows.

A much greater amplitude of hue readings was obtained from the several passerine species included in Table 2. Intraspecific variability again is marked. Whether the distinctly purplish colors found in the Catbird and the species of thrush are natural or are due to food staining is uncertain. There was no evidence of staining of other parts of the alimentary tract. In Table 2, as in Table 1, it is evident that much larger series of colorimetric readings of this sort will be necessary before one can ascertain whether some of the interspecific differences are statistically significant. Large series for particular species would also reveal whether hues, values, and chromas exhibit normal distributions. If the distributions should prove normal, it would seem that food-staining effects would be of little or no consequence. If they should prove non-normal (as suggested by the three color readings from Swainson's Thrushes, one being light brown and two grayish purple), food staining might be part of the explanation. At this point, however, we cannot rule out the possibility that stomach-lining color variation (and perhaps even dichromatism) is genetically determined. Other questions suggest themselves. For ex-

TABLE 1

COLORS OF STOMACH LININGS OF PARULIDS AND FRINGILLIDS

Mean hue readings	(10.0 R)	(2.5 YR)	(4.1 YR)	(4.8 YR)	(5.0 YR)	(5.1 YR)	(5.8 YR)	(7.5 YR)	(8.4 YR)	(8.9 YR)	(10.0 YR)	(10.0 YR)	(1.7 Y)	(2.5 Y)	(2.5 Y)
Color names	Moderate reddish brown	Dark reddish brown	Strong brown	Light yellowish pink	Deep orange	Brownish orange	Moderate brown	Moderate orange	Dark orange yellow	Strong yellowish brown	Moderate orange yellow	Dark yellowish brown	Moderate olive brown	Light olive brown	Dark grayish yellow
PARULIDAE															
Black-and-white Warbler						*†									
Tennessee Warbler	*												*		
Orange-crowned Warbler			*												
Nashville Warbler										*					
Parula Warbler			*												
Cape May Warbler		*													
Black-throated Blue Warbler			*									*			
Myrtle Warbler			(2)			*							*		
Black-throated Green Warbler			*												
Chestnut-sided Warbler			*												
Bay-breasted Warbler			*				*								
Blackpoll Warbler			(2)												
Prairie Warbler			*												
Ovenbird			(2)			*	*								
Connecticut Warbler						*									
Yellowthroat			*		*	*	*								
Hooded Warbler			*												
Canada Warbler						(2)									
American Redstart			(2)												
FRINGILLIDAE															
Cardinal										*					
Indigo Bunting										(2)					
Grasshopper Sparrow				(2)		*		*	*					*	
Henslow's Sparrow			*			*									
Vesper Sparrow			*												
Slate-colored Junco										*	*				
Chipping Sparrow										(2)					
Field Sparrow						*			*	(3)					*
Swamp Sparrow			*			*				(2)			*		
Song Sparrow						*			*	(3)					

† In Tables 1 and 2, asterisks indicate single records; numbers, more than one record.

TABLE 2

COLORS OF STOMACH LININGS OF SEVERAL PASSERINE SPECIES

Mean hue readings	(7.5 P)	(8.3 P)	(10.0 P)	(5.4 RP)	(10.0 RP)	(3.8 R)	(7.5 R)	(10.0 R)	(5.0 YR)	(5.0 YR)	(5.8 YR)	(10.0 YR)
Color names	Dark purple	Grayish purple; dark grayish purple	Dark reddish purple	Dark purplish red	Blackish purple	Grayish red; dark grayish red	Dark grayish reddish brown	Light reddish brown; moderate reddish brown	Strong orange; brownish orange	Light brown	Strong brown	Moderate yellowish brown
Traill's Flycatcher											*	
Least Flycatcher								*				
Catbird			*	*			*					
Wood Thrush		*										
Hermit Thrush						(2)		*	(2)		(2)	*
Swainson's Thrush		(2)								*		
Gray-cheeked Thrush	*											
Ruby-crowned Kinglet					*							*
Solitary Vireo									(2)			
Red-eyed Vireo				*							*	

ample, are there groups of birds in which plumage color and stomach-lining color tend to show concordance or positive correlation? No such correlation is suggested by data here tabulated.

In the Munsell system, color values range from very dark (1 = almost black) to very light (9 = almost white), with gradations (2 through 8) in between. Thus, the higher the value, the lighter the color. Values of stomach-lining colors of the parulid group range from 3 to 5.3, averaging 4.1. Values for the fringillids are a little higher, ranging from 3.3 to 6.7 and averaging 5. Those for the mixed group of passerines, mostly thrushes, range from 0.7 to 5.7, averaging 3.7. The fact that dark colors are rather more prevalent in the last-mentioned group is indicated not only by these figures but also by the color names in Table 2. As to chroma or brightness, the duller colors in the Munsell system are designated by smaller numbers (2, 4, etc.), the brighter by larger numbers (up to 12 or 14 for certain hues). Chromas for the series of parulids range from 3 to 10, averaging 6.3. Those for the fringillids extend from 3 to 9, averaging 7.4. Hence they tend to be a little brighter than the chromas for the warblers. Chromas for the mixed group of passerines range from 1 to 11; they average 4.7, tending to be duller than those for either the warblers or the sparrows. In this mixed group low chroma readings (from 1 to 3) pertain to the more or less dark purplish colors.

To sum up: stomach-lining colors of samples of the Parulidae (34 specimens of 19

species) and Fringillidae (32 specimens of 10 species) were appraised quantitatively with the aid of Munsell Color Charts. There was marked intraspecific variability. The parulids tended toward "strong brown," the fringillids toward "strong yellowish brown." The parulids' colors averaged a little darker and duller than those of the fringillids. Several thrushes and other passerines had purplish stomach linings, these averaging darker and duller than those of either the warblers or the sparrows. Several questions (for example: Are food-staining effects important?) are raised by this preliminary study. —ROBERT A. NORRIS, *University of Georgia Ecological Studies, AEC Savannah River Plant area, Aiken, South Carolina. Present address: 427 Eureka Street, San Francisco 14, California, 28 October 1960.*

Purple Sandpiper in Michigan.—The Purple Sandpiper (*Erolia maritima*) has apparently not been taken in Michigan. In Wisconsin (Schorger, *Passenger Pigeon*, 1948 : 147) only two specimens have been recorded; in Illinois, two specimens (7 November 1871 and June 1895) seem to be all that have been taken; and in Indiana there is as yet no specimen, but movies have been taken of one individual along Lake Michigan at Michigan City by C. T. Clark (Keller, *Ind. Aud. Quarterly*, 1958 : 18). The earliest sight record at the Michigan City breakwater was 12 November (1950), and the latest, 6 February (1954).

Margaret D. Elliott (*Jack-Pine Warbler*, 1949 : 60–61) gave several sight records for Pere Marquette Park, Lake Michigan, Muskegon, Michigan, December 1939; 15 December 1940; 18 December 1942; 23 December 1944; and 17 December 1947; then on 9 January 1949. On 26 December 1954, G. M. Wickstrom and Peter Hovingh, Jr., observed another, and Wickstrom observed others on 2 January 1955 and 7 April 1957 at Muskegon. On 1 January 1960, William Freeman observed two at Muskegon, and on 3 January 1960, Freeman, Clara Walkinshaw, and I observed two which flew immediately up the Muskegon Lake–Lake Michigan channel out of sight.

Clara Walkinshaw and I returned the morning of 10 December 1960 to the same spot and almost immediately found and collected a Purple Sandpiper from a small pile of rocks along the Lake Michigan shore. The bird proved to be a female. Her weight was 70.9 grams. The wing measured 130 mm.; tail, 67 mm.; tarsus, 23.1 mm.; exposed culmen, 33.2 mm. The legs and feet were strong yellowish, as was the tomium. The eye was very dark. The specimen is now in the University of Michigan Museum of Zoology. —LAWRENCE H. WALKINSHAW, *819 North Ave., Battle Creek, Michigan, 20 December 1960.*

Flamingo in Michigan.—On 16 August 1959, a report came that a flamingo was located on the farms of Arah Pullman and Frank Tillman in Sections 21 and 28, Burlington Township, Calhoun County, Michigan (T4S, R7W). We made several trips to see this bird and found that it was apparently an American Flamingo (*Phoenicopterus ruber*) from its general rich pink color. It was a full-winged bird, and on the morning of 19 August it flew about a mile from us then returned to feed again in typical flamingo fashion, swinging its bill back and forth in the shallow water. This bird remained into late September then disappeared.

The area where it fed regularly was a pit from which marl had been removed. It had areas of both shallow and deep water, but the bird fed and roosted in the shallow areas. —WILLIAM A. DYER, *Union City, Michigan,* and LAWRENCE H. WALKINSHAW, *819 North Ave., Battle Creek, Michigan, 9 November 1960.*