THE NUMBER OF CONTOUR FEATHERS IN PASSERIFORM AND RELATED BIRDS.

BY ALEXANDER WETMORE.

WHILE studies of the arrangement of the contour feathers of birds on the body (pterylosis) have been numerous only slight attention has been given to the total number of feathers comprising the plumage so far as I have been able to ascertain. Dr. Jonathan Dwight[1] found 3235 feathers on a male Bobolink taken in spring. R. C. McGregor[2] has recorded 1899 feathers on a Savannah Sparrow (presumably a western form) and 6544 on a Glaucous-winged Gull both enumerations being made from study skins. Miss Phoebe Knappen[3] has reported 11,903 feathers on an adult female Mallard obtained March 19, 1932 at Pohick, Virginia, the bird being one that had died from phosphorus poisoning. According to the legend on a cartoon in the 'American Magazine' for October, 1934, p. 86, "to settle an argument over the number of feathers on the average chicken, Vernon Thornburg, Barnesville, Ohio, dairy employee, killed and plucked a Plymouth Rock. He reported 8,325 feathers." The only other report of pertinence known to me is that of Dr. Percy Lowe[4] who records that in a young of the Gentoo Penguin (*Pygoscelis papua*) he found 300 feathers to the square inch. The total number for the bird was not given. No other notes on this subject have come to my attention.

Though the number of feathers that might compose the plumage of the average bird had been in mind as a subject worthy of thought for a number of years it was not until 1933 that opportunity came to make definite investigation. Through funds provided by a grant from the private income of the Smithsonian Institution it was possible then to carry out a series of studies that covered the period from the middle of February to the end of October with an intermission from the middle of July to the latter part of September when it was not practicable to secure birds that were not in molt. The actual labor of counting was done under my direct supervision by Marie Siebrecht (now Mrs. James Montroy) who, employed as an assistant, worked carefully and conscientiously at a long and somewhat tedious task. A brief report on this work was given before the A. O. U. meeting in New York City in the fall of 1933, and it was intended to continue the investigation. Various circumstances have prevented this and it seems desirable now to place the observations made on record.

[1] The Sequence of Plumages and Moults of the Passerine Birds of New York. Ann. New York Acad. Sci., vol. 13, 1900, pp. 118–119.
[2] Condor, 1903, p. 17.
[3] Auk, 1932, p. 461.
[4] Proc. Zool. Soc. London, 1933, p. 487.

METHODS.

The work of counting feathers was carried on entirely with birds in the flesh. These were collected in Maryland and Virginia within a radius of eighty miles from the city of Washington under permits granted by the Game Commissions of these states, and were obtained in part through the assistance of Mr. Frederick C. Lincoln. I am indebted to Miss Phoebe Knappen for a number of birds killed by striking the Washington Monument during fall migration. The specimens, when study of the feathers had been completed, were made into skeletons, which are preserved for other investigations in the U. S. National Museum.

In the field the birds as taken were handled carefully to prevent injury or loss in plumage. At once they were examined for blood spots, the throat was plugged with cotton, and the bird was dropped into a paper cone for safe carrying in the method usual in collecting birds for specimens. Where loss of feathers occurred during this handling a record was made of the number on the paper cone. In warm weather I carried a small portable ice box in my auto in which the birds were placed soon after death. At home the specimens were kept until wanted in an electric refrigerator where they were held just above the freezing point. The latter is important since in small birds that have been frozen the skin often slips almost immediately after thawing, making them difficult to handle.

In the laboratory specimens were placed in a small ice box to keep cold when laid aside temporarily during noon hour or other interruptions. By careful attention it was thus possible to keep birds in proper condition for use for a week or ten days without particular difficulty.

In this study contour feathers alone have been considered, the downs and filoplumes being disregarded. The feathers were plucked a few at a time by means of fine tweezers and were counted in lots of one hundred, a check mark being made for each hundred. At any interruption in the work the number counted was set down at once to avoid error.

Account was made separately for the different feather areas under the headings of capital, dorsal, caudal (including rectrices), humeral, alar (including remiges), femoral, crural and ventral tracts, these figures being added to arrive at the total for each bird. The lines of division between the different feather tracts on the upper surface of the body were made arbitrarily as feather growth there in most species of birds is continuous so far as capital, dorsal and caudal tracts are concerned. A separate record sheet was made for each bird giving the record number, name, sex, locality where obtained, and date when collected. Necessarily there was some change in procedure as data accumulated and beginning with specimen number 53 record was made of the weight of the bird on the day that it was killed. It

was weighed again before plucking there being a slight loss from evaporation during refrigeration.

The feathers as counted were placed in a glass beaker on which there was a paper cover held in place by a rubber band. By means of a small hole cut in the paper top it was possible to confine the feathers and to ascertain the weight of the plumage. There was a regular difference between the weight of the bird before plucking and the weight after plucking plus the weight of the feathers due to a certain amount of dessication during the work. With ordinary small birds one specimen was counted each day, two being handled on a few occasions. The work was exacting so that more prolonged effort was liable, through fatigue, to lead to error.

DISCUSSION.

In beginning these studies it was the original intention to ascertain the total surface area of skin in each of the birds that was plucked in order to have some criterion for comparison between size and total number of feathers. It developed, however, that the surface area of an irregularly formed body like that of a bird could not be obtained with sufficient exactness to give the desired information.

To those accustomed to skinning birds it is at once evident that it is not practicable to remove the skin and measure it, since stretching or drying would change the size too materially. Consultation with Dr. C. G. Abbot, Secretary of the Smithsonian Institution, and Mr. L. B. Aldrich of the Astrophysical Observatory, and inquiry among other physicists failed to develop any method of measurement sufficiently accurate to give the necessary comparative data. One suggestion was to paste bits of thin cloth cut to fit over the body and then remove these and measure them, a method that was tried on two specimens. It developed, however, that there was a possible error here of two percent or more due to indentations in the body that could not be fitted, to drying of the patagial membranes, and to expansion and contraction of the cloth so that this procedure did not yield the desired information. Formulas that have been currently used in which the weight and certain measurements are the basis for computing the body area proved subject to even greater margin of error.

As a final resort the weight of the bird before plucking and the weight of the plumage removed were obtained by sensitive scales. The data secured are included in the accompanying table but are not considered particularly significant. They are given more for the interest attaching to the weight of the plumage than for any other reason.

With birds kept in the relatively dry air of an electric refrigerator there is a slight loss in weight due to dessication. Thus a Mourning Dove dropped from 152.7 grams to 152.4 grams in two days, a Nighthawk from 67.9 grams

to 66.8 grams in four days, a Hummingbird from 2.8 to 2.6 grams in two days, and a Long-billed Marsh Wren from 11.3 to 10.7 grams in six days. The weights given in the table are those recorded within a few hours of the time when the bird was killed.

There was also a regular loss from dessication during the time required to pluck the bird this being proportionate roughly to the size of the specimen. This amounted to 2 grams in the Mourning Dove mentioned, to 1.5 grams in the Nighthawk, to .1 gram in the Hummingbird, and to .4 grams in the long-billed marsh wren. The plumage was weighed immediately after it was plucked. The weight of the feathers varied somewhat with atmospheric conditions but this difference was relatively slight.

From the data at hand certain inferences may be drawn which are discussed in the following paragraphs. In considering these it must be born in mind that generalization is made from an amount of information that, while decidedly more than has been available previously, is still so small, when each species represented is considered, as to be in a measure tentative and so subject to change and revision.

The work of feather counting is tedious and exacting and yields small result relative to the labor involved. It gives information of interest and value however and it is hoped that others may carry on the work. In the present studies only the smaller birds have been considered, and those handled have come from a somewhat limited geographic area, though they have included northern migrants. It will be of interest to check these same species with records at distant points, to obtain counts for many additional species concerning which now nothing is known, to compare related subspecies, to compare like types of birds from different geographic areas of similar climate, to compare birds of similar type from temperate and tropical areas, and to follow some common species through the year making counts weekly or even more frequently.

INDIVIDUAL VARIATION.

In the series examined there does not appear to be any difference in number of feathers that may be correlated with sex. For example male and female of the Hermit Thrush taken on the same day had 1884 and 1873 feathers respectively, while male and female of the Chestnut-sided Warbler secured together had 1426 and 1396. It is probable that where there is marked difference in size as in some Hawks and Owls, or where there is considerable difference in plumage, as in the Birds of Paradise, that there may be a corresponding sexual variation in total feather count. In the limited data at hand where there is evident any difference it seems due to other factors than sex, as will be presently indicated.

The limits of individual variation, regardless of sex, among birds taken

at the same season are shown by a few examples. Two Downy Woodpeckers secured on February 12 had 2512 and 2584 feathers. Two Phoebes shot April 1 and 9 had 2083 and 2081 feathers in the plumage. The count for three Hermit Thrushes taken October 21 ranged from 1828 to 1884; for two Golden-crowned Kinglets secured October 14, 1268 and 1386; for three White-eyed Vireos secured September 29 from 1332 to 1542; for two Magnolia Warblers collected May 7 and 14, 1414 and 1493; for two Canada Warblers May 14 and 21, 1398 and 1473; for three Slate-colored Juncos March 26 to April 1, from 1961 to 2092; for three Field Sparrows April 16 and 23, from 1822 to 1849; for five White-throated Sparrows February 22 to March 19, from 2384 to 2710; for four Fox Sparrows February 26 to March 26, from 2482 to 2757; for six Song Sparrows March 5 to 19, from 2093 to 2335. The latter were taken especially to show what the range of individual variation might be. The range is more than had been anticipated.

SEASONAL VARIATION.

One of the interesting facts ascertained through these studies is that a definite seasonal variation in number of feathers is evident in all those species for which sufficient evidence is present.

The Goldfinch may be indicated in particular in this connection since it has differing plumages for winter and summer, the nuptial dress being acquired by a prenuptial molt that involves the body plumage but not the wings and tail. According to Dwight[1] the prenuptial molt is found in both sexes though less complete in the female. The data at hand apply mainly to females. Two of this sex obtained in February and March had 2107 and 2368 feathers, while one shot April 1 had 1901. These were all in winter plumage. A female secured June 25 in full breeding dress had only 1439 feathers. The difference is definite and considerable.

Similar seasonal differences are shown by birds in which there is little or no difference between winter and summer dress. Three Downy Woodpeckers taken from February 12 to 19 ranged from 2153 to 2584, one shot March 26 had dropped to 2020, and one taken April 20 to 2009. A Carolina Chickadee taken February 19 had 1704 feathers while in one secured June 4 there were 1140. A Black-and-White Warbler obtained April 9 had 1679 feathers and another secured May 7 had 1473. A Louisiana Water-Thrush shot April 18 had 2146 feathers while another taken June 4 had only 1525. Slate-colored Juncos taken from March 12 to April 1 ranged from 1961 to 2092, while one collected April 21 had 1886. A Chipping Sparrow on May 28 had 1511 feathers while two on July 9 had only 1150 and 1204. Field Sparrows in April ranged from 1822 to 1849, while one on July 9 had 1280

[1] Ann. New York Acad. Sci., vol. 13, October 19, 1900, h. 180.

feathers. Song Sparrows taken in March ranged from 2093 to 2335, while on July 2 a male had 1304.

It is evident from this that in the species studied from a maximum number of feathers found in the winter plumage there is a steady decline through early spring to a final low at the entrance of summer. The loss in feathers seemingly progresses steadily as cold weather passes and warmer weather advances. In other words birds have a natural adjustment in dress to the needs of the season, a sensible arrangement that while apparently hitherto unknown is one that might be expected. As the lessening number of feathers is accompanied by considerable wear in those that remain the amount of the body covering is very appreciably lessened. The final low ebb of summer culminates in the post-nuptial molt by which the plumage is renewed for another seasom.

While the greater part of the plumage is replaced immediately at the post-nuptial molt there is some adjustment to the needs of the bird through which the complete plumage may be acquired more slowly. While a Carolina Chickadee had 1704 feathers on February 19, two taken October 8 and 15 had only 1309 and 1256 respectively; a Ruby-crowned Kinglet on April 9 had 1560 feathers, while three taken October 11, 15 and 19 had 1119, 1326 and 1289; a male Chewink shot April 18 had 2235 feathers, while another on October 8 had 1816; a Chipping Sparrow on May 28 had 1511 and another on October 24, 1313; white-throated sparrows in February and March varied from 2384 to 2710, while two on October 4 and 8 had 1545 and 1508 respectively. There appears here to be some adjustment in these species whereby, while the bulk of the plumage is acquired at once following the summer molt, the complete, dense plumage that comforts the body in winter does not come until later, so that during the fall when the weather is relatively warm these birds are not burdened with too heavy a covering.

The forms just mentioned are among the hardier species which pass the winter season in areas where cold, for short periods at least, is considerable. In some species that migrate early and pass the winter in the tropics the complete body plumage seems to be acquired immediately following the summer molt. Thus, a White-eyed Vireo on May 21 had 1313 feathers, while three that struck the Washington monument on southward migration on September 29 numbered 1332, 1386 and 1542 respectively; the feathers of a Red-eyed Vireo on June 4 numbered 1510, while others secured September 18 and 29 counted 1784 and 1531; two Magnolia Warblers taken May 7 and 14 had 1414 and 1493 feathers, while one on September 18 had 1635; a Black-throated Blue Warbler on May 14 had 1527 feathers, while another on September 18 had 1620; a Yellow-breasted Chat on May 14 had 2001 feathers, and another on September 28 possessed 2113.

The difference between this group of species and the one described just

before is obvious. Further data on other families will be interesting. It appears that Vireos and Wood Warblers may be uniform in a speedy, complete renewal of the body plumage following the summer molt. The Myrtle Warbler may be an exception, as some individuals winter in regions of considerable cold. It would be interesting to compare the number of feathers in the latter with others taken at the same season in the West Indies.

VARIATION AMONG SPECIES.

Certain points of variation in number of feathers among the different species considered in this report are of interest as being indicative of what may be expected when more information is available. The bird with the smallest number as might be expected, is the smallest in the group, a Ruby-throated Hummingbird taken June 11 that had 940 feathers. One may wonder as to the number of feathers found on the diminutive Helena's Hummingbird (*Calypte helenae*) of Cuba, or the almost equally small Vervain Hummers (*Mellisuga minima*), whose two races inhabit Jamaica and Hispaniola.

Size however is not necessarily a criterion in number of feathers, since a Mourning Dove taken June 11 with 2635 feathers is about equivalent to a female Robin on April 14 with 2587 and not much in excess of a Bluebird on April 1 with 2550. The comparison is not quite fair to the Dove however since it was collected in summer and may well have had more feathers in April when the others were obtained. Comparison between the Hairy and Downy Woodpeckers is of interest, since a male of the former on April 23 had 2395 feathers, while a female of the latter on April 20 had 2009. The difference is not great when disparity in size is considered. Song Sparrows taken from March 5 to 19 ranged from 2093 to 2335, White-throated Sparrows secured from March 12 to 19 ran from 2384 to 2507, Fox Sparrows obtained March 5 to 26 from 2482 to 2757, a Cardinal on April 9 had 2280, and a Red-eyed Towhee April 18 had 2235. The variation here curiously is apparently without particular reference to size.

TABULAR STATEMENT OF FEATHER COUNT.

For further reference for those who may be interested in the subject the following table gives figures for all the birds studied in the present connection. These are listed under their common names as given in the Fourth Edition of the A. O. U. 'Check-List' published in 1931, grouped by families in systematic order. To simplify the table the locality for each has been omitted as this information had no pertinence, all birds coming from a radius of eighty miles from Washington. The common name is used instead of the Latin appelation in order to make the data readily understood by those who are not professional ornithologists.

Species	Date	Sex	Number of feathers	Weight of Bird	Weight of feathers
Columbidae					
Mourning Dove	June 18, 1933	♂	2635	152.7	11.7
Caprimulgidae					
Eastern Nighthawk	June 11, 1933	♂	2265	69.3	5.6
" "	July 9, "	♀	2034	67.9	5.7
Trochilidae					
Ruby-throated Hummingbird	June 11, 1933	♂	940	2.8	.2
Picidae					
Yellow-bellied Sapsucker	Mar. 12, 1933	♀	2242		
Eastern Hairy Woodpecker	Apr. 23, "	♂	2395		
Northern Downy Woodpecker	Feb. 12, "	♀	2584		
" " "	Feb. 12, "	♀	2512		
" " "	Feb. 19, "	♀	2153		
" " "	Mar. 26, "	♂	2020		
" " "	Apr. 20, "	♀	2009		
Tyrannidae					
Eastern Kingbird	May 28, 1933	♂	1868	40.2	3.0
Northern Crested Flycatcher	June 11, "	♂	1570	33.8	2.5
Eastern Phoebe	Apr. 1, "	♂	2033		
" "	Apr. 9, "	♂	2081		
Acadian Flycatcher	May 14, "	♂	1554	13.7	1.2
Eastern Wood Pewee	June 4, "	♂	1495	13.4	1.0
Hirundinidae					
Rough-winged Swallow	June 25, 1933	♂	1369	17.1	1.0
Barn Swallow	June 18, "	♂	1476	17.6	1.4
Corvidae					
Northern Blue Jay	Oct. 8, 1933	♂	1898	97.2	6.8
Paridae					
Carolina Chickadee	Feb. 19, 1933	♀	1704		
" "	June 4, "	♀	1140	9.1	.5
" "	Oct. 8, "	♀	1309	10.0	.8
" "	Oct. 15, "	♀	1256	8.3	.6
Certhiidae					
Brown Creeper	Oct. 21, 1933	♀	1408	8.5	.6
" "	Oct. 24, "	♀	1247	8.5	.6
Troglodytidae					
Eastern House Wren	June 11, 1933	♂	1271	13.3	.6
" " "	July 9, "	♂	1178	11.5	.7
Carolina Wren	June 4, "	♂	1405	21.1	.7
Long-billed Marsh Wren	Apr. 30, "	♂	1433	11.3	.5

Species	*Date*	*Sex*	*Number of feathers*	*Weight of Bird*	*Weight of feathers*
Mimidae					
Eastern Mockingbird	June 18, 1933	♀	1601	51.3	3.6
Catbird	June 4, "	?	1733	35.6	2.3
Brown Thrasher	June 11, "	♂	1960	69.2	3.2
Turdidae					
Southern Robin	Mar. 26, 1933	♀	2973		
" "	Apr. 14, "	♀	2587		
Wood Thrush	May 25, "	♀	2075	60.4	3.2
Eastern Hermit Thrush	Oct. 21, "	♂	1884	31.2	2.4
" " "	Oct. 21, "	♀	1873	32.7	2.4
" " "	Oct. 21, "	?	1828	31.9	2.3
Eastern Bluebird	Apr. 1, "	♀	2550		
Sylviidae					
Eastern Golden-crowned Kinglet	Oct. 14, 1933	♂	1268	5.8	.7
" " "	Oct. 14, "	♂	1386	5.5	.6
" " "	Oct. 21, "	♀	1233	5.9	.6
Eastern Ruby-crowned Kinglet	Apr. 9, "	♂	1560		
" " "	Oct. 11, "	♀	1119	6.4	.5
" " "	Oct. 19, "	♀	1289	6.4	.7
" " "	Oct. 15, "	♀	1326	6.2	.5
Laniidae					
Migrant Shrike	May 28, 1933	♂	2170	50.9	3.1
Vireonidae					
White-eyed Vireo	May 21, 1933	♂	1313	12.0	.3
" " "	Sep. 29, "	♂	1542	14.8	.6
" " "	Sep. 29, "	♂	1386	14.7	1.0
" " "	Sep. 29, "	♂	1332	12.4	.9
Yellow-throated Vireo	May 21, "	♂	1664	16.6	1.0
Red-eyed Vireo	June 4, "	♂	1510	17.9	1.0
" " "	Sept. 18, "	♂	1784	18.2	.8
" " "	Sept. 29, "	♂	1531	17.6	.9
Mniotiltidae					
Black and White Warbler	Apr. 9, 1933	♂	1679		
" " " "	May 7, "	♀	1473	13.7	.6
Tennessee Warbler	Oct. 8, "	♀	1348	9.3	.6
Southern Parula Warbler	May 7, "	♀	1422	7.7	.4
Magnolia Warbler	May 7, "	♂	1414	9.4	.2
" "	May 14, "	♀	1493	7.9	.4
" "	Sept. 18, "	♀	1635	9.0	.6
Black-throated Blue Warbler	May 14, "	♀	1527	9.0	.5
" " " "	Sept. 18, "	♀	1620	9.9	.6
Myrtle Warbler	Feb. 22, "	?	2291		
" "	Apr. 1, "	♀	1995		
Black-throated Green Warbler	Sept. 18, "	♂	1688	9.2	.6

Species	*Date*	*Sex*	*Number of feathers*	*Weight of Bird*	*Weight of feathers*
Mniotiltidae—Continued					
Blackburnian Warbler	May 21, 1933	♀	1360	11.2	.5
Chestnut-sided Warbler	May 7, "	♀	1396	11.1	.6
" " "	May 7, "	♂	1426	11.4	.7
Bay-breasted Warbler	Sept. 21, "	♂	1718	12.1	.6
Black-poll Warbler	Oct. 15, "	♂	1583	17.6	1.2
Northern Pine Warbler	Apr. 30 "	♀	1685	13.9	1.1
Yellow Palm Warbler	Apr. 23, "	♂	1839		
Oven-bird	Sept. 21, "	♂	1849	21.8	1.5
Louisiana Water-thrush	Apr. 18, "	♂	2146		
" " "	June 4, "	♀	1525	19.6	1.0
Kentucky Warbler	May 14, "	♀	1511	14.4	.7
Connecticut Warbler	Sept. 19, "	♂	1803	13.1	1.0
Northern Yellowthroat	Sept. 18, "	♀	1698	10.3	.7
" "	Sept. 18, "	♀	1508	11.4	.8
" "	Oct. 1, "	♀	1371	9.3	.4
" "	Oct. 1, "	♂	1335	10.2	.6
Maryland Yellowthroat	June 18, "	♂	1351	9.6	.7
" "	Oct. 1, "	♂	1465	10.7	.8
Yellow-breasted Chat	May 14, "	♂	2001	29.6	1.8
" " "	Sept. 28, "	♂	2113	30.8	1.8
Canada Warbler	May 14, "	♀	1473	9.5	.7
" "	May 21, "	♀	1398	9.3	.6
American Redstart	Apr. 23, "	♂	1785		
Ploceidae					
English Sparrow	July 2, 1933	♂	1359	28.1	1.5
Icteridae					
Eastern Red-wing	June 18, 1933	♀	1639	42.6	2.2
Orchard Oriole	June 11, "	♂	1601	24.0	1.5
Purple Grackle	May 28, "	♂	2730	117.7	8.3
Eastern Cowbird	July 2, "	♀	1622	41.4	1.9
Thraupidae					
Scarlet Tanager	May 21, 1933	♂	2023	29.1	1.8
Fringillidae					
Eastern Cardinal	Apr. 9, 1933	♂	2280		
Rose-breasted Grosbeak	May 7, "	♂	2228	48.2	1.7
Indigo Bunting	June 25, "	♂	1480	15.3	.9
" "	July 25, "	♀	1386	15.5	.8
Eastern Goldfinch	Feb. 26, "	♀	2107		
" "	Mar. 5, "	♀	2368		
" "	Mar. 12, "	♂	1916		
" "	Apr. 1, "	♀	1901		
" "	June 25, "	♀	1439	13.3	.8
Red-eyed Towhee	Apr. 18, "	♂	2235		
" " "	Oct. 8, "	♂	1816	42.0	3.1

Species	*Date*	*Sex*	*Number of feathers*	*Weight of Bird*	*Weight of feathers*
Fringillidae—Continued					
Eastern Savannah Sparrow	Apr. 30, 1933	♂	1747	17.9	1.3
Eastern Grasshopper Sparrow	June 25, "	♂	1419	18.1	.9
" " "	July 2, "	♂	1249	16.4	1.2
" " "	July 9, "	♂	1224	18.7	.8
Eastern Henslow's Sparrow	May 28, "	♀	1436	14.6	.9
Sharp-tailed Sparrow	Apr. 30, "	♂	1796	18.5	1.0
Northern Seaside Sparrow	Apr. 30, "	♂	1941	24.4	1.5
" " "	Apr. 30, "	♂	1897	26.4	1.6
Eastern Vesper Sparrow	June 25, "	♂	1439	26.9	1.5
" " "	July 2, "	♂	1252	24.5	1.2
Slate-colored Junco	Mar. 12, "	♂	2063		
" " "	Mar. 26, "	♂	1972		
" " "	Mar. 26, "	♂	1961		
" " "	Apr. 1, "	♂	2092		
" " "	Apr. 21, "	♀	1886		
Eastern Tree Sparrow	Mar. 5, "	♀	2594		
Eastern Chipping Sparrow	May 28, "	♂	1511	11.6	.5
" " "	July 9, "	♀	1150	14.3	.9
" " "	July 9, "	♂	1204	12.6	.9
" " "	Oct. 24, "	♀	1313	13.0	.6
Eastern Field Sparrow	Apr. 16, "	♂	1822		
" " "	Apr. 16, "	♂	1849		
" " "	Apr. 23, "	♂	1822	10.8	.9
" " "	July 9, "	♂	1280	11.6	.6
White-throated Sparrow	Feb. 22, "	♀	2710		
" " "	Feb. 22, "	♂	2556		
" " "	Mar. 12, "	♂	2384		
" " "	Mar. 12, "	♀	2436		
" " "	Mar. 19, "	♀	2507		
" " "	Oct. 8, "	♀	1508	24.4	1.8
" " "	Oct. 4, "	♀	1545	27.9	1.7
Eastern Fox Sparrow	Feb. 26, "	♀	2638		
" " "	Mar. 5, "	♀	2757		
" " "	Mar. 26, "	♀	2482		
" " "	Mar. 26, "	♀	2648		
Swamp Sparrow	Apr. 3, "	?	2217		
" "	Apr. 23, "	♂	1953		
Eastern Song Sparrow	Mar. 5, "	♀	2208		
" " "	Mar. 5, "	♀	2093		
" " "	Mar. 19, "	♂	2315		
" " "	Mar. 19, "	♂	2271		
" " "	Mar. 19, "	♂	2335		
" " "	Mar. 19, "	♀	2283		
" " "	July 2, "	♂	1304	20.9	1.1

U. S. National Museum,
Washington, D. C.