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INDEX VOL. XXV, 1913

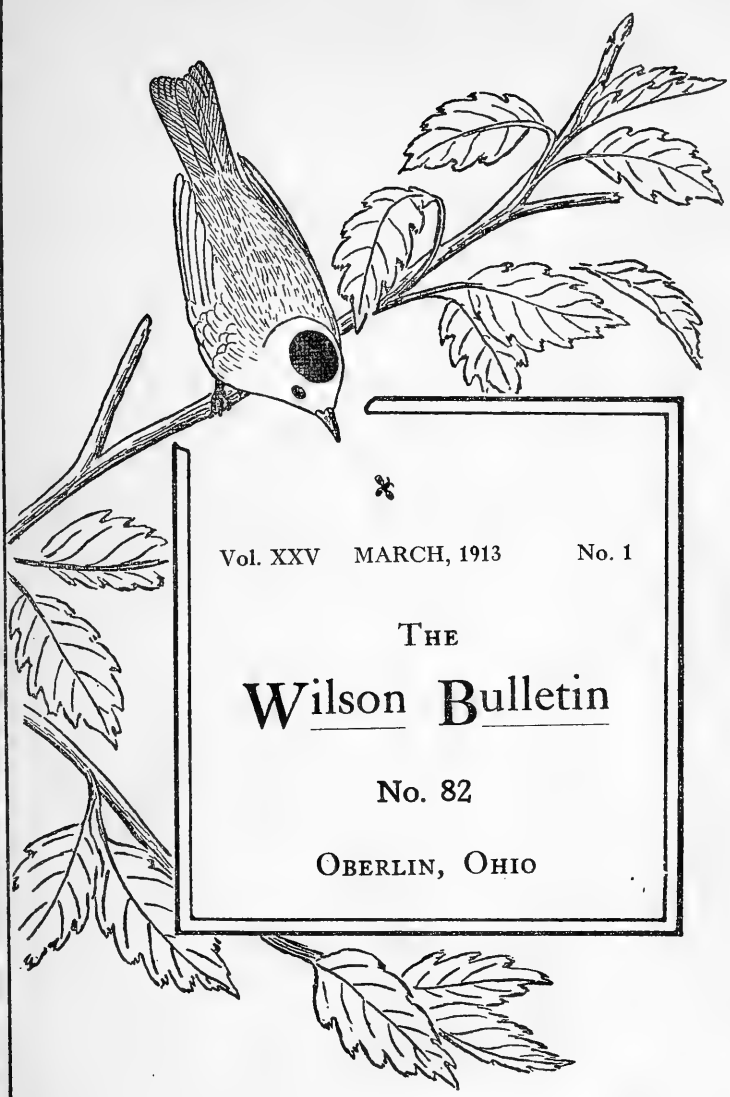
INDEX

INDEX

INDEX

INDEX

INDEX



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CONTENTS

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VARIATIONS IN BIRD MIGRATION FROM YEAR TO YEAR.

BY WELLS W. COOKE.

The records of the Weather Bureau show that the average temperatures of the three spring migration months — March, April and May — vary very considerably from year to year. In some years all three months are below normal. In other years the whole season averages above normal. If the birds depended to any considerable extent on temperature to indicate to them the proper time for migration, their movements should vary up and down with these great changes in average temperature. If on the other hand the later theory is correct that the departure from the winter home has no connection with the weather, and that the *average* temperature at the *breeding grounds* is the principal factor that determines the time and speed of migration, then it should follow that local variations in temperature should have only a slight influence in varying the dates of arrival from year to year.

The latter assumption is borne out most strikingly by a long series of careful migration observations. They show that the average of migration at any locality for the entire season as compared with the average for other years is remarkably uniform. The migration arrivals in any given week may be much retarded by a great storm or a long spell

of exceptionally warm weather may induce the birds to arrive somewhat earlier than usual. But these variations from week to week largely balance one another and the average dates of arrival for the whole season show from year to year very slight variations.

Thus at Lanesboro, Minn., the average date of arrival for the ten years, 1884-1893, is 144.8 days after January 1; the variations are: 1886, 0.2 days late; 1887, 0.3 days early; 1888, 0.7 early; 1889, 0.4 early; 1890, 1.2 days late. The average variation is 0.6 days, and the maximum variation, 1.9 days, from 0.7 days early to 1.2 days late. The year 1885 is 1.9 days late, but there are evidences in the notes that this is due to lack of time in the field on the part of the observer rather than to actual variation by the birds.

The same test was made of the migration dates from Keokuk, Iowa. The year 1892 is 1.0 day earlier than the average; 1893, 0.1 day later; 1894, 1.7 days late; 1895, 0.8 days early; 1899, 0.5 days early; 1900, 0.5 days late. The extremes of variation are 2.7 days and the average variation 0.9 days.

Grinnell, Iowa, shows much the same: 1885, 0.7 days late; 1886, 0.2 days late; 1887, 0.7 early; 1888, 0.6 early; 1889, 0.1 late; 1890, 1.0 late; average variation only 0.5 days; maximum variation, 1.7 days from 0.7 days early to 1.0 day late.

The averages for Aweme, Manitoba, are: 1898, 1.2 days late; 1900, 0.2 days late; 1901, 0.8 early; 1902, 0.8 early; 1903, 0.2 days late; average variation 0.6 days; maximum variation, 2.0 days from 0.8 days early to 1.2 days late. The records for 1899 are omitted because that year the observer could not devote the usual time to the work and the average is several days late.

The records just given include the work of four observers in four widely separated towns during fifteen different years and hence ought to be a fair test. The remarkable agreement of the results is a strong indication that they represent the actual movements of the birds. The twenty-one series of observations give a maximum range of 2.5 days from 0.8

days early to 1.7 days late, with an average variation of 0.7 days. That is to say the whole migration of different years may vary as much as two and a half days, between the earliest spring and the latest, but the probable variation is less than a day. Or to say the same thing in another way, the notes of a first-class observer in any one year will give an average that probably will not vary more than two-thirds of a day from the date that would be obtained for that locality as the average of long years of observation.

The figure 2.5 days for the maximum variation is the sum of two variables — the actual variation of the birds in their times of arrival and the variation in the amount of time and care that the observer can give to the work in the different years. The fact that the sum of these two variables is so small shows both the extreme uniformity of the birds in their migrations and the very careful and accurate work done by the four observers whose notes were selected for the test.

The above may be summarized by saying that the migration of birds as a whole is remarkably uniform. A season may start out early or late and quite wide variations may occur in the times of arrival of any one species, but in the course of the whole season's migration, these extremes nearly balance and the result is very small net variations.

The dates of arrival of individual species show considerable variation between the extremes of early and late arrival, but the average variation from the mean date of arrival is surprisingly small. To arrive at a mathematical statement of this variation thirty-six species were selected, which are easily noted, and are common enough so that they would ordinarily be seen as soon as they arrive. The records at Lanesboro, Minn., for the six years 1885-1890 were used and there should therefore have been six times 36 records or 216 in all. Six of these records were lacking, while eight records were rejected because too early to show the ordinary movements of the species, and ten more because they were so late as to indicate that the species was overlooked on its arrival. Thus 18 records, or 9 per cent, were rejected.

The remaining records show an average extreme variation of 10.0 days between the earliest and the latest dates of arrival for each species, with an average variation of 2.9 days from the normal date of arrival.

The records of these same thirty-six species for the same six years at Grinnell, Iowa, after rejecting 13 per cent because too late or too early, show an average extreme variation of 9.4 days and an average variation of 3.4 days from the normal date of arrival. The records from Lanesboro are thus seen to be a trifle more regular than those from Grinnell. As it is hardly supposable that the birds themselves are more variable in one of these places than the other with such closely similar physical surroundings, it must be that this difference is due to differences in ability or opportunity on the part of the observer. In this particular case it is probable that the two observers knew birds about equally well, but the Lanesboro observer was so situated that he could spend more hours per day in the open air than the observer at Grinnell, with the result that he averaged seeing the birds a little sooner after their arrival.

These final averages of 2.9 and 3.4 days represent the probable variation in the observance of the arrival of the first, or in other words a first-class observer, who is in the field every day and is able to spend time enough each day to cover his neighborhood satisfactorily will make records that show an average variation from the normal date of arrival of about three days, and unless extreme attention is paid to the birds another half day will be added. This time — three days — is the sum of two variables, first, the variations due to the birds themselves as they vary their actual date of arrival from year to year; and second, variations due to failures on the part of the observer to note the species immediately on its arrival. Since the second of these causes must have some influence it follows that the birds themselves must be remarkably uniform in their spring movements.

The above investigation was undertaken for the purpose of obtaining some standard that could be used in testing mi-

gration reports. The Biological Survey during the past twenty-five years has received reports from more than two thousand different persons and it must needs be that this large number would include observers good, bad and indifferent. A large part of the most exacting work of the present writer for the past ten years has been the examining of these thousands of reports and separating the wheat from the chaff. No better single basis for a judgment has been found than the above three-day variation. It received a striking confirmation in a very extended set of records that were received from Raleigh, N. C. In some twenty years of records about half the years showed small variations, while the other years gave less regular results even to a fifty per cent increase in the amount of variation. Later the observer sent his original notes and diary and they showed conclusively that the variations were inversely according to the amount of time spent in the field. The more days a month and the more hours a day devoted to hunting for new records, the more regular the records obtained.

Conversely if an observer in a level district sends notes with wide variations it is certain that some of his records are not representative of the normal movements of the birds and extra care must be taken to ascertain which notes should not be used.

During all these years, as would be expected, there has been some nature-faking in the reports. The percent of spurious records has been very small and they have varied from the crude impossibilities of ignorance to the carefully worked out report of a person well up in birds and bird migration. But they can be detected with ease when the above rule is applied and they are compared with genuine records from neighboring districts. Either the variations will be too small — the dates more regular than the actual movements of the birds, or if they have taken pains to vary the dates they have placed the wider variations on the wrong birds, since species differ widely in their normal variations. It would probably astonish some of these nature-fakers if they

could see the comments that have been entered on their reports.

But to return to the original subject. The average variations of 2.9 and 3.4 days already mentioned are the average for the whole spring migration period of March, April and May, but birds are much more variable during the early part of the season when March storms interfere with their uniform northward progress. The average variation from the normal date of arrival at Lanesboro is for March, 4.0 days; April, 2.7 days, and for May, 2.6 days. At Grinnell the same averages are for March, 3.6 days; April, 3.6, and May 2.9 days. The average of the two places is for March, 3.8 days; April, 3.1, and May 2.7 days. The average extremes, that is, the difference between the earliest and the latest record for each species is at Lanesboro, for March, 12 days; April, 9 days, and for May, 8 days. At Grinnell, March, 10 days; April, 10 days, and May 9 days. Average of the two places for March, 11 days; April, 9.5 days, and for May, 8.5 days.

When the records of single species are considered of course the variations are much larger. The earliest ducks and geese migrating in the unsettled weather of the breaking up of winter show the widest variations, as will be seen from the following table of the movements of the Canada Goose.

SPRING ARRIVAL OF THE CANADA GOOSE.

PLACE	Number of years of observation	Average date of normal arrival	Extreme differences between normal date of arrival and recorded date of arrival	Differences between extremes of recorded dates of arrival	Average differences between normal date of arrival and recorded date of arrival
			DAYS	DAYS	DAYS
Nebraska, lat. 40°30′...	14	February 21	+9 to —34	43	10
Iowa 41°	9	February 24	+9 to —39	48	14
Iowa 42°	15	March 4	+6 to —31	37	12
Minnesota 43°40	8	March 18	+2 to —23	25	10
North Dakota 47°30.....	11	March 27	+5 to —28	33	10
Manitoba 50°	15	April 6	+6 to —23	29	9
Average				36	11

The table shows that the early geese are very variable in their movements; that early migrants sometimes appear a full month before the usual time of arrival, and that extreme variations in different years amount to a month and a half. Attention is called to the last column, which is the "probable error" in records of the arrival of the Canada Goose and means that when a good observer sees the first goose of the season, the probability is that the date is within nine to fourteen days of the normal date of arrival for that district. With such wide variation, a large series of observations is necessary to establish a reliable normal for any given locality.

The extremes of variation are considerably greater in the district just north of the winter range, since with these hardy birds, a few warm days may tempt them north even in January, and in mild winters, like those of 1888-9 and 1889-90, geese may be seen every few days all winter, many miles north of the usual winter abode. When it is remembered that the probable error in the date of arrival of the late migrants is hardly more than three days, it will be understood how great an influence the changeable spring weather has on the early migrants.

Birds differ quite decidedly in their tendency to vary the date of their arrival. The extreme is found in the Canada Goose just mentioned, which has an average variation of 11 days from the normal date of arrival. At Lanesboro and Grinnell, the birds showed the following as their average variations from the normal time of appearance.

Phœbe	4.9 days	Ruby-crowned Kinglet	2.1 days
Black-poll Warbler	4.9 "	Chipping Sparrow	2.1 "
Bluebird	4.0 "	Wood Thrush	1.8 "
Meadowlark	4.1 "	Chimney Swift	2.0 "
Bronzed Grackle	3.7 "	Kingbird	2.0 "
Whippoorwill	4.0 "	Baltimore Oriole	2.1 "
Purple Martin	3.9 "	Black-billed Cuckoo	2.0 "
Robin	2.5 "	Ovenbird	1.4 "

Thus the Canada Goose and the Ovenbird represent the extremes — the one eight times as variable as the other.

AUTUMN BIRDS IN ALCONA COUNTY, MICHIGAN.

BY J. CLAIRE WOOD.

We will begin a brief sketch of Alcona County, Michigan, with the statement that between fifteen and twenty years ago the region about the village of Lincoln was a vast primeval forest of white pine and some Norway. Old residents speak of driving about beneath these great trees, there being no undergrowth. They covered the hill tops and slopes, but were replaced in the swampy valleys and low coast lands by hemlock, spruce, cedar and deciduous softwood, growing in a black muck. Near Lake Huron were belts of hard wood, and west of Hubbard Lake an open, sterile, sandy region of which Jack pine, scrub oak and sweet fern are characteristic plants, but the bottom lands differed little from other portions. The entire pine and hardwood forest has been cut away, except a few small pieces of the latter. The majority of pine stumps stand to-day and are a detriment to agricultural development. From measurements taken, the general run are approximately thirty inches in diameter and some exceed sixty inches. The general aspect of this pine section at the present writing is stumps and logs, with an occasional limbless tree trunk extending into the air. Every stump and stub is blackened by fire, which has ravaged the region more than once and destroyed nearly all of the fertile surface soil, and over it all is a growth of young poplar and some birch. The cultivated area lies mainly east and south of Lincoln, where we find the soil rather poor, as a whole, but with excellent patches where the hardwood existed or the humus was not destroyed by fire.

The village of Lincoln is located on the east and west center line of the county and seven miles inland from Lake Huron. It claims a population of 200 souls and an approximate area of one square mile, the south half of which is in the southeast corner of Hawes and the remainder in the northeast corner of Gustin Townships. In the easterly portion of the north half is Brownlee lake, nearly half a mile north and

south by a third less east and west. In the northwesterly portion of the south half is East Twin lake, about three-quarters of a mile east and west by a third less north and south; the other twin lying just west of it. The village lakes are separated by a high sand ridge, the nearest point between them being some 300 yards. The village dwellings are mainly clustered on the southerly side of this ridge just east of Twin lake. An abandoned railway grade runs east from the village on the line between Harrisville and Haynes Townships. The latter township is on the north side and the first two miles in sections 31 and 32, respectively, while the first mile of Harrisville Township is in section 6. One-quarter mile from the village we come to low ground covered with second growth swamp maple, birch, poplar, etc., with a scattering of hemlock and small tamarack. This low land is nearly all south of the grade, or in section 6, and reaches nearly to Crystal lake, which is just north of the grade and about half a mile from the village. This lake is about one-third of a mile east and west by slightly less north and south and one-third of a mile east of it is "mud pond," some 600 feet east and west by 400 feet in width. Along the northwest margin of Brownlee lake is a small woods of hemlock, arbor vitae, etc., with a few hardwood on the higher ground. On a hill one-half mile north of the west half of the village is some thirty acres of genuine hardwood forest, mostly beech, oak and maple, abundant in the order named, and extending northeasterly from this woods are lowlands, densely covered with small hemlock, pine, spruce, arbor vitae, yellow birch, etc. The southwest corner of the village touches some eighty acres of lowland similar to the above, except that it contains a solid ten-acre patch of tall tamaracks. This lowland is separated from East Twin by a ridge running east the length of the lake and thence southeast. There is quite a valley between this ridge and the one supporting the building section. This was formerly a cedar swamp, but is now covered with low bushes and thick weeds. The ridges are more or less under cultivation, but in most cases with the stumps still standing. From the high point

in the village all directions, far or near, terminate in the prevailing county scenery of stumps, stubs and second growth. The village lakes are mainly surrounded by second growth growing from the water and a dense blue-berry growth surrounds "mud pond" in a similar manner, while Crystal lake is encircled by a beach of white sand. The village lakes are said to be shallow and Crystal over a hundred feet deep, but none of these bodies of water show plant life above the surface. Fish have been introduced into these lakes with poor success; doubtless, in part owing to absence of suitable aquatic plant life. From Lincoln to the Backus hotel, at the south end of Hubbard lake in Sec. 2, Hawes Township, is six and one-half miles west and four and one-half north; thence the lake extends north seven miles to the county line, with an east and west width of about three miles and a stated depth of ninety-seven feet. The water shed here is towards the north. Sucker creek flows northwest from the vicinity of Lincoln and West Branch river flows northeast, both entering the lake at the south end, while the outlet is Hubbard river at the north end, which flows nearly due north for eighteen miles. Sucker creek was not visited, but West Branch enters the southwest corner of the lake in Sec. 3. It narrows from eighty feet in width at the lake to thirty feet one mile inland and is a very crooked channel of clear water through inundated lands caused by a dam across the outlet of Hubbard lake, which has raised the water level some three or more feet. Entering West Branch from the lake we pass through tamarack forest, gradually changing to white elm, red maple, black ash, etc., but all killed by the overflow and imparting a dreary aspect, enhanced by the rushes that are spread through the woods from the channel bank. Yellow perch, black bass and pike are the common Hubbard lake fish and brook trout abound some six miles from the lake in West Branch, as doubtless up the Sucker and other streams. Some half dozen farms begin one mile west and north of Lincoln and extend west on both sides of a road and this is spoken of as "the settlement." The foregoing briefly depicts

the topographical features of the country covered by our ornithological observations and is deemed advisable as a key to the localities mentioned in the appended list and because of its being in a stage of transformation.

We arrived at the village of Lincoln on the evening of October 5, 1912, and remained there until the 13th of November, with the exception of one week beginning October 13, which was spent at Hubbard lake. Bird study was not the object of our trip, but it developed that we were able to devote a portion of each day to that purpose and in consequence the following list presents a fairly accurate estimate of avian conditions during the period of our stay. Comparing with any section of southeastern Michigan we find Alcona County deficient both in the number of species and individuals and also in the flora, but it is doubtless the richer in the mammalia. Without hunting for them we saw Chipmunk, Red Squirrel, Northern Hare, Badger and Porcupine, while Virginia Deer and one Black Bear were shot and brought to Lincoln. The bear was taken in Mitchell Township, about fifteen miles west of Lincoln, and during the season about twenty deer were taken within that distance from the village. The absence of Siskins and Red-polls and scarcity of diurnal raptores were certainly surprises. A Buteo and Accipiter were seen in the swamp east of the village on October 10, a Buteo while driving to Hubbard lake on October 13, and another at the lake on the 16th. These five hawks were apparently the last of the autumn migration, but down in Wayne county the southward movement is not entirely concluded until December, and a few remain throughout the winter; this, of course, refers to those species that winter mainly south of Michigan. In Alcona County there is doubtless a definite route of migration near the shore of Lake Huron, and with access to this section we probably could have added a few species to our list. Over the territory we visited there was a general southward movement, while Pipits and Horned Larks were seen passing south over the dwelling section of Lincoln only and there was a westerly movement through the second

growth along the south shore of Hubbard lake and thence southwest up the West Branch river. We daily saw Blue Jays following this route, and also other birds, including the first Robins we noticed in the county. Four birds were found that have not been taken in Wayne County, namely, the American Scoter, the Arctic Three-toed and Northern Hairy Woodpecker, and the Horned Lark. Of these, the first is of no especial interest as all the Scoters occur in flocks on Lake Erie and undoubtedly stray into the lower Detroit River.

The Three-toed Woodpecker we welcomed as a pleasant reminder of bygone days in coniferous forests. Though of minimum size the Northern Hairy Woodpecker was noticeably larger than the more southern form in Wayne County. The Fourth Provisional Zone Map of North America assigns Alcona County to the Canadian Zone, though it more properly belongs to the upper Transition. It was never entirely Canadian and now the pine forests are gone and a more southern fauna and flora have penetrated the county and spread with its agricultural development. However, probably no change has affected the local Hairy Woodpeckers and we find them less than the dimensions of typical *leucomelas,* but in our opinion of that form, though the specimens we examined may have been transients from further north rather than local breeding examples. The greatest pleasure of all, however, was in finding the Horned Lark, as we had not previously seen it in life. There are no records for southeastern Michigan, nor did Messrs. Swales and Taverner find it at Point Pelee; in fact, it is considered rare as far east at least as Toronto, Canada, and Erie County, Pennsylvania, according to the bird students who back their records with actual specimens on hand, but it has been reported as more or less common over this entire region. In Michigan it has been found abundant during the autumn migration on Isle Royal in 1905 and tolerably common in Houghton County and the Charity Islands, Saginaw Bay, in 1910. With the exception of an approximate dozen specimens in collections this is all we knew of its distribution in the state prior to finding it at

Lincoln. Accepting the geographical areas assigned the subspecies, we find that Michigan is south of the easterly breeding range of *hoyti,* but instead of that form the representative northern transient is typical *alpestris* that breeds in east-Labrador and the coastal region just south of it. As the east Hudson Bay form is approximately *alpestris*+*hoyti* and the rarity of *alpestris* at Toronto precludes the possibility of its reaching Michigan along the natural course of the St. Lawrence River and northern shores of Lake Ontario and Lake Erie, we suggest a hypothetical overland route from the northern half of Labrador to Lake Superior and the St. Mary's River and thence south through Michigan and possibly into southwestern Ontario by way of St. Clair County. However, subsequent data may change all this and even now we are ignorant of the spring migration and know *hoyti* only as a straggler, which is doubtless incorrect. The status of the two forms in the state may never be determined owing to the steadily increasing opposition to the killing of birds by a class who are grossly ignorant of everything pertaining to science.

1. *Columbus auritus.*—Horned Grebe. This was the only species of grebe on Hubbard Lake and none were seen elsewhere. In calm water it was difficult to approach, but when the waves were running high the rapidly moving launch seemed to confuse it and it would endeavor to escape by flying towards the shore instead of diving. Under these conditions Mr. Love shot three females; the first from a flock of four on October 16, the second from a flock of five on the 17th, and a single bird on the 18th. A pair entered the West Branch on October 14, but escaped to open water at the report of a gun.

2. *Podilymbus podiceps.*—Pied-billed Grebe. We noticed one on each village lake on October 8 and there continued to be one on each lake until we left for Hubbard lake on the 13th. Doubtless the same individuals were seen each day. They were wary and kept beyond gunshot range of the shore. There was a grebe on East Twin lake on October 31 and another on Brownlee lake on November 7, which we believed to be of this species.

3. *Larus argentatus.*—Herring Gull. From one to eight were daily seen on Hubbard lake. In calm weather they would for hours perch upon the snags projecting above the water, but preferred to sail about in brisk winds and devoted much time to

watching the surf for food washed ashore. Four gulls of this species thus occupied were seen at Lake Huron in the city of Harrisville on October 27.

4. *Mergus americanus.*—Merganser. Two adult males flew east over the village dwellings on October 10 and another two passed west over the same route on November 5. They did not patronize the local lakes and were doubtless passing between Lake Huron and Hubbard lake.

5. *Lophodytes cucullatus.*—Hooded Merganser. On October 17 we explored Hubbard lake in a launch and flushed six small flocks of this merganser. We examined five females shot by sportsmen on the lake October 20.

6. *Nettion carolinense.*—Green-winged Teal. An adult female was secured on the West Branch on October 20.

7. *Marila americana.*—Red-head. A flock of seven appeared on Hubbard lake on October 18 and a female was secured.

8. *Marila affinis.*—Lesser Scaup Duck. A pair came from the west and dropped into Brownlee lake on October 8, where they remained three days. On October 14, among the ducks driven into the West Branch by the rough sea on the lake were six of this species. A male and two females were on "mud pond" November 7 and flew east when flushed.

9. *Charitonetta albeola.*—Buffle-head. Small flocks were on the West Branch on October 14 and later were scattered about the lake, where three females were taken on the 18th. A female was shot on Brownlee lake November 2 and a pair noted there November 5.

10. *Oidemia americana.*—Scoter. The three species of scoters were of similar habits and differed from the other ducks on Hubbard lake by preferring the deep water and remaining there in spite of the roughest seas we experienced. On October 14 we came upon a flock of *americana* consisting of two pairs and secured a female. Mr. Love secured a female on the 16th, while a pair was seen on the 17th and two females were secured on the 20th.

11. *Oidemia deglandi.*—White-winged Scoter. A flock of eight was flushed on October 14 and a single male on the 16th. This species was more wary than *americana* and none were secured. The white wing patch is very conspicuous in the dark plumage of the adult male while in flight.

12. *Oidemia perspicillata.*—Surf Scoter. We had the pleasure of examining a female secured on Hubbard lake by Mr. Love on October 13. The bird allowed him to approach within gunshot range, when it dove and reappeared nearer the boat.

13. *Branta canadensis canadensis.*—Canada Goose. During the last week in October a deer hunter shot one from a flock about

eight miles west of Lincoln and brought it to the village. We saw none and were informed that they seldom alight in the county.

14. *Gallinago delicata.*—Wilson's Snipe. Three were flushed in the swamp south of the building section in the village on October 25.

15. *Bonasa umbellus umbellus.*—Ruffed Grouse. This may be classed as a common resident in the county and abundant where conditions are favorable. It was seen in both the north and south portions of the village and surrounding covers and along the trail to Hubbard lake. We flushed several within 200 yards of the Backus hotel and a young lady stopping there shot fourteen during our stay and without the aid of a dog.

16. *Accipiter velox.*—Sharp-shinned Hawk. One flew along the shore of Brownlee lake and thence south over the dwelling section on October 10.

17. *Bubo virginianus virginianus.*—Great Horned Owl. We found an adult male in the hardwood forest on November 11. It possessed a wariness fully equal to the genus in more civilized districts, but was secured by a lucky shot at long rifle range. It was necessary to secure the bird as we were not acquainted with the local avifauna and both *pallescens* and *subarcticus* have been taken in the state. However, allowing for individual variation this bird did not differ from Wayne county examples.

18. *Ceryle alcyon alcyon.*—Belted Kingfisher. A kingfisher frequented the village lakes during the first week of our stay. As it had certain haunts and perches it was doubtless the same bird seen on all occasions instead of different migrants. At sundown on October 20 one settled on a dead limb in front of the Backus hotel. It was a transient, as none had been seen about the lake during the entire week.

19. *Dryobates villosus leucomelas.*—Northern Hairy Woodpecker. The elevated position of the hardwood forest rendered it conspicuous for miles around and one would suppose it an attractive land mark for transients, but we were disappointed to find less bird life there than elsewhere. This thick woods, containing many giant beeches and oaks with tops perforated with woodpecker holes, seemed to us an ideal location for Hairy Woodpeckers, but none were seen there. We saw our first bird in a cedar swamp in Sec. 2, Hawes Township, on October 18. The second, fourth and sixth were noted on October 25 and 30 and November 7 among the pine stumps on an area cleared of second growth in Sec. 6, Harrisville Township. The third was among second growth and pine stumps in Sec. 31, Haynes Township, on October 28, and the fifth among pine stumps in the village on November 4. Ridgway's Manual

gives the length of *villosus* as 8.50 to 9 inches and wing 4.50 to 5.00, and the length of *leucomelas* as 10 to 11 inches and wing as 5.02 to 5.40. Four of the six we observed were secured and measure as follows:

Oct. 18—male—10.20x16.63x5.25.
Nov. 7—male—10.12x16.50x5.12.
Oct. 30—female—9.63x——x4.88.
Nov. 4—female—9.75x15.85x4.88.

Jenkins gives the wing average of 5 male *leucomelas* as 5.16 and 6 male *villosus* as 5.00.

20. *Dryobates pubescens medianus.*—Downy Woodpecker. A pair was seen in the second growth along Hubbard lake on October 15 and another in the same locality on the 18th. All three were working west along the south shore.

21. *Picoides arcticus.*—Arctic Three-toed Woodpecker. In the northwest corner of the hardwood are some hemlock trees and among these we discovered a female of this species on November 11. It allowed a close approach, but upon taking wing passed entirely from the woods in a southerly direction. This was our last day afield and as we did not meet with it earlier it may have been the first of a migration from the north.

22. *Otocoris alpestris alpestris.*—Horned Lark. The height and barren appearance of the ridge supporting the dwelling section of Lincoln was doubtless an attractive land mark for both forms of this lark and the pipits as none were seen elsewhere during our entire stay. There was a gravel outcropping and a bean field that few larks could pass without alighting. All of the Horned Larks came from almost due north and departed towards the south. The migration began with a flock of twelve on October 30 and from seven to twelve were noted daily until November 5, when we counted forty in one flock, and this was the last of them. Six individuals were secured, and comparing with four winter specimens from Rhode Island we find but one of the latter with the sulphur yellow of equal brightness on chin, throat, forehead and line over the eye.

23. *Otocoris alpestris praticola.*—Prairie Horned Lark. Three birds of this form were seen on the gravel slope on October 7 and about 25 on the following day. They were carefully inspected and the one questionable example secured. This was a male with throat, chin and forehead sulphur yellow and could not have been identified without the bird in the hand. During the month it was necessary to take two more for the same purpose and the three specimens of this form and six of the alpestris were all that we required to fix the status of the two beyond all question. About

three to eight of this form were continually about the village and we counted thirty on the 28th and an average of nine a day until November 5, when twenty were counted and these followed the large flock of *alpestris*. During the earlier part of our stay an occasional flock came to the hill from the south or departed east for the cultivated district near Lake Huron, but the general trend was north to south.

24. *Cyanocitta cristata cristata*.—Blue Jay. From two to ten jays were seen daily in the vicinity of Lincoln. The majority of these were single birds and more than a pair was rare. They were all working in a southerly direction until the last few days of our stay, when they appeared to be congregating in the evergreen swamps in flocks of ten to twelve, where they doubtless occur all winter. An average of ten per day passed along the south shore of Hubbard lake and thence up the West Branch.

25. *Corvus brachyrhynchos brachyrhynchos*.—Crow. On October 7 we saw a flock of nearly fifty flying south about two miles east of "mud pond"; also, two single birds on the 8th and six on the 10th, going south over the village. Thus ended the migration before it had begun down in Wayne County, and incidentally we wish to state that a flock exceeding one thousand entered the latter county from Ontario on November 18, 1912, and the next day a flock of twenty concluded the autumn migration in that locality or two days less than six weeks later than in Alcona County.

26. *Sturnella magna magna*.—Meadowlark. From the car window on October 5 we saw a flock of about twenty at Handy station fourteen miles south of Lincoln. Four were seen on October 13 in "the settlement" while driving to Hubbard lake and three were noted in Mikado village on the 27th.

27. *Euphagus carolinus*.—Rusty Blackbird. We saw three in the village on October 11 and two flocks, or about forty birds, among the dead trees on the West Branch on the 14th.

28. *Quiscalus quiscula æneus*.—Bronzed Grackle. Three were flying northeast over Sec. 6, Harrisville Township, on October 28.

29. *Astragalinus tristis tristis*.—Goldfinch. On October 31 we located a flock of twelve in the aspens bordering Brownlee lake. They flew northwest towards the hardwood forest and a single individual was flying over this forest and uttering the characteristic flight note on November 11.

30. *Plectrophenax nivalis nivalis*.—Snow Bunting. The first snowfall occurred on October 23, but the snow melted as it fell. On the 26th a flock of about 100 Snow Buntings passed over the village headed due south and we expected lowering temperature and snow storms, but it continued clear and became warmer. On the 31st a flock of about 150 passed over the village on a course

of about N. 20° E., which would indicate rising temperature, but it turned cold and snowed all day of November 1 and 2. About 200 in two flocks went southwest on November 5, but it turned warmer on the 6th. During the following five days flocks of three to fifteen were seen and all flying northwest. Only three individuals were found with the Horned Larks.

31. *Calcarius lapponicus lapponicus.*—Lapland Longspur. A single individual was with the Prairie Horned Larks on November 4.

32. *Passer domesticus.*—English Sparrow. An approximate estimate of the abundance of the English Sparrow in Lincoln would place the number at 200, or one to each human inhabitant. We often mentally calculated the mortality that must attend so many on such a small living area during the rigor of winter, but in early November the birds became restless with a daily increasing fondness for flying about in flocks and chirping noisily, and on November 8 they arose in one flock and several times circled the village dwellings, making all the noise of which they were capable. We then saw a flock of about one hundred high in the air and approaching from the north. The village sparrows finally dropped to the ground, where they were soon joined by the strangers and all was confusion and excited chatter. We did not see the departure, but the next day only forty sparrows could be found.

33. *Poœcetes gramineus gramineus.*—Vesper Sparrow. This was the most common species in the mixed flocks of sparrows found in the village during our first week there. We counted twenty-four on October 8, but ten was the daily average. Last seen on the 13th in "the settlement," where twenty-five were counted.

34. *Passerculus sandwichensis savanna.*—Savannah Sparrow. Two were flushed on October 8 and three on the 10th from flocks of Vesper Sparrows on some pasture lands in the village.

35. *Zonotrichia leucophrys leucophrys.*—White-crowned Sparrow. A flock, consisting of one male and two females, was discovered in a small brush pile on a highway in the village on October 7.

36. *Zonotrichia albicollis.*—White-throated Sparrow. Four were seen along the margin of Brownlee lake on October 10 and eight the following day in the swamp south of the dwelling section of the village. We expected to find this species rather common.

37. *Spizella monticola monticola.*—Tree Sparrow. Thirty were counted on October 25 in the evergreen swamp touching the southwest corner of the village limits. These were the first of the migration and the greatest number seen on any one day, except November 10. The daily average was fourteen.

38. *Spizella passerina passerina.*—Chipping Sparrow. One was noted on October 10 and a second on the 12th in flocks of Vesper

Sparrows in the village. We secured one of the birds as *pallida* might occur.

39. *Junco hyemalis hyemalis.*—Slate-colored Junco. During our first week at Lincoln we saw an average of fifteen per day, mainly in the mixed flocks of sparrows. There were thirty in "the settlement" on October 13. A daily average of twenty-one was noted along the south shore of Hubbard lake from October 14 to 19, both inclusive. Forty was the most seen in one day prior to October 25, when about 150 were counted southwest of the village. This was the grand exodus, the season concluding with one bird on the following day.

40. *Melospiza melodia melodia.*—Song Sparrow. Found only during the first week of our stay and in the swampy district south of the dwelling section, where twelve were counted on October 11.

41. *Melospiza georgiana.*—Swamp Sparrow. Four were found in the tangled vegetation over water in the same swamp as melodia on October 11.

42. *Passerella iliaca iliaca.*—Fox Sparrow. Small companies of this species were found at different places along the trail to "mud pond" on October 7 and one bird the next day. As time progressed without additional records we concluded that the species had fled the county, but on October 25 we shot one beside a trail in the heart of a dense cedar growth southwest of the village.

43. *Lanius borealis.*—Northern Shrike. One passed in a westerly direction through the village on October 29. Occasionally it would alight, but only to remain less than a minute.

44. *Dendroica coronata.*—Myrtle Warbler. We saw one individual with a flock of juncos on the south shore of Hubbard lake on October 15.

45. *Anthus rubescens.*—Pipit. As we stepped from the house on the morning following our arrival at Lincoln the first birds we saw were individuals of this species, and during our first week at the village no other birds were so abundant. Coming from the north they usually lit among the stumps on the northern slope of the ridge and then worked over the top and southward, sort of drifting along the village streets and the tops of buildings and stumps. They were usually in flocks of ten to fifteen and one of these occasionally remained about the ridge all day. The range of abundance per day was from thirty to more than two hundred individuals. They were in greatest abundance at the time we left for Hubbard lake and probably the migration continued during the week of our absence, for upon our return we noted a flock of fifteen on October 21 and three birds about the village from the 25th to the 29th.

46. *Certhia familiaris americana.*—Brown Creeper. One noted

in the second growth along the south shore of Hubbard lake on October 15.

47. *Sitta carolinensis carolinensis.*—White-breasted Nuthatch. We saw but one individual of this common species during our entire stay in the county. This bird had appropriated the Backus hotel, probably for the winter, and spent about half its time hopping about the roof in search of a crack between the shingles that would just fit the acorn it carried. The hotel is well sheltered in a small pine grove.

48. *Penthestes atricapillus atricapillus.*—Chickadee. Although but tolerably common this species was of more uniform occurrence than any other except the English Sparrow. We found it from the first to the last day afield and usually in little flocks of four or five, while the number of individuals seen on any one day did not exceed fifteen. Down in Wayne County at this season of the year a flock of this species is almost invariably accompanied by a Creeper, Nuthatch or Downy Woodpecker, and sometimes by all three at once, but here the three were rare at Hubbard lake and absent elsewhere and consequently the Chickadees were always alone. We never heard them calling in the hardwood forest without listening for and expecting to hear the nasal pipings of the Nuthatch. All of the Chickadees we discovered were carefully inspected for individuals of *hudsonicus*, and though none were found the species may occur, especially in winter.

49. *Regulus satrapa satrapa.*—Golden-crowned Kinglet. Two flocks, or about twenty individuals, were in the swamp east of Lincoln on October 7. A flock of about twenty on the 16th and ten on the 19th were in the second growth along the south shore of Hubbard lake. This is another species that affiliates with the Chickadee, but we failed to find them together.

50. *Hylocichla guttata pallasi.*—Hermit Thrush. We counted three single birds in the swamp east of Lincoln on October 7 and another on the 19th.

51. *Planesticus migratorius migratorius.*—Robin. On October 14 we were located for several hours where we commanded a view of the lower West Branch and the south shore of Hubbard lake. A flock of three Robins followed the south shore and ascended this river and an occasional Jay came over the same route until we had counted twelve. A flock of Robins appeared in the swamp east of Lincoln on October 25 and remained there inclusive of the 28th. We estimated the flock to contain about a dozen birds, but were unable to ascertain the exact number owing to the dense cover.

52. *Sialia sialis sialis.*—Bluebird. There was a flock of twelve scattered among the stumps along the ridge on October 8. They departed on a course slightly east of south.

THE NEST OF THE GOLDFINCH (*Astragalinus t. tristis*) BASED ON STUDY OF THE DESERTED NESTS.

BY FRANCIS M. ROOT.

Everyone who has noticed birds at all is sure to know the Goldfinch, although he may call it a "Wild Canary." He is a jolly little fellow and his undulating flight and pretty "Per-chic-o-ree" call are known by every bird-lover. But it is only the select few who know him the year round; who have watched him through the winter in his brown suit, and watched his nest-building in the summer.

All through the winter the Goldfinches who remain with us wander about in little bands of from six or eight up to a score or two, subsisting on weed-seeds and scattered grain. In the spring the males change their brown coats for others of brilliant yellow and black, but they still wander about, reinforced by their brethren who have wintered in the south, until mid-summer.

In late July or early August the Goldfinches set about building their dainty, cup-like nests, in which the females lay from four to six very light blue eggs, which in a couple of weeks hatch out into baby Goldfinches. Then comes a busy time, for the parents must hurry around and catch enough insects, mainly plant-lice and flies, for their insatiable little charges. When the young finally leave the nest their food soon changes to the regulation diet of their family; a little gleaned grain, thistle, milkweed, sunflower and weed seeds.

During the winter, the Goldfinches are found mainly on pasture lands or fields that were allowed to grow up to weeds after the crops were gathered, their distribution being determined almost entirely by that of suitable food. In the spring they wander anywhere, and in the fall, when all the weed-seeds are ripe, when grain is being gathered in and left scattered on the ground, when all nature seems to be making provision for the seed-eaters; in this season the Goldfinches may roam where they please, and always find themselves in

a land of plenty. But in the summer, when they are burdened with the care of a family and have to find insects for their young, the Goldfinches seek out some spot that combines the advantages of concealing the nests with that of attracting the insects that must be obtained for their growing young.

The nests that I have found were usually in some such general situation as this. A patch of woods is bordered by a slashing in which numerous small elm and hickory saplings mingle with large thorn bushes of about the same size. Beyond the slashing lies a small area filled with weeds, and beyond that a great red clover field. In such a slashing of two or three acres, there may be from two to half a dozen Goldfinch nests. Another favorite place is in the midst of a bed of thistles or of a berry-patch surrounded by woods, and sometimes nests are found in a lone tree in the middle of a pasture, overgrown with weeds.

The average height of the nest from the ground is from six to ten feet. By far the majority of nests that I have seen were at that height. In slashings they are almost always placed so. Nests in thistles or berry-bushes are usually only three or four feet up, but when the nest is placed in a lone tree or in a tall tree in the edge of woods it is sometimes from twenty-five to forty feet up. Messrs. Baird, Brewer and Ridgeway, in their "North American Land Birds," say that the nest is "very rarely higher than ten feet," which suggests that eastern birds may build lower than ours, on the average.

According to my observations and reading, the nest is invariably placed at a fork, and usually in a crotch. Most nests will be found in an upright, two or three pronged crotch and bound to each fork at the rim and along the sides. An interesting variation from this type was found, in which the nest was bound to both forks of a two-pronged crotch and the bottom supported by a twig, the whole nest being on one side of the crotch and not in it. Occasionally the nest will be found saddled on an almost horizontal limb, but always

at a place where there is a fork, or a couple of side branches, so as to offer a broader surface for the foundation.

It does not seem to matter much what kind of a tree is used, so that it has a good crotch at a convenient distance from the ground. Thistles are often used, as are also berry or rose bushes. The favorite tree seems, about here, to be the American elm, but this apparent preference is probably due to the abundance of suitable elm saplings in the slashings and their good supply of upright crotches of three or four prongs. Nests were also found in maple, apple and shagbark hickory trees.

There is considerable variation as to size, especially of the cavity. The average height of the nests examined was two and three-fourths inches, the average diameter three and one-half inches. The average depth of the cavity was one and one-half inches, and its average diameter two and one-half inches. This would make the walls of the nest each half an inch thick and the bottom an inch and a quarter thick. This average size, and especially depth of the cavity, is probably too small, for several of the nests examined had phenomenally thick bottoms and broad, shallow cavities.

The shape of the nest is that of a round-bottomed china cup. The cavity is usually deep, so that the bottom is not more than twice as thick as the sides. In a few of the nests, as mentioned above, the cavity was so shallow (because the bottom was thick, not because the nest was small) that it was rather of the shape of a saucer than of a cup.

Not having witnessed the building of the nests I cannot say as to the method of construction. The nests have a base, formed by stretching strips of bark from one fork of the crotch to another, so as to form a framework in the shape of a hammock. The spaces between and around these are filled with a felting of shredded vegetable matter. Upon this the cup is built. Similar strips of bark run around and around the rim and sides of the cup, and the interstices are filled with felting as before. The bottom of the cup is mostly felting, with sometimes a few strips of grass or

bark to reinforce it and hold it in shape. Within all is the lining, covering the bottom and the lower part of the sides of the cavity.

The materials used vary a great deal in exact kind, but the general type of things necessary is the same in all. For the framework of the base and cup, long strips of some material, five to seven inches long and one-sixteenth to one-fourth inch wide, are required. These are often of grapevine bark, and milkweed inner bark is also much used. The framework may be composed entirely, or almost entirely, of grapevine bark, of milkweed bark, of grass-stems or weed-stems; or it may be composed of all of these, together with hickory, elm or raspberry bark.

Apparently the materials nearest at hand are used. Two nests taken from elm trees in a slashing containing many milkweeds and few other sources of supply, have the framework almost entirely of milkweed bark, with a little elm bark in one (Nos. 1 and 4 in the table). Another (No. 6), from a slashing containing no milkweeds, but near a large patch of wild grapevines, has its framework entirely of their bark.

The framework is often fastened together with cobwebs. The felting, which fills all the interstices of the framework and fastens it to the crotch, hangs out in rags, giving the nest a fantastic tattered appearance. It is composed mostly of comparatively coarse "vegetable wool." The felting also contains always some fine grass-stems or twigs and cobwebs, usually a dried leaf or two of the tree the nest is built in, often a little dried moss or some hickory leaf-stems, and I once found a good deal of real wool.

The "vegetable wool" mentioned before, is composed of very finely shredded vegetable fibers. The most common substance in it is the outer bark of the milkweed, although it often contains also a little bark or grass substance. The milkweed plant is common in all kinds of places, and its dried stem often stands till a year or two after its death. On these dead stems the thin outer bark hangs in little ragged shreds, inviting attention. The inner bark is very tough and strong

and is often used for the framework, as stated above. The outer bark is of a silvery-gray color, and when finely shredded and packed down looks much like dirty thistledown. Under the lens, however, its curling tendency and splittings and flat shape of the strands is easily seen.

This "wool" is the felting used in most cases. In some nests a similar substance has been prepared from grass-stems, while in the nest mentioned above (No. 6), in which the entire framework was of grapevine bark, the felting is very scanty, consisting of cobwebs and a few fine grass-stems. In another nest (No. 7) the framework is mainly of grass-stems, while the felting contains fine rootlets, cobwebs, a little "vegetable wool" and considerable real wool, evidently picked from the barbed-wire fence of a nearby sheep pasture.

The lining should be, of course, thistle-down, according to all precedents. However, in only one of the eleven nests I examined was there any considerable amount of it, and in only one other was there any trace of it. Two nests, each built near a swamp, were lined with the yellowish down of the cat-tail, and the rest were lined mainly with very fine "vegetable wool." This "vegetable wool" looked so much like dirty thistledown that I was at first deceived as to its nature, but on making a microscopic examination the difference could be readily seen. The wool was in such fine shreds that its source can be only a subject of conjecture. Most was of a silvery-white, greatly resembling dirty thistledown, and this, I think, came from the thin outer bark of the milkweed. Other specimens, showing a yellowish tinge, were probably made up of shredded grass-stems, while another owed its pinkish tinge to an admixture of some kind of shredded bark. In the nest (No. 6) so conspicuously of grapevine bark and lacking in milkweed "products," the lining was extremely scanty, being composed of fine strips of grapevine bark, mixed with a little "wool," probably from grass-stems. In nest No. 5, on the other hand, built where milkweeds were many and grapevines few, the lining was of extremely fine "milkweed wool," and in some places was fully three-quarters of an inch thick.

It is interesting to wonder whether there is any connection between the color of the lining and the color of the eggs. The lining gives a general effect of a dirty white, which would match pretty well the light bluish tint of the egg. Does the bird make a point of having a light-colored lining, or is it merely that the available materials all give that effect? This point could perhaps be determined by a careful study during the nest-building period. It does not seem likely that the bird does this, but there is the possibility.

One other point, however, is well worth noting. I refer to the correlation between the bird's nesting materials and feeding habits. The nesting materials are all such as could be gathered under the same circumstances as feeding, and many of them, such as the grass and weed-stems, and the "vegetable wool," come from plants which are themselves sources of food supply.

The chief point that has forced itself upon my attention, throughout my study of the nests, has been the use of the most easily available materials. In none of the nests was there any material that could not have been gathered within a hundred yards of the nest, and in most the materials could have been duplicated within twenty feet. For the framework the Goldfinch demands long flexible strips, but they may be bark of either milkweed or grapevine, or grass-stems or small twigs from weeds. For the felting, cobwebs are apparently a necessity, but for the rest vegetable fibers, wool, grass-stems, bits of weed and bark, or dead leaves will serve. If, for the lining, thistledown is available, well and good; if not, why, cat-tail down or fine "vegetable wool" will serve. This adaptability enables it to increase more rapidly than if it demanded thistledown alone for its lining. If this were the case, it would be concentrated in colonies, around the few thistle patches that the country around here affords. Now, on the contrary, it can find some good substitute anywhere, and is found distributed rather with regard to suitable nesting trees and food conditions than to nest materials.

A CRITIQUE OF BARROWS' "MICHIGAN BIRD LIFE."

BY BRADSHAW H. SWALES

Museum of Natural History, University of Michigan.

The recent appearance (July, 1912) of Barrows' book on the birds of Michigan [1] marks an important epoch in the history of Michigan ornithology, if not in that of the entire region bordering the Great Lakes. Viewed as a whole the ornithology of the several states in this region has been but superficially studied; in certainly the majority of the counties composing each state there has either been no field work by competent ornithologists, or what has been done is very inadequate when measured by present standards.

In Michigan there have been only a few careful and competent men and their work has mainly been done at a few places in the state, viz., Ann Arbor, Detroit, Grand Rapids, Kalamazoo, and Lansing. The biological expeditions of the University of Michigan Museum and the Michigan Geological and Biological Survey have added considerable data for certain areas, viz., the Porcupine Mountains, Ontonagon County; Isle Royale, in northwestern Lake Superior; the south shore of Saginaw Bay, Huron County; the Brown Lake region, in Dickinson County; the Charity Islands of Saginaw Bay, and Whitefish Point, in Chippewa County, but much remains to be done, especially in the northern peninsula and the entire upper half of the lower peninsula. The breeding ranges of a number of species will undoubtedly be materially extended by studies in these sections.

The ornithology of Michigan has also suffered from the publication of records made by unreliable observers. In some instances the questionable records may be checked up by discounting them in proportion to the experience of the observers and the chances of error in identifying the species,

[1] Michigan Bird Life, by Walter Bradford Barrows. Special Bulletin of Zoölogy and Physiology of the Michigan Agricultural College. 1912.

but unfortunately this can not be done in one case. In the interests of Michigan ornithology it must be said that the local naturalists have long since learned that the records of A. B. Covert are mostly unreliable, whether or not they are represented by extant specimens.

We have one book on Michigan ornithology,[1] which appeared in 1893, but it is unfortunate, to say the least, that this work was ever published, as it is unauthoritative, carelessly compiled and marred by many errors and mis-quotations. The book was never reviewed by any one at all familiar with Michigan ornithology or ornithological conditions in the state, so that a number of the records accepted by the author have been widely quoted, with the result that the status of a number of species in the state is not rightly understood.

In view of this condition it is easy to see why Barrows' work is considered a boon by Michigan naturalists. It is all that our previous list was not. It is up-to-date, comprehensive, compiled carefully in that most of the doubtful records have been confirmed as far as possible, and well written in a form that may be used by students. With little doubt it will be the standard reference work on Michigan ornithology for years to come. With all the care with which the book has been prepared, however, several species have, in the opinion of the writer, been included upon insufficient or unreliable evidence, and these should be pointed out that they may not be accepted without proper consideration.

As will be seen from the discussion of each of these species (see below), some of the controversy over the right of certain forms to a place in the Michigan list depends upon what shall be considered as constituting a primal record. The writer believes that Brewster[2] gives the only safe and proper guide when he states, — "My early training and ex-

[1] Birds of Michigan, by Albert John Cook. Bulletin 94, Michigan Experimental Station, State Agricultural College.

[2] The Birds of the Cambridge Region of Massachusetts. By William Brewster. Memoirs of the Nuttall Ornithological Club, No. IV, 1906, p. 5-6.

perience have led me to believe that — with certain exceptions about to be specified — the occurrence of birds in localities or regions lying outside their known habitats should not be regarded as definitely established until actual specimens have been taken, and afterwards determined by competent authorities. But on no authority, however good, should a mere field observation of any bird that is really difficult to identify be taken as establishing an important primal record." The fact that the species should or might occur in Michigan because it has been secured or observed in a neighboring state or waters, does not, in the writer's opinion, entitle the bird to a place in the Michigan list. It should actually have been secured in the state and the specimen examined by some competent authority before it is taken from the hypothetical list. This constitutes the only strictly safe guide, and should have been enforced in the past.

Another thing to be carefully considered is the reliability of the early records. It is not to the discredit of the early observers to say that they were not generally as carefully trained as the ornithologists of today, and that they were usually unfamiliar with the museum specimens and literature. This particularly applies to western states, for many of the now familiar western species were very rare in collections other than those of a few of the large eastern institutions. Indeed, it was not until the appearance of Baird's masterly treatise in the ninth volume of the Pacific Railway Reports (1858) that careful descriptions of many species were available. These are facts that must be considered in any comprehensive attempt to compile an accurate list of the species of a state.

If one gives due weight to the absence of actual Michigan records, the probable errors of the early ornithologists, and the unreliability of some of the later observers, thirteen of the three hundred and twenty-seven species admitted by Barrows to the Michigan ornis must be excluded until further evidence is at hand. These species are as follows:

1. *Larus hyperboreus*. Glaucous Gull.—No authentic Mich-

igan record or specimen of this species is known. It has been found on Lakes Michigan and Ontario, and probably occurs rarely on Michigan waters, but under a strict ruling the bird should be taken from the state list until a specimen is actually secured within our limits. The writer knows of no Lake Erie records.

2. *Larus franklini.* Franklin's Gull.—There is apparently no authentic record for this bird in Michigan. Barrows includes it on the strength of its occurrence in Indiana, where "it has been occasionally seen by Mr. J. W. Byrkit at Michigan City."[1] This region of sand dunes seems to be a very unlikely locality for this gull. It is not included by Woodruff in the list of species in the Chicago area,[2] a region which is close to Michigan City. Wisconsin records are mainly in the interior, as would be expected, since Franklin's Gull is more a bird of the prairies than of the larger bodies of water like Lake Michigan. Undoubtedly *Larus philadelphia* is the source of many records of Franklin's gull. I am aware of no records for Indiana, and but one early one for Ontario.[3] There is one late record for Ohio.[4]

3. *Xema sabini.* Sabine's Gull.—This bird is included as a Michigan species on the authority of A. B. Covert,[5] who states that a female was secured on the Huron River, Ann Arbor, November 17, 1880. Anyone who will consult and compare the two lists published by Covert, and his two manuscript lists, will see how vague was his knowledge of the majority of the water birds, which, taken with his total unreliability in other respects, renders this record worthless. The above bird was said to have been taken by James Bowyer, and nothing is known of it at the University of Michi-

[1] Butler, A. W. Birds of Indiana. Dept. Geol. and Nat. Resources, Ind., XXII, 1897, p. 574.

[2] Woodruff, F. M. The Birds of the Chicago Area. Chicago Acad. Sci., 1907.

[3] McIlwraith, Thomas. The Birds of Ontario, 1894, p. 49.

[4] Wilson Bulletin, XIX, March, 1907, p. 20.

[5] Covert, A. B. Birds of Washtenaw County. History of Washtenaw County, 1881, p. 192. Chicago.

gan Museum. There are but few records for the Great Lakes and these are generally unaccompanied by any convincing proof. There are no Indiana or Ontario records. In Ohio there is an old and somewhat unsatisfactory record of Winslow's at Cleveland. In northern Illinois E. W. Nelson records a bird seen and shot at, but not secured, in 1873, which was probably a mistake in identification.

4. *Sterna maxima*. Royal Tern.—This tern is included as a Michigan bird on the authority of Stewart E. White, who states that at Mackinac Island "I examined several specimens. Rather more rare than *S. tschegrava*."[1] Of *S. tschegrava* (*caspia*) he writes: "Thousands of large terns accompany the gulls in migration, but are shy. They resemble each other so much that identification on the wing is very uncertain. I repeatedly took this tern and should call it common." When one takes into consideration the fact that there are no records whatever for *Sterna maxima* for Indiana, Illinois, Wisconsin, Ohio, or Ontario, and that the bird has a decided southern range, the above statement may certainly be taken to represent an error in identification. If the Caspian tern is called "common" and the Royal tern "rather more rare than *S. tschegrava*" the latter assuredly would be classed as a fairly abundant bird, which it is not. There is no evidence known to the writer that a Michigan specimen of the Royal tern has ever been examined by an experienced ornithologist. Mr. White, at the time of these observations, had only a limited field experience. The A. O. U. Check List, 1910, does not record *Sterna maxima* as far north as the Great Lakes, and consequently does not accept this record. The species should be eliminated from consideration as a Michigan bird until confirming evidence is at hand.

5. *Sterna paradisæa*. Arctic Tern.—The Arctic tern is included by Barrows on the basis of a statement of A. B. Covert that he "secured a male bird at Monroe, Mich., April 9, 1875." The writer is not aware of the source of this record as recorded by Barrows, as the species is not included in either

[1] The Auk, 1893, p. 222.

of Covert's annotated lists[1] of the birds of lower Michigan, or in his 1881 list,[2] or in the manuscript of 1878. In his latest manuscript list, 1904, Covert states: "Included in all the lists of the birds of the state yet no authentic records." It should be noticed that this writer consistently repudiates in his later lists many of his earlier records. The record is furthermore doubtful as Covert had very little experience with the *Laridæ*. The species has few, if any, satisfactory Great Lakes records. We know of none for Ohio, Indiana, or Ontario. The Wisconsin breeding records of Kumlien are apparently not accepted by the A. O. U. in the third edition of the Check-List.

6. *Sterna antillarum*. Least Tern.—There appears to be no unimpeachable record for this tern in the state, the various published records all being open to suspicion. Barrows writes: "It is included in Dr. Miles' list of 1860 on the authority of Professor Fox, who is said to have taken a specimen at Grosse Isle, Detroit River." This is a mistake as the record given by Fox[3] is "The Least Tern, *Sterna minuta*.[1]" The figure 1, he states, denotes that the records are given on the authority of Audubon in his Synopsis of the Birds of North America.

Barrows further writes, "In the manuscript notes of A. B. Covert there is a record of a male taken at Sandshore Lake, Ann Arbor, May 4, 1873, as well as three specimens (two males and one female) taken at Bayport, Huron County, October 13, 1878." None of these specimens can be located, however, and it is not impossible that they were specimens of the Black Tern, which has been repeatedly mistaken for the present species. The writer cannot determine the source of these records, as Covert does not furnish any specific dates in any of his published or manuscript lists. He does not include the species in the 1878 list, but in the Atkins manuscript

[1] Forest and Stream, 1876.

[2] Birds of Washtenaw County.

[3] Fox, Charles. The Birds of Michigan, p. 163. Place of publication unknown.

list, says: "Not uncommon during the migrations." In the 1881 list he says: "Migrant, not common." And in his latest compilation, 1904, he writes, "Recorded first in Covert's list of 1875. Dr. Gibbs, in his list of 1879, questioned the correctness of this record, but the bird has since proven to be a common summer resident at suitable localities throughout the lake regions of the state." It will be noticed that in each of these lists the statements regarding the bird are totally at variance. Careful search at the University of Michigan Museum reveals no mounted specimen labelled Michigan or any catalogue entry; there is, however, a mounted bird from Nebraska in the collection.

7. *Somateria dresseri.* Eider Duck.—The eider duck is included as a Michigan bird by Barrows as follows: "Dr. Gibbs says that W. E. Collins, of Detroit, wrote him, in 1883, that he had one specimen in his collection (a young male showing white traces), taken on the Detroit River in December, 1882." There appear to be few, if any, authentic records of this bird on the western Great Lakes, and a number of specimens labelled as this species have proved, upon examination, to be *S. spectabilis.* Collins is known to have procured the latter bird, and the above evidence is too meagre to entitle the eider duck to a place in the Michigan fauna.

8. *Branta canadensis hutchinsii.* Hutchins' Goose.—The claim of Hutchins' goose to a place in the Michigan fauna is still unproven, although it probably has been taken here. The late W. E. Collins, a taxidermist in Detroit, wrote Morris Gibbs that he "had it, taken at the St. Clair Flats." The writer recalls having examined years ago a goose formerly belonging to the old Detroit Scientific Association, labelled as this species, which was mounted by Collins. This bird was a small Canada Goose, and may have been the basis of the above record. It would be well to treat Hutchins' goose as hypothetical until a more satisfying record is available. The species seems to be a rare one in the region of the Great Lakes.

9. *Elanus leucurus.* White-tailed Kite.—Barrows writes

of this bird: "The claim of this bird to a place in the Michigan fauna rests mainly on the statement of A. B. Covert, of Ann Arbor, who says that he killed a specimen in September, 1878, on the Honey Creek marshes, four miles west of Ann Arbor, and that another was killed April 21, 1879, by C. H. Manley, in Livingston County. The latter specimen is said to be mounted and in the possession of Capt. Manley. The first specimen was for a time in the possession of Mr. Herbert Randall, of Ann Arbor, but we have not been able to examine either specimen." These records are undoubtedly erroneous, and there is no evidence at hand to support them. No other ornithologist appears to have seen or known of the existence of these specimens. The last A. O. U. Check-List does not admit this record and it should be eliminated.

10. *Ictinia mississippiensis.* Mississippi Kite.—This southern kite is included as a Michigan bird on the strength of a specimen said to have been taken many years ago and recorded by Mr. D. D. Hughes in a manuscript list of the birds of the state. No trace of this specimen can be found and no statement as to who examined it. The writer has not seen the manuscript list referred to, but the record is entirely too vague and unsatisfactory, and is not included in the A. O. U. Check-List of 1910.

11. *Sayornis sayus.* Say's Phœbe.—This bird is admitted on the authority of Charles Fox,[1] who says: "Say's Flycatcher (a) Musicapa Saya." (a) refers to the footnote, "Killed near Owasso, Shiawassee County, July, 1853." Miles, in the first biennial report, says: "*41a. *Sayornis sayus* Baird. Say's Flycatcher."[2] The note *41a refers to "*Sayornis sayus* Bd. on the authority of Rev. Charles Fox, who shot a specimen at Owosso, Shiawassee County, July, 1853. The species in the catalog marked 'a' were obtained at Grosse Ile, Wayne County, by Fox, and are given on his authority." As stated by Barrows these two records, with little doubt, refer to the same bird which was taken near

[1] The Birds of Michigan, p. 161.

[2] Miles, M., in First Bien. Rept. Geol. Surv., Michigan, 1861, p. 224.

Owosso in July, 1853, as Fox mentions no Grosse Ile bird. This record is certainly a misidentification by Fox, as it is not probable that he had ever examined actual specimens of this species. The record does not appear in Baird's work,[1] although Fox was a correspondent of the Smithsonian Institution and sent specimens there. The extent of Fox's ornithological knowledge is of course unknown, as he only issued a practically unannotated list of Michigan birds. He was locally known more as a general naturalist, and was particularly interested in herpetology. The A. O. U. does not accept his record and *Sayornis sayus* should be eliminated from all consideration as a Michigan species.

12. *Passerherbulus lecontei.* Leconte's Sparrow.—Barrows gives only one record for this species as a Michigan bird, A. B. Covert's claim that he secured a specimen at Ann Arbor. There is a mounted bird in the University of Michigan Museum (488q, date May 12, 1894), but there is grave doubt that the specimen was taken in Michigan. Covert never recorded it as one would naturally expect him to, owing to the fact that it was the first and only Michigan specimen. As Covert's records are all open to such grave suspicion it would seem best to eliminate this species from the Michigan fauna.

13. *Helmitheros vermivorus.* Worm-eating Warbler.—This is another species whose occurrence in Michigan rests on the authority of Covert. Barrows quotes a record of Covert's, from the latter's last manuscript list, "That he took a male at Ann Arbor, Washtenaw County, May 21, 1878. The specimen, however, has been lost sight of." There is no record of this specimen in the University of Michigan Museum, where it might naturally be expected to be. Moreover, Covert does not include the species in his "Annotated List of the Birds and Mammals of Washtenaw County, Michigan," issued in March, 1881, and this list was supposed to be up to date. In the Atkin's manuscript list of 1878 he says: "I can regard this bird only as an accidental visitor. One specimen, a male,

[1] Pacific R. R. Rept., Vol. IX.

was taken May 12, 1875." Here again a discrepancy in dates is apparent, and the record is omitted altogether in his final published list. This record may be safely eliminated from consideration, and there appear to be no others at all sufficient to admit the species to the state list. Jerome Trombley, of Petersburg, Monroe County, a careful and keen observer, was unable to find it in a section of the state where it might naturally be expected to occur if at all.

NOTES ON THE BREEDING HABITS OF AGELAIUS PHOENICEUS.

BY NOEL L. HACKETT.

The following observations on the habits of the Red-winged Blackbird (*Agelaius p. phœniceus*) were made during the spring of 1910 on a farm in the Missouri river bottoms about thirty-five miles south of Sioux City.

The birds came into the country along about the last of March from the twenty-fifth to the thirty-first. The males seemed to flock together and the females by themselves, but they came so close together that I could not tell whether there was any difference in the date of arrival. They came in large flocks containing several other species, such as the yellow-headed blackbird and bronzed grackle.

They were seen for about a week and then it seemed as though they had almost all disappeared from the country, but again about the first of May they appeared in small flocks of twenty-five or thirty, and took to the meadows rather than to the trees as they had done earlier in the season. They now began the process of mating, but it was impossible for me to tell much about the way this was accomplished.

However, there seemed to be a scarcity of females, and all over the meadow little flocks could be seen, consisting of four or five males and one female. On the Sunday morning following their second arrival I could not find in the whole col-

ony a single unmated male. They had mated and the extra males had flown to some other territory. As I have indicated they nested in a colony. There were fifteen pairs and we found fourteen nests within a very few rods of each other.

They built their nest of weeds and dead grass. The foundation was of coarse weeds laid crossways in layers, thus raising the nest off the ground about an inch and a half. Then the nest proper was made of very fine grass wound around it horizontally with some very fine roots woven in up and down to hold it together. It is a very neat little affair about two and one-half or three inches across the top. Both birds worked diligently in the process of home-building and it was here that I found my pair and was able to note some marks of distinction, which were: on the male a light spot on his breast that was almost a freak mark, and on the female a little tinge of red on the left wing.

They finished the building of the nest on the twenty-third day of May; then they rested over the twenty-fourth and the first egg appeared on the twenty-fifth and one each succeeding day until the twenty-eighth, when the clutch was completed. It is very hard to describe the eggs. They are a sort of a pale blue bordering on green and having a sort of a yellowish tinge. They were spotted at the large end with large irregular brownish-black spots, while the lower or smaller half was perfectly clear.

They were about one inch through the long way. They were laid in the nest with the small end towards the center. In order to see if that was the intention I took the eggs and pointed the small end of each towards the outside, but the next day they were all changed back again and in that position they just filled the nest.

The female did not begin incubating immediately after the clutch was laid, but waited and seemed to rest for three days. Then she began the process of incubation. At one time, about six o'clock I went to the nest, and as I approached the nest the male flew off, seeming to indicate that he was assisting in the process.

CORRECTIONS TO A PRELIMINARY LIST OF THE SUMMER BIRDS OF FALL RIVER COUNTY, SOUTH-WESTERN SOUTH DAKOTA.[1]

BY S. S. VISHER.

Otus a. maxwelliæ.—Rocky Mountain Screech Owl. A specimen collected near Oelrichs, August 4, 1911, has been identified by Oberholser as this form. Though I then strongly suspected that it was the Rocky Mountain bird, such a great extension of range as this capture makes, caused me to await verification.

Speotyto c. hypogæa.—Burrowing Owl. Very common in the very extensive prairie dog towns which are to be found along many of the valleys of this county. Omitted from the list by stenographic error.

Dryobates p. homorus.—Batchelder's Woodpecker. Recognizing that the Downies of the western edge of South Dakota were different from those of the east, I somehow fell into the serious error of confusing the names of the illustrious ornithologists, Nelson and Batchelder, and reported the Nelson Woodpecker (which replaced the Batchelder's in the northern Rocky Mountains). Editor Stone pointed out this error in "The Auk," whereupon I submitted a specimen of the Downy of extreme western S. D. (collected in Harding County) to Mr. Oberholser, who named it *D.p. homorus.*

Sitta c. nelsoni.—Rocky Mountain Nuthatch. Recently a new variety of the White-breasted Nuthatch has been recognized. The "Slender-billed" variety is now restricted to the Pacific coast and the Nuthatches of the Rocky Mountain, etc., are called *S. c. nelsoni.*

Myadestes townsendi. Townsend's Solitaire. The fledgling collected July 27 near Minnehahta has been identified by the Biological Survey as the Solitaire. The bird was in such a juvenile plumage, short wings, short tail, etc., that its identification was not simple. This is the first "authentic"

[1] The Wilson Bulletin, March, 1912, p. 1-6.

record of the Solitaire in South Dakota and quite an extension of range. Knowing of the previous capture of the mockingbird in the Black Hills (as referred to in "The list") I naturally assumed the fledgling was a mockingbird instead of a bird not before "recorded" from that section.

University of South Dakota, Vermilion, S. Dak.

THE WILSON BULLETIN

A Quarterly Magazine Devoted to the Study of Birds.
Official Organ of the Wilson Ornithological Club.

Edited by LYNDS JONES.

PUBLISHED BY THE CLUB, AT OBERLIN, OHIO.

Price in the United States, Canada and Mexico, one dollar a year, 30 cents a number, postpaid. Price in all countries in the International Postal Union, $1.25 a year, 40 cents a number. Subscriptions may be sent to Lynds Jones, Oberlin, Ohio, or to Mr. Frank L. Burns, Berwyn, Penn.

Editorial

The editor will be away from Oberlin from the last week in June to the middle of September. His address during that time will be Kelleys Island, Ohio. He hopes that any important communications may reach him before his departure for the summer work, and that communications addressed to him during his absence will bear the new address. His work during the summer will be studies of the summer birds of the region, in which previous work has been done on the migrations, followed by a further study of the migrations. In this work he will be assisted by students.

We have received an interesting letter from our vice-president, Mr. Bradshaw H. Swales, who is spending some time among the islands off from Tampa Bay, Florida. Readers of the Bulletin may expect to share with Mr. Swales the interesting experiences of which his letter speaks. Our president, Mr. W. E. Saunders, is also in the South Atlantic states on ornithological business. There has been all too little work done in the south-eastern part of our

country since the days of Wilson and Audubon, and we are pleased to note that recently more attention is being given the region.

At the date of writing (March 8) there has been but one small migration wave, consisting of Bluebirds, Robins, Killdeers, and Meadowlarks in Northern Ohio. This occurred on February 19. Immediately winter shut down again with the largest fall of snow of the entire winter and temperatures as low as any experienced even in the cold wave of early February. Since these conditions prevailed over most of the northern half of the country we may all look forward to a rush of migrants when the winter finally breaks, and a probable mixing of the species making up the second and third waves. Watch for it.

THE ANNUAL MEETING.

It has been impossible to complete arrangements for the meeting which was voted to be held during this spring season, so that announcements will have to be made by postal or letter later. It is hoped that all who have any clear ideas about the place and time for the meeting will make their ideas known to the secretary, Mr. G. Eifrig, Addison, Ill., at the earliest possible moment.

ELECTION OF OFFICERS FOR 1913.

Balloting for officers resulted in the election of the following:

President—W. E. Saunders, London, Ontario, Canada.

Vice-President—B. H. Swales, Grosse Isle, Mich.

Secretary—G. Eifrig, Addison, Ill.

Treasurer—W. F. Henninger, New Bremen, Ohio.

Executive Council—Frank L. Burns, Berwyn, Pa.; J. H. Fleming, Toronto, Ont.; Lynds Jones, Oberlin, Ohio.

ELECTION OF MEMBERS.

The following persons are nominated for Active Membership since the last report:

John Dryden Kuser, Bernardsville, N. J.

H. G. Morse, Huron, Ohio.

SPECIAL RESERVATIONS FOR WILD BIRDS.

It is gratifying to see that the U. S. Government is finally awakening to the fact that it is policy to give more attention to the preservation of wild birds. Such a course is directly in line with the so-much-talked-of conservation of our natural resources.

The part that birds play in the economy of nature by their destruction of insects is of more importance than has been, or is even now, generally realized. In the protection and consequent increase of our birds we utilize a great natural power in the war against noxious insects—pests that are making havoc with our crops to the extent of many millions of dollars yearly.

The agitation of bird protection is bringing tangible results. Laws for their welfare are being extended, made more rigid and perhaps better enforced. A more wholesome observance of the game laws is noticeable.

Reservations are being set apart by the government for the especial benefit of the birds—places where they can resort to breed, or can stop to rest when migrating, unmolested by hunters. These reservations vary greatly in character, some being rocky and almost barren islands, while others are vast areas of marshy waste, grown up to rank vegetation—tempting resorts for waterfowl and the waders. If properly policed these will have a powerful influence for good.

We have these bird reservations not only in the United States proper, but also in Alaska, in the Dry Tortugas islands south of Florida, and at Hawaii. At the latter place several whole islands have been thus set apart, and they constitute one of the largest and most successful breeding places for sea birds to be found anywhere in the world.

Four years ago we had but sixteen of these reserves. During the next year they were increased to 51. Since then the number has been considerably augmented. This shows commendable progress.

L. B. CUSHMAN.

North East, Pa.

Field Notes

A BALTIMORE ORIOLE IN WINTER.

On January 15th, 1913, I observed a male Baltimore Oriole in first year plumage, at the home of H. D. Rymer, a farmer, living near Columbiana, Ohio.

The Oriole first appeared a few days before Christmas, and has been feeding there regularly ever since. While I was observing him, he went from the suet to an orchard, where he was eating apples that remained on the trees. Mr. Rymer informs me that when it first appeared its feathers were ruffled, and it did not seem to be in nearly as good condition as at the present time. I am inclined to think the bird was disabled at migration time and could not leave for its usual winter home with the other migrants. I judge this from the fact that its left wing appeared to be about an inch lower than the right when the bird was perching with the wings folded to his body.—Geo. L. Fordyce, Youngstown, Ohio.

CHRISTMAS TOWHEES NEAR STEUBENVILLE, OHIO.

A flock of fifteen or twenty Towhees, consisting of both males and females, was observed on December 26, 1912, about four miles south of Steubenville, in West Virginia. There was several inches of snow on the ground, temperature about 60, with a bright sun. The Towhees were seen about 11:30 in the morning.

KENYON ROPER.

Steubenville, Ohio.

UNUSUAL RECORDS FOR HURON, OHIO.

Robins, Bluebirds, and Meadowlarks have been seen all during January. Red-winged Blackbirds were seen December 28, also two Snow Buntings, Rusty Blackbirds during December and on January 1 and 5. Two Red-headed Woodpeckers have remained in the region all winter. On January 19 I found a Myrtle Warbler and a White-throated Sparrow with a flock of Tree Sparrows just east of Rye Beach. An Old-squaw Duck was found in the lake on February 2.

H. G. MORSE.

Huron, Ohio.

THE MOCKINGBIRD IN CAMBRIDGE, OHIO.

Two strange birds appeared in our town the evening of September 1st. As Mockingbirds had never before been reported from this locality, we were puzzled, at first sight, to name them. The shape

immediately suggested "Brown Thrasher Family," and when the white banners in wings and tail were spread in flight the identification was perfect. A friend, who was familiar with them, both in the South and in California, verified our "find." They were in and around the lawn for a month. Numbers of Blue Jays were with us at the time, and the Mockers would give the harsh scream of the Blue Jay so perfectly, that unless seeing the bird, we would be unable to distinguish the real from the mimicry. This, aside from the shrill call note, was the only sound we knew them to make. Brown Thrashers are very common in this locality.

MRS. ROBERT T. SCOTT.

SOUTH DAKOTA RECORDS OF SOME EASTERN BIRDS.

The state museum of South Dakota is in an embryonic stage, but it contains a few interesting South Dakota bird skins. A short time ago I went over the collection selecting specimens that promised to be of interest and sent off a number to the U. S. Biological Survey for identification by H. C. Oberholser. Wells W. Cooke, in a recent letter, mentioned some twenty-three as noteworthy extensions of established ranges. The data concerning the records of such western birds has been published in "The Condor." It is here desired to submit that on certain eastern forms whose ranges are extended westward hereby. Specimens from Menno were collected by E. H. Sweet. I am responsible for the remaining.

Hairy Woodpecker (*Dryobates v. villosus*).—Menno, Hutchinson County, Southeast-central S. D., August 2. The supposition has been that the Hairys were of the northern variety.

Alder Flycatcher (*Empidonax traillii alorum*).—Forestburg, Sanborn County, Southeast-central S. D., August 10; Evarts, Dewey County, Northwest-central S. D., August 6. The most common small flycatcher of eastern South Dakota.

Savannah Sparrow (*Passerculus sandwichensis savanna*).—Vermilion, Clay County, April? A migrant.

Lark Sparrow (*Chondestes g. grammacus*).—Hutchinson County, June 21. A common summer resident.

Bay-breasted Warbler (*Dendroica castanea*).—Hutchinson County, May? A rare or accidental migrant.

Winter Wren (*Nannus h. hiemalis*).—Hutchinson County, April 14. A rare migrant.

White-breasted Nuthatch (*Sitta c. carolinensis*).—Menno, Hutchinson County, February 15.

S. S. VISHER.

State University, Vermilion, S. D.

Publications Reviewed

Index to Papers Relating to the Food of Birds by members of the Biological Survey in Publications of the United States Department of Agriculture, 1885-1911. By W. L. McAtee. 1913.

There are thirty-one pages of brief summaries of twenty-seven Bulletins, and 103 other titles, and thirty-six pages devoted to the Index. This is a timely and convenient paper. L. J.

Notes on the Iridescent Colors of Birds and Insects. By A. Mallock, F.R.S. From the Smithsonian Report for 1911, pages 425-432 (with plates 1-3). 1912.

After painstaking study and many tests the author is led to the conclusion that "interference of one kind to another is the true cause of natural iridescence color in all cases." L. J.

On the Positions Assumed by Birds in Flight. By Bentley Beetham, F.R.S. From the Smithsonian Report for 1911, pages 433-439 (with plates 1-8).

Much has been compressed into the seven pages of description and discussion, both in explanation of the sixteen figures and in drawing conclusions from them. The author brings out the fact that in various flight movements the feet and tail supplement the wings, especially in retarding the forward movement preparatory to alighting. Steering is accomplished by changes of position of the body and wings in their resistance to the air. The tail is used more as a corrective after the actual steering has been done by wings and body than in initiating any change of direction. The pictures are for the most part well chosen to illustrate the points discussed. L. J.

The Passenger Pigeon. Accounts by Pehr Kalm (1759) and John James Audubon (1831). From the Smithsonian Report for 1911, pages 407-424. By Edgar A. Mearns. (With Plate 1, colored.)

A reprint of the accounts by these two men of the earlier days in the palmiest days of this now extinct bird. Not only intensely interesting in themselves, but most timely in these days when discussion is closing the record. L. J.

Description of a New African Grass-Warbler of the Genus Cisticola. By Edgar A. Mearns, Associate in Zoölogy, U. S. National Museum.

Cisticola prinioides wambugensis, Wambugu Grass-Warbler. From

British East Africa, collected during the Roosevelt African Expedition. L. J.

Two New Species of Birds from the Slopes of Mount Pirri, Eastern Panama. By E. W. Nelson. From Smithsonian Miscellaneous Collections, Volume 60, Number 21.

Capito maculicoronatus pirrensis, Mount Pirri Barbet; and Pseudotriccus pelzelni berlepschi, Berlepsch Flycatcher. L. J.

Western Wild Life Call. Published by the California Associated Societies for the Conservation of Wild Life. February 7, 1913.

A publication of this sort, illustrating by pictures of what is now happening to our wild life, and showing what the results in the past have been when such practices have gone on unchecked, scattered over the country at large and put into the hands of sportsmen as well as others, would, in our opinion, be of the greatest service in the warfare now on to protect and conserve our wild life. We trust that the impetus which this movement in the Golden State is certain to give to the conservation of Wild Life will reach eastward across the mountains and become evident the country over. L. J.

THE BIRD MAGAZINES.

The Auk. Vol. XXX, January, 1913, No. 1. Cambridge, Mass.

The present number contains 165 pages, of which 105 are concerned with longer articles and an account of the Thirtieth Stated Meeting of the American Ornithologists Union. Four of the ten articles are based on field studies, two are concerned with the technical aspects of the study, one is biographical, one controversial, and one deals with photography. Of the twenty-six titles under the caption, "General Notes," twenty-one record extralimited occurrences of species. The other departments are treated in the usual thorough manner. L. J.

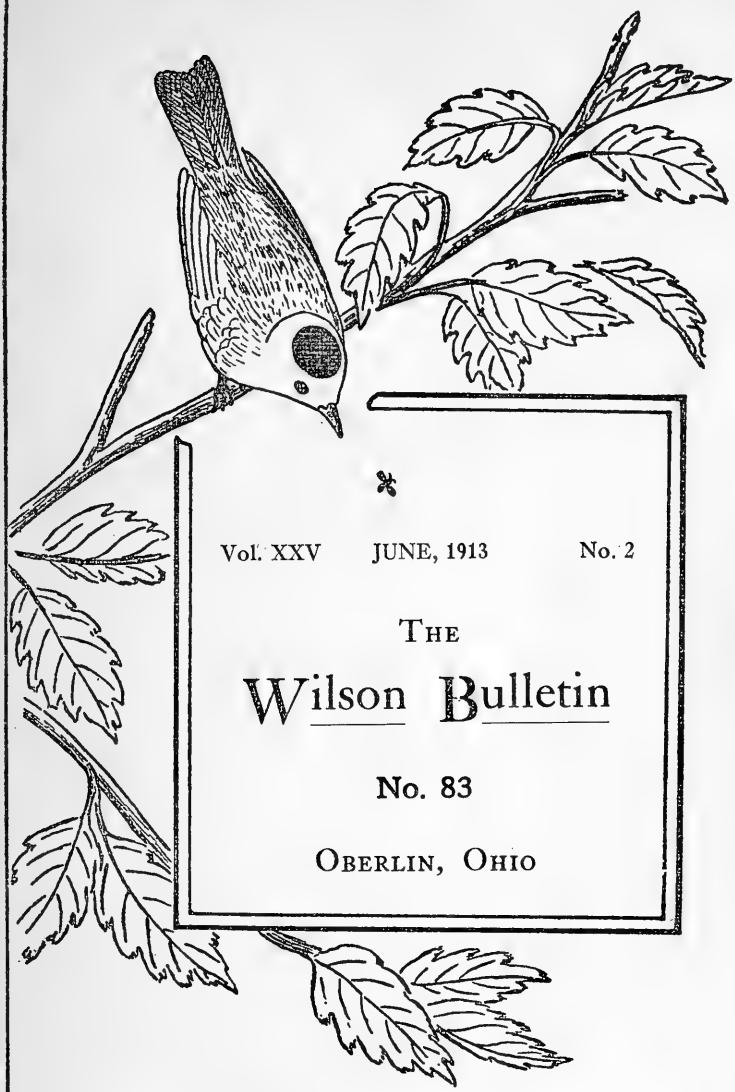
Bird-Lore. Vol. XV, No. 1, January-February, 1915. Harrisburg, Pa.

The three colored plates in this number illustrate the Snow Bunting from the brush of Louis Agassiz Fuertes, and the Hudsonian Curlew and the Ruffed Grouse by Bruce Horsfall, these under the department of the Audubon Societies. This number, according to the custom, is the Christmas Bird Census number. There are 199 lists from 187 localities. The lists come from the Atlantic to the Pacific, and from Ontario to Florida. The largest list was made by

Dawson and Brooks at Santa Barbara, California. They can beat Northern Ohio in the winter, but fall behind in May. L. J.

The Condor. Vol. XV, January-February, 1913, No. 1.

It is rarely that we are treated to such a feast of Shore Birds as we find in the first article by W. Leon Dawson, "A Glimpse of Surf-birds." The five reproductions of photographs approach perfection both from the standpoint of the photographer and the engraver. "Concealing and Revealing Coloration of Animals," by Junius Henderson, adds valuable points to this current controversy. In "Swallows and Bedbugs" Edward R. Warren shows that the swallows are not guilty of harboring the species which harrasses humans, but that it does harbor an allied species. Two articles follow relating to local distribution. In the final article Joseph Grinnell discusses at length. "The Outlook for Conserving the Band-tailed Pigeon as a Game Bird of California." Interesting field notes close the number to the editorial page. L. J.



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Oberlin, Ohio

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CONTENTS

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A STUDY OF THE NESTING BEHAVIOR OF THE YELLOW WARBLER (*Dendroica æstiva æstiva*).

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Introduction.

The data upon which this paper is based was obtained during the summer session of 1912, of the Macbride Lakeside Laboratory, on Lake Okoboji, Iowa, to the director of which I wish to express my obligation. With the exception of about six hours, the nest was constantly under observation during the feeding hours of the day, from 4:15 p. m. on July 2 until the last nestling left the nest on July 12 at 6:28 a. m.

I wish especially to thank Prof. T. C. Stephens for suggesting to me this piece of work, and also for assistance in bringing it to completion. I owe my thanks to Mr. Ira N. Gabrielson, from whom I obtained many valuable ideas for carrying on the observations. It would have been impossible for one individual to carry out the continuous program involved in this work. Relief at meal time and other periods of the day was freely given by students of the laboratory, and for this I am under obligation to the following: Miss Hudson, Miss Nellie D. Fisher, Messrs. H. S. Doty, G. A. Muilenburg, J. Weaver, P. J. Kruse, D. H. Boot, M. O. Insko, A. H. Schatz, C. H. Farr, and Prof. A. O. Thomas.

The nest of this yellow warbler, *Dendroica æstiva æstiva* (Gmelin), was built about two feet from the ground in a buck bush, or wolfberry bush, (*Symphoricarpos occidentalis* Hook), which was located on the south slope of a narrow, winding ravine. In the vicinity of the nest the oak trees were few and scattered as compared to the dense wood farther down the ravine. The soil was black and fairly moist, crumbling very readily. A dense vegetation grew on the slopes and in the bottom of the ravine. The plants named in the following list were found growing within a radius of fifteen feet from the nest: House Mint (*Monarda mollis* L.).[1] Tall Meadow Reu (*Thalictrum polygamum* Muhl.). Cup Plant (*Silphium perfoliatum* L.). True Solomon's Seal (*Polygonatum commutatum* (R. & S.) Dietr.). False Solomon's Seal (*Smilacina racemosa* (L.) Desf.). Virginia Creeper (*Psedera quinquefolia* (L.) Greene). Poison Ivy (*Rhus toxicodendron* L.). Plum Tree (*Prunus sp.*). Sun Flower (*Heliopsis scabra* Dunal). Strawberry (*Fragaria virginiana* Duchesne). Meadow Parsnip (*Thaspium aureum* Nutt). *Anemone cylindrica* Gray. Golden Rod, Stinging Nettle, Ash (seedling), and a grass.

The nest was found on June 21, and was well concealed and shaded by the neighboring plants. It was built into a fork of the bush and anchored with some white cord which was twined around the supports. The foundation of the nest was built of interwoven coarse straws, and was lined inside with soft down mixed with hair.

There were three eggs in the nest when first seen on June 21. The nest was visited shortly before noon on the following day and it was then found that the fourth and last egg had been laid. The nest was visited daily, with one exception, from this time on until the hatching, when the regular observations began.

On June 28 the blind was erected south from the nest at a distance of about two rods. On each succeeding day, except

[1] I am indebted to Mr. H. S. Doty for the identification of the plants in this list.

one, the blind was moved a little nearer to the nest in order to gradually accustom the birds to its presence. Upon visiting the nest on the morning of July 2, at 7:30, it was found that three of the eggs had hatched, and the young, evidently, were but a few hours old. The blind was now brought to within two feet of the nest; during this operation the parents continued to feed the nestlings. At 4:15 p. m. of the same day the blind was entered and observations began, which were continued as described elsewhere. On July 5 the blind was moved six or seven inches nearer the nest so as to get a better view of the feedings and distinguish the young.

INCUBATION PERIOD.

The last egg hatched at 5:30 a. m. on July 3; while the fourth egg was first observed in the nest at 11:30 a. m. on June 22. Between these two dates ten days and six hours are counted. It is taken for granted that the egg was laid earlier in the day, perhaps, between four and six o'clock. By adding this calculated six hours, the incubation period would appear to be just about even eleven days.

HATCHING.

At about 5:30 a. m. on July 3 the writer was attracted by a peculiar rolling motion of the egg in the nest, and noticed upon closer observation, that the shell bulged out in a ring around the middle or a little nearer the smaller end; and soon it began to crack at this place. The egg raised on the small end, leaning against the side of the nest, and the young bird freed himself from the shell by a series of pushes and kicks by the head and feet, respectively. The head escaped from the larger part of the shell and the lower part of the body from the smaller end. The crown of the head and the median line of the back of the nestling were downy. This entire process covered a period of less than four minutes.

DISPOSAL OF THE SHELL.

The female, bringing a grasshopper, returned to the nest immediately after the hatching of the fourth egg. She fed

one of the nestlings and then picked up one-half of the shell, which she worked around in her bill, thus effecting its comminution. This part of the broken shell was then quickly swallowed. Soon the male returned and perched on the edge of the nest while the female in a similar manner broke up the other half of the shell, after which both birds devoured it. The parent birds then cleaned the nest by picking up and eating the smaller portions of scattered egg shell.

MARKING THE YOUNG.

There were three methods tried for marking the young, but only the last one was successful. At about eleven o'clock on July 3 the attempt was made to mark the young with aniline dyes, but it seemed impossible to make them take hold. Though it must be acknowledged that this plan may not have been given a fair trial. Then again a little after one o'clock on July 5, an effort was made to mark the nestlings with colored adhesive papers, but these would not stick very well to the downy skin of the birds, and when one did so the female picked it off upon her return to the nest. On the evening of July 6 the last method was tried, that of tying different colored strings to the legs of the young. In this way the largest bird was marked white, the next blue, and the third in size and activity red.

There are a few explanations which should be made at this time. On July 4 one of the nestlings was lost from the nest and cannot be accounted for, as the disappearance was not observed. This occurred before the marking of the young, and the absence of one would less likely be noticed.

On July 7 the bush, in which the nest was located, was strengthened by being tied to an upright driven into the ground.

In reading the records of the days following July 8 and also the tables, it should be taken into consideration that the proceedings were abnormal, as the male left the care of the young entirely to the female.

FEEDING.

The feeding of the nestlings was carried on by both male and female parent birds. As is shown in Table I, during the first four full days of observation, the male bird made more feeding visits than did the female, but on the following day the female outworked the male in this respect. However, during the remaining days it was impossible to follow this comparison because the male discontinued all feeding visits on July 8, immediately following the snake incident.

TABLE I.

Showing exact periods of observation and totals of feeding visits of the parents by days.

Day	Time	Hours	Min.	m	f	Total
July 2	4:15 p. m.-7:40 p. m.	3	25	21	24	45
July 3	4:20 a. m.-8:30 p. m.	16	10	136	91	227
July 4	4:20 a. m.-8:30 p. m.	16	10	106	94	200
July 5	4:15 a. m.-8:10 p. m.	15	55	127	114	241
July 6	4:32 a. m.-7:35 p. m.	15	3	151	131	282
July 7	4:10 a. m.-8:25 p. m.	16	15	155	189	344
July 8	6:20 a. m.-8:48 p. m.	14	28	117	161	278
July 9	6:30 a. m.-8:10 p. m.	13	40	...	264	264
July 10	4:30 a. m.-8:47 p. m.	16	17	...	221	221
July 11	4:25 a. m.-7:45 p. m.	15	20	...	238	238
July 12	4:20 a. m.-6:30 a. m.	2	10	...	33	33
Total		144	53	813	1560	2373

During the first three or four days when the female was brooding, usually the male gave her the food, which she distributed to the nestlings. But there were times when the male ignored the outstretched bill of the female and fed the young himself. She would also, on some visits, move to one side of the nest and allow the male to feed the young. Again there were several times that the male gave part of the food to the female and then both the parent birds distributed their shares to the nestlings. On one occasion (visit No. 1584) the male fed a fly to one of the nestlings, but the female immediately took the fly from the young and ate it herself. When

the food was too large for the nestling to swallow, the parent bird sometimes pulled it out of the young bird's mouth and thrust it in again, repeating this process as many as three times, until the nestling swallowed it. On one visit (No. 336) both parent birds helped to push the food down the nestling's throat. Again if the young did not swallow the food, the parent took it and either broke or shook it into a mass so that it was then easily devoured. The worm brought at visit No. 641 was so large that the outline of it was seen through the skin of the neck of the nestling bird. There were times, also, when the young quarrelled over the food; for example at visit No. 272, two of the young grabbed the food and pulled back and forth until the larger one got it. The parent birds in feeding would also try one nestling and if it did not respond properly he would try another, and sometimes go back to the first one again. On July 10 at 12:36 the female brought some food and tried to feed red, but the nestling did not take it; then the female left and soon returned, but still red would not respond, so the female left the nest, carrying away the food. A very unusual performance occurred on visit No. 398, when the parent birds came to the nest carrying a large yellowish worm between them, which they broke into three pieces and fed to the young.

The identification of the food was very difficult because of its minuteness. Table II shows the distribution of food per day along with a somewhat indefinite classification. There were periods when the male and female brought the same kind of food during a number of consecutive visits, which may have been due to the fact that at times the parent birds traveled together while feeding, as was seen during a short observation. This was especially true of the green worms.

TABLE II.

Showing the distribution of food by days.

July	2		3		4		5		6		7		8		9	10	11	12	Total
	m	f	m	f	m	f	m	f	m	f	m	f	m	f	f	f	f	f	m & f
Unknown	10	12	18	14	15	9	28	18	32	3	29	21	25	15	9	16	48	9	331
Insects	..	..	19	11	31	23	37	17	26	20	48	63	28	32	55	83	54	6	553
Green Worms	4	5	60	33	28	22	29	27	52	55	44	40	24	47	84	63	39	3	659
Fly Forms	..	..	3	5	10	6	13	17	18	26	17	20	21	42	60	33	32	3	326
Worms	1	2	13	8	12	9	13	10	16	17	10	11	7	5	10	10	8	..	162
May Fly	..	..	..	..	..	4	4	3	4	3	10	15	3	14	41	23	16	7	147
Moths	1	3	14	7	3	2	4	1	1	2	3	3	1	4	17	16	17	4	103
Miller	..	..	..	..	..	2	..	1	..	..	..	2	7	12	8	4	35	4	75
Mosquito	..	..	..	2	4	5	4	5	4	1	1	9	..	3	5	..	22	..	65
Larvæ	..	..	..	..	5	4	..	..	4	3	..	..	2	..	8	..	..	..	26
Grasshopper	4	2	2	4	2	2	2	..	..	1	..	2	..	2	..	1	1	..	25
Spider	..	..	1	..	..	..	1	..	1	3	1	2	2	3	5	1	3	..	23
Ant	..	1	4	..	2	2	..	..	..	..	..	..	..	1	..	6	2	..	18
Grub	..	..	4	3	..	1	2	2	..	..	..	..	..	1	..	1	..	..	14
Beetle	..	..	..	..	2	1	..	..	1	..	..	..	..	..	1	2	1	..	8
Damsel Fly	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	1	4
Tree Hopper	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	2
Bee	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1
Total	20	25	138	87	114	92	137	101	159	134	163	190	120	182	303	261	279	37	2542

The time when feeding began in the morning varied within rather narrow limits. On one day it started at 4:29 a. m., and on another at 4:50 a. m. In the evening the earliest final feeding visit was at 7:56 p. m., except one rainy evening, when the female started brooding at 7:36. The latest final feeding visit was at 8:04 p. m. The average feeding period per day was fifteen hours and thirty minutes. (See Table I.)

Table III is prepared with the view of ascertaining whether the parent birds followed any system of rotation in distributing food to the young. However, there were three facts which prevented the collection of complete data, viz., a) the young birds were so small and delicate that they were not marked until the nestling period was nearly half gone, b) the early death of two of the young, c) and the unusual behavior of the male after the snake incident. No plan could be discovered which they seemed to follow. At one time one nestling received the food as many as seventeen successive visits; at other times the feeding rotated from one to the other.

TABLE III.

Showing the distribution of the food to the different nestling birds by the two parents.

	July 6.		July 7.		July 8.		July 9.	July 10.	July 11.	July 12.	Total
	m.	f.	m.	f.	m.	f.	f.	f.	f.	f.	
Red	2	3	51	50	37	51	118	170	238	33	753
White ...	2	3	48	83	43	45					224
Blue	3	4	46	58	38	63	146	51			409
Total	7	10	150[1]	192[1]	118	159	266[1]	221	238	33	1397
Total for m. & f. per day...		17		345[2]		277	266[1]	221	238	33	1400

[1] Error in total, due to fact that it was impossible to determine which nestling received the feeding.

[2] And on one occasion both parents were present at the same moment and all three nestling were fed, but without determining by which parent, thus making the total 345.

After blue left the nest on July 10, the female seemed to take care of it, for many times she was seen to approach with food, but would dart into the weeds near by, and soon fly out with bill empty. She would also remain away from the nest for rather long periods at this time. For example, a period of twenty minutes elapsed between visits No. 2148 and No. 2149, and fourteen minutes between visits No. 2442 and No. 2443.

When the observations commenced the parent birds were feeding the young large food, such as insects and green worms. As described elsewhere the writer was present when the fourth egg hatched and is able to state that the food of this bird was not at all different from that which was being given to the rest of the nestlings, viz., green worms, grasshoppers, and other insects. At no time while the nest was under observation did the parents feed by regurgitation. It might be said that on visits Nos. 138, 440, 745, 769, and 798, one or other of the parents came to the nest with beak empty, so far as could be discerned. This parent then thrust its bill into the mouth and throat of one of the young birds, and then repeated the act on another. Then again on visits Nos. 751, 1059, and 1880, after the parent bird fed one of the nestlings, it put its apparently empty bill in the mouth of one of the other young. This behavior is not understood, but is not regarded as explainable on the assumption of regurgitative feeding, for the reason that it was long after hatching, and so irregular and infrequent.

Brooding.

Brooding was carried on entirely by the female, with one possible exception. On July 3 the observer, who was in the blind it the time, recorded that the male brooded for seven minutes. Since this is the only instance where such behavior on the part of the male was noted by any one, and because the writer observed on two occasions the male perched on the edge of the nest inspecting the young, once for a period of four minutes, it seems doubtful if the observer

employed the term brooding in the sense of sheltering the young from sun, wind or rain.

The female while on the nest usually sat facing the blind, but during rains and strong winds from the northwest she would face in that direction, occasionally glancing back at the blind.

The female was more careful in brooding the young during the first few days. She would stop for intervals throughout the day, while feeding, and brood the young. Her way of completely covering the brood was to fluff out the under coverts against the rim of the nest and bring the wings down, just inside, so as to effectually close the nest. As the young grew older and became larger, brooding also became more difficult. She experienced great difficulty in covering the young, for the nest was very much battered and misshapen, making a larger area to cover. The young were very active and there were times when the female would be contentedly brooding, while covering only the head of one nestling.

The female had different brooding attitudes for the varying circumstances. For protection against the cold of early morning she brooded in the manner described above, completely covering the young. Through the rains she brooded in much the same way as for cold, sheltering the young, so that after an unusually heavy downpour, the nest remained perfectly dry inside. During the heat of midday she usually stood in the nest with wings spread, shielding the young, but without shutting off the circulation of the air. On the contrary, at times she gently flapped her wings, as if fanning the young. During the strong winds she stood in the nest with wings outstretched, and leaned in the direction of the wind, so as to secure a delicate balance and at the same time keep the young in the nest.

Curves were plotted for the brooding period of each day in an effort to determine the variability in intensity of brooding throughout the day. But the results obtained were not satisfactory because of the different elements, such as rain,

wind, heat, cold, and nest location, which help to determine the brooding periods and the length of the same. Then many brooding periods were cut short by the male bringing food. But it was found that the brooding was more intense during the morning, and scattered throughout the rest of the day, according to the wind and the shading of the nest. The length of the brooding periods varied to a great extent, generally ranging from one minute up to between ten and twelve minutes. There were a few periods which exceeded this, the longest being thirty-two minutes, on the afternoon of July 5, and twenty-three and twenty-four minutes, on the afternoon of July 7. These long periods occurred when the nest was unprotected from the rays of the sun.

On July 7 the brooding periods became less in number and more scattered, the parent bird often departing with only a brief inspection. On the day following, and thereafter, brooding was discontinued entirely except during storm; while the brief inspections continued as before. As the young became stronger and walked around the nest, they stretched under the shadow of the leaves or even climbed into the branches.

These observations show a certain adaptability of behavior under natural environment. It was also shown that their behavior could be modified by artificial conditions. Between the hours of 1:00 p. m. and 5:00 p. m. the sun shown directly upon the nest, owing to the fact that the tall weeds which normally shaded the nest, were trampled down, in erecting the blind. During this time broad leaved burdocks were hung upon the guy ropes to throw a shadow over the nestlings. The female did not brood when the nest was thus shaded, unless there was a strong wind. Thus it would seem that the accident of location would have some bearing upon the intensity of brooding.

During the first days, the female began the brooding in the evening and was also on the nest in the morning before the feeding began. But on the last two days it was not seen which parent commenced the brooding in the evening or

which left the nest in the morning. It is not known whether the female brooded the entire night or whether the male relieved her, although there is no reason to suspect that such a change took place. The attitude of the female in sleep was to turn her head to the left, backwards and tuck the bill under the wing.

SANITATION.

The parent birds were very careful as to the cleanliness of the nest. The mother bird seemed to be more particular in this matter, for she did more than an equal share of work in keeping the nest clean.

From the beginning of the observation up to the snake incident the parent birds failed to catch the excreta sac only fifteen times. While, from this time on to the departure of the young she failed thirty-four times. But it must be borne in mind, that during this latter period the responsibility of caring for the young rested entirely upon the female. With this extra share of labor it was not surprising that she occasionally missed the excreta sac. This circumstance was, of course, an abnormal one. The records show that in many of these instances the excreta sac was voided "immediately following the departure of the female, after feeding one of the young." Several times when the sac fell to the ground the female picked it up and carried it away. Again the female made more feeding visits, *per young,* for, as the nestlings grew, they demanded more food. And, too, as the birds became older and larger their bodies often projected over the rim of the nest. Table IV shows the number of times each day that the excreta sac was not caught by the parent.

TABLE IV.

Showing the total number of times each day the excreta sac was not caught when voided.

July	2	3	4	5	6	7	8	9	10	11	12	Total
Not caught		4		1	6	2	3	5	10	15	3	49
Total number of excreta sacs	13	38	41	34	34	49	45	35	39	32	3	363

There was an unusual occurrence on July 8, when an excreta sac was left in the nest during two successive visits by each of the parent birds, although on the third visit the female carried it away. This instance is the more extraordinary, for there were times when one of the parent birds would be making a feeding visit and upon seeing an excreta sac in the nest, would promptly swallow the food so as to carry away the excreta at once.

While the nestlings were small, they were watched as far as was possible to ascertain whether the excreta was always taken from the same bird as fed. It was noted that this generally held true. Then after the young had been marked, more complete records were taken. Out of a total of one hundred and sixty-eight times, there were but five times recorded that the young voiding the excreta was not the one fed at that visit.

The excreta was usually eaten by the parents until July 5; on this day it was carried away a little over half of the time. And from then on, it was eaten only on eight occasions. Table V shows the disposal of the excreta and the total number of defecations.

TABLE V.

Showing by days the total number of excreta sacs, together with their disposal.

	Sex	July 2	3	4	5	6	7	8	9	10	11	12	Totals
Eaten	m	4	7	6	1								18
"	f	8	25	23	12	3	2	1		2[1]			76
Carried	m		6	8	9	10	20	17					70
"	f	1		4	12	21	25	27	34	36	27	2	189
Total.....		13	38	41	34	34	49[2]	45	34	38	27	2	363[3]

[1] One of the sacs of excreta was but partly eaten.

[2] On one trip the sex of the parent bird was not determined, and also once not noted whether excreta was carried away or eaten.

[3] Eight times the excreta sac fell to the ground and was neither carried away nor devoured by the parent birds, but are included in the final total.

Observations were taken as to what was done with the excreta when carried away and it was seen that the parent

bird flew to the limb of one of the nearby oak trees and either dropped the sac to the ground or deposited it on the bark of the tree. The bird then wiped the sides of its beak against the limb.

Miscellaneous Behavior.

Throughout the period of observation, the female made close inspections of the nest. She was very careful of the young, through the heat, wind and rains, covering them well and keeping the interior of the nest dry. During the early days, if the young leaned out over the rim of the nest, she pulled them back or pecked them until they moved of their own accord.

The parent birds were very watchful of the young, and always present at the approach of any intruder. Several birds, such as the cowbirds, blue jay, wren, chickadee, brown thrasher, king bird, and blackbird, came into the neighborhood of the nest at different times. They were driven away either by the combined efforts of the male and female, or by one of the parents alone. The only bird which did not seem to arouse the warblers, and which was not driven out, was a catbird.

On July 8, shortly before noon, the observer in the blind caught sight of a small garter snake crawling along on the tops of the weeds, not more than a foot away from the nest. While the snake seemed to be directing its course aimlessly, yet it came nearer to the nest, and even rubbed against the bush containing the nest, a few inches beneath the latter. At this point the observer interfered, but failed to capture the intruder. In the meantime the parents were very greatly disturbed and afraid to return, notwithstanding the calls of the young birds. Five minutes after the snake had been driven away, the female returned to the nest with a miller. The male came almost at the same time with food.

Later in the same day another snake incident occurred, which terminated in a tragedy. The following account was

written up immediately after the incident by Miss Nellie D. Fisher, who was in the blind at the time:

"At 2:40 p. m. the male bird fed the young and immediately afterward the female flew close to and directly above the nest without stopping; this act being unusual I looked around closely and at the base of the bush in which the nest was located a garter snake[1] was seen lying partly coiled up. I watched it for about two minutes, not thinking it would harm the birds; then it began to move, and I took a large piece of stove wood, all that was at hand in shape of a weapon, and struck at the snake through the peep-hole in the tent. At once it began to show fight, and in so doing it came almost into the tent; but when nearly under it, turned and went up the stick, which had been put in place to strengthen the bush, passed over the nest to the farther side, took the larger bird, and at once started off with it. The nestling, in the meantime, made considerable noise. I ran out of the tent after it, and followed the noise a few feet to the northwest, near the plum tree, when the noise stopped. I looked around a short time and then returned to the blind and found the snake just below the nest with the bird in its mouth. With the same stick of stove wood the snake was killed. By this time the bird was dead. Meantime, the male and female were flying about, uttering loud angry calls, and flying close to the ground where the snake lay."

The following notes are taken from the field records:

"Before 6:00 p. m. observer laid dead bird on branch near the nest; female, after feeding, seized dead bird by the leg with her beak, then darted against the tent as if frightened; but soon returned and took its head, hopped backward and unbalanced it so it fell to the ground. She seemed afraid of it; but made little darts at it, pulling it away from the nest.

"The female flew down near dead bird with food and twit-

[1] I am indebted to Dr. Alexander G. Ruthven, of the University of Michigan Museum, for identifying the snake as *Thamnophis sirtalis parietalis* (Say). This particular specimen was not over twelve inches in length.

tered several times; after feeding young, she again flew down about in the bushes and even under the nest.

"About 5:42 p. m. the female flew near the dead bird with a mosquito.

"Male came into the bushes, no food left.

"For a time parents approach nest, chirp and twitter.

"Again female flew near dead bird."

Following the snake incident the female was much more careful in approaching the nest, being nervous and very easily frightened away by the slightest noise. The male stopped feeding and left the entire care of the two remaining nestlings to the female. This action on the part of the male may have been due to fear. He remained throughout the day in an oak tree to the right of the nest. The two parent birds occasionally called or sang to each other, while the male came down from the tree at the warning call of the female, usually to drive away some intruding bird.

There was a certain stereotyped method of approach by both the parent birds, which remained unchanged throughout the nestling period. The female alighted in the weeds at some little distance to the north of the nest and gradually approached the nest by hopping from weed to weed. Thus she concealed her actions from any passers by. She usually stopped for a moment and inspected the young. The male invariably came straight down from the oak tree to the right and perched on the edge of the nest with his back or right side to the blind. He fed in a hurry and left at once. This made it difficult at times to identify the food or see which nestling received it.

During the first few days, the nestlings threw up their heads, with bills open, both when the parents visited the nest and when there was no observable stimulus. At this time it seemed that all they lived for was food. After the eyes had opened, they became more attentive to the things happening around about them.

It had been noticed that the young birds threw up their heads, with bills open, when the parent birds reached the

nest, and also when a gust of wind moved the nest. On July 7 a simple experiment was carried on. And it was found that the nestlings threw up their heads for food at the snapping of fingers, scraping the pencil on the blind, a low whistle, or contact with the nest. This instinct was shown whenever the birds were artificially stimulated, but on July 8 it became modified. For, at this time, such a stimulus caused the response from one, or, possibly, two birds, or from none. As they grew they became more watchful and attentive, for they perceived the parent bird approaching with food at some little distance. On July 9 the young marked red opened its bill at the shutting of a farm-house door, and both red and blue opened their bills when the nest was moved by the wind. Then on July 10 red opened its bill at an artificial chirp. It seemed that this instinct lessened each day, from July 8 on, but still it was present to a certain degree when the nestlings left the nest.

During the first half of the nestling period, the parent birds evinced a peculiar habit of pecking the young, especially about the eyes. It would, perhaps, be hazardous to attempt an interpretation of this beyond suggesting that it might simply indicate an impatience on the part of the old birds for the eyes to open. The eyes of all three nestlings were open by the evening of July 5, or, approximately, within a period of three days and a half after hatching. After this pecking about the eyes ceased, though continued on the other parts of the body.

On several occasions one of the nestlings swallowed the end of a hair, which was used in constructing the nest. This caused the bird much distress, and also made it impossible for its food to be swallowed. When the female visited the nest, on such occasions, she picked up the hair and attempted to pull it out, sometimes flying in a semi-circle around the nest. This certainly could become a grave danger to the nestling bird, because in many cases the hair was quite securely fastened in the gullet, and might easily result in the dislodgement of the young from the nest.

On the afternoon of July 11 the one remaining nestling (red) left the nest several times for the twigs nearby, sometimes for shade, and at other times as if to leave, but it returned to the nest each time, as if not yet sure of its ability to travel. On several occasions during this behavior, the female stayed in the weeds near at hand, watching the young bird, as if to be of assistance when needed.

The following notes are taken from the field record:

"On the morning of July 12, at 4:22 a. m., the nestling awakened, stretched, flapped wings, and chirped for some time. Then settled down again and seemed very listless.

"At 5:15, red was on the west edge of the nest; at 5:30, red left the nest for nearby twigs; foot was caught but soon pulled it loose.

"Red went from twig to twig until it reached another bush at 5:24; here it stretched and preened. At 5:35, red turned around on the twig and then back again. At 5:41, crawled farther out, stood up twice, as if to go, and then settled down again.

"Female approached and called.

"At 6:05, red jumped farther down on the same twig, four to six inches lower. Tried to climb up a weed, but slid down to first landing.

"At 6:07, red flew to weed about one and one-half inches away, but went back again.

"Female departed.

"At 6:25, red moved to another part of the same twig.

"At 6:27, red jumped to a low clump of weeds, and so on to another, and then on to the ground, at 6:28.

"Then I removed the red string from the leg; while both male and female were near, calling and scolding.

"All during this period, while the nestling was leaving the nest, the female brought food."

SUMMARY.

1. The young in the nest were under observation for 144 hours and 53 minutes.

2. During this time the parents fed the nestlings 2373 times.

3. The incubation period for *Dendroica æstiva* is eleven days.

4. The egg shells are disposed of by being devoured by the parents.

5. This species does not feed its young by regurgitation at any period.

6. Brooding is carried on only by the female.

7. Intensity of brooding is due to a complexity of factors, including nest location.

8. The brooding instinct can be modified by artificial environment.

9. During the first half of the nestling period, the excreta sac is usually devoured, and carried away during the latter half.

10. The excreta sac is either dropped to the ground or deposited on the limb of a tree.

11. The parent birds have a stereotyped approach to the nest.

Sioux City, Iowa.

SOME RECORDS OF THE FEEDING OF NESTLINGS.

BY LYNDS JONES.

During the summer of 1912 two students made a number of studies of the feeding of nestlings, summaries of which I herewith present. These studies were made without the aid of a blind, because it was found possible to approach within a few feet of the nests without disturbing the parent birds in their feeding activities. It was also found that the sex of the birds could be determined positively, after noting each bird for the first few hours. This was done by noting the individualities of the two birds, and by the frequent singing of the male, either just before or just after he delivered the food.

FIELD SPARROW (*Spizella pusilla pusilla*)—Four Young.

Only the last two days of the nest life were noted. The time spent with this pair was 19 hours and 12 minutes. During that time 237 pieces of food were delivered and 31 excreta removed. The shortest time between feedings was one minute and the longest 21 minutes, the average being 10 minutes between feedings. If each of the four young were fed in regular rotation each received food once in 40 minutes. There were 154 Geometrid larvæ (104 green, 37 brown, 13 white), 45 grasshoppers, 24 moths, 3 scattering, and 11 unknown. There was no regularity apparent, either of the intervals between feedings or of the sort of food secured as regards the time of day. All of the birds left the nest in the early morning, and apparently at the same time. It was not certainly determined that they were frightened away by a horse, but that is likely, The male was not seen to bring any food, but he secured some occasionally and delivered it to the female. The food was secured within a radius of 50 yards of the nest, mostly from the grass of the orchard, but occasionally from the apple trees. The bird always approached the nest from the same direction, usually alighting on the ground within three yards of the nest and proceeding directly to it by hopping along the ground and entering the bunch of grass in which the nest was built by means of a short tunnel. Her approach with food was heralded by a low chip, to which the young responded by stretching their necks up and opening the mouth. There seemed to be no method to the feeding to make certain that each young bird had a fair share, but all seemed to be equally well fed, judging from their appearance. Most of the excreta was eaten by the old bird. It was not allowed to soil the nest.

SONG SPARROW (*Melospiza melodia melodia*)—Four.

This nest was placed in a bunch of weeds beneath a Baldwin apple tree, within six inches of the ground. The old birds were sometimes disturbed by a flock of young chickens. The nest was under observation for the first three days after

the young hatched, and during the last three days that they spent in the nest — a total of 35 hours and 31 minutes. The female was less shy and was more attentive to the young, the male more shy and would leave the nest immediately after feeding. He had the habit of perching upon a limb near the nest and singing after each feeding. Neither bird made any sound on approaching the nest. The female did the most of the brooding of the young, spending the greater part of the time on the nest for the first three days. During this time the male brought the food and delivered it to the female, who delivered it to the young.

The male made 158 visits, the female 119 visits to the nest during the period of observation, or 277 by both birds. The male carried away 44 excreta, the female 31, or 75 by both birds. The excreta was sometimes eaten, sometimes fastened to the limb of a tree. 300 pieces of food were brought. Of these 178 were Geometrid larvæ, 46 grasshoppers, 11 bugs, 3 moths, 31 unknown, and 31 times nothing was brought. There were an average of eight feedings an hour. This is an average of one feeding every 30 minutes for each of the four young. There was no regularity in the time between visits to the nest at any time of day. The duration of absence seemed to be determined wholly by the ability of the birds to find food. They ranged rather farther than the Field Sparrows did, but seemed to find the bulk of the food in the grass.

House Wren (*Troglodytes aëdon aëdon*).

This nest was located when the birds first carried nest material into the woodpecker's hole in a sycamore post in the south-east corner of the orchard. The nest was near the top of the post, about four feet from the ground. The hole was on the north side of the post. A barbed wire was fastened to the post just below the nest hole, and below the barbed wire the fence was of woven wire. A corn field with the ears in full silk occupied the ground just south of the nest, the five-acre orchard of apple trees north-west, while two

rods to the east there was an oat stubble and the unoccupied part of a cemetery, from which the grass had just been cut for hay.

The birds finished the nest in a week, the eggs were laid in another week, incubation consumed eleven days, and the birds left the nest nine days after hatching. It was not possible to learn the number of young without breaking the nest open, which was not done. It was supposed that there were seven young. They were hatched early on the morning of July 22 and left the nest about ten o'clock on July 31.

This family was under observation 65 hours and 4 minutes. On three days the observations began before the awakening of the old birds. There were two days when no observations were made. There were 667 visits made to the nest, of which 560 were made by the male and 107 by the female. This great discrepancy is due to the fact that the female did not leave the nest much, but received the food from the male and fed the young herself. The male rarely entirely disappeared within the nest hole. Apparently the female left the nest only to obtain food for herself. No droppings were removed from the nest for the first three days, but must have been eaten by the female, since the nest was left clean.

The average number of visits per hour was a little better than 10. The approach to the nest was usually from the east, the birds alighting on the barbed wire within a few feet of the nest, and then flying out and darting into the nest hole, but many times there was no stop from the time the birds left the place where food was procured until they darted into the nest hole. The male almost invariably sang before and after visiting the nest, unless he flew directly in, and left without first perching on the fence. The food was mostly secured from the oat stubble and the cemetery, but some was found in the corn field, and only a little of it in the orchard.

There were 637 pieces of food brought, of which 161 were Geometrid larvæ, 141 leaf-hoppers, 112 young grasshoppers, 56 bugs, 42 spiders, 29 crickets, 10 moths, 5 ants, 4 scattering, and 29 times nothing was brought. 81 pieces were un-

identifiable. During the first three days the food consisted of Geometrid larvæ and leaf-hoppers, while the grasshoppers, crickets and ants were brought during the last two days.

It will thus be seen that with these three species of birds the preference of food for the young seems to be Geometrid larvæ. This may be partly due to the greater abundance of this food material as well as to the fact that these larvæ are about the right size for feeding birds the size of these, and that they are easily prepared for the young. One would expect the wrens to make use of smaller insects than the sparrows, and the large number of leaf-hoppers fed by them bears this out.

There was no evidence that any of these birds fed by reguritation. In the case of the sparrows this was clearly proved, but what might have happened in the case of the wrens can only be surmised. At any rate, the food was uniformly brought dangling from the bill and was not swallowed before being delivered to the nestlings. This was the case with the very first feedings of both Song Sparrows and House Wrens.

Intensive studies of this sort are needed for all of our birds. It is not an exhausting sort of work, and pays large returns for the effort and time spent. Generalizations are in order only after a considerable number of nests of each species are studied, the nests under as different conditions of environment as possible. As one's experience in this work increases accuracy of observation increases.

PRELIMINARY LIST OF THE BIRDS OF NORTHERN PASSAIC COUNTY, NEW JERSEY.

BY LOUIS S. KOHLER. BLOOMFIELD, N. J.

In preparing the following list of birds, which the author has observed in Upper Passaic County, New Jersey, during the past ten years, all of the species have been included to which may be attached no doubt as to their identification or authenticity of record. The territory covered in these obser-

vations includes the whole of the townships of West Milford and Pompton. The country consists mostly of low rolling hills, heavily wooded, intersected by broad valleys, in whose precincts are located the farming districts of the section. Dotted here and there are many small ponds and lakes, the principal of which are Echo Lake, Mud Pond, Pompton Lake and the lower half of Greenwood Lake. Most of the ponds and lakes are connected by small streams and rivers, forming a network over the whole of the district canvassed. In the western half are located the Bearfort Mountains, the highest in the section. These range from 600 to 1,400 feet in elevation and are heavily wooded with an original growth which covers more than three-quarters of their slopes. At the southern end of this range is located the Kanouse Mountain, another heavily wooded hill, but much lower in elevation. Along the southern border the Pequannock River meanders nearly the whole length of the section and separates these townships from Morris County, their southern neighbor.

But little has ever been written or published regarding the ornithology of this section, and it has been the object of the writer to gather together an authentic as well as a complete record of each and every species present, together with notes on those which breed and rear their progeny with us each year.

(1) *Colymbus auritus*—Horned Grebe. A regular spring and fall migrant. May be resident on the northern lakes during the summer months. Spring dates: April 14, 1906 (Pompton Lake); April 23, 1910 (Echo Lake), and April 14, 1911 (Green wood Lake); April 13, 1912 (Pompton Lake), and April 14, 1913 (Pompton Lake). Fall dates: October 2, 1911 (Echo Lake), and September 29, 1912 (Pompton Lake). Summer date: August 10, 1912 (Greenwood Lake).

(2) *Podilymbus podiceps*—Pied-billed Grebe. A regular spring and autumn migrant. Occasional summer resident. Spring dates: April 10, 1911, and April 18, 1912 (Pompton Lake). Autumnal dates: September 19, 1910 (Pompton Lake); October 8, 1911 (Echo Lake); September 15 and 30, 1912 (Pompton Lake). At Mud Pond on August 17, 1912, thirteen of these birds were observed feeding among the lily pads near the southern shore.

(3) *Gavia immer*—Loon. A rare visitant. A male of this species was observed at Pompton Lake on April 14, 1912, diving and swimming about near the northern end. Only record for the section.

(4) *Larus argentatus*—Herring Gull. A common spring migrant. Rare in autumn and occasional during winter. Numerous spring dates at all of the lakes. Observed but twice during autumn: September 30, 1906, and October 2, 1911. Seen on December 18 and 28, 1912, over Pompton Lake.

(5) *Mergus americanus*—Merganser. Occasional winter and spring visitant. Observed on February 18, 1911 (Wanaque River); March 31, 1912 (Pequannock River), and January 5, 1913 (Echo Lake).

(6) *Anas platyrhynchos*—Mallard. An irregular visitor. Found nesting at Echo Lake and Mud Pond by Cleveland Cook, of Haskell, and C. McKinnon, of Butler, at Rotten Pond. Of these three broods the eggs were measured and averaged 2.24″ by 1.26″, eight, ten and nine, and adult birds observed and positively identified.

(7) *Anas rubripes tristis*—Black Duck. An abundant migrant and occasional winter visitant. A brood of eight with adult female observed at Echo Lake on June 8, 1910. Only record of nesting obtained.

(8) *Nettion carolinensis*—Green-winged. Teal. A rather irregular migrant. Individuals observed April 14, 1912, and April 10, 1913, at Pompton Lake.

(9) *Aix sponsa*—Wood Duck. Occasional summer resident. In 1903 ten of this species were observed at Echo Lake, and in 1904 four more were seen at Greenwood Lake. Since that time they have been rather uncommon, only a few individuals appearing each year. One nest with twelve eggs found at Echo Lake on May 28, 1905, and adult female in the close vicinity at finding of this nest.

(10) *Branta canadensis*. A regular spring and autumn migrant. Arrives in spring, April 10 to 25, and departs in fall from October 15 to December 1.

(11) *Ardea herodias*—Great Blue Heron. An occasional visitant, especially during April. Recorded at Pompton Lake April, 21, 1911, and April 14, 1912. Also two were present at Echo Lake on June 20, 1902.

(12) *Butorides virescens*—Green Heron. Abundant summer resident. No nests of this species ever located, but they must certainly breed and nest here, as they are present from April 20 to September 10.

(13) *Philohela minor*—Woodcock. Summer resident; also abundant migrant. Occasional in winter.

(14) *Gallinago delicata*—Wilson Snipe. A regular spring and fall migrant. Arrives about April 1 and returns November 10. Occasionally found during summer months at Greenwood Lake.

(15) *Actitis macularia*—Spotted Sandpiper. Common summer resident. Arrives April 18 to May 10 and departs about September 15. Nests found at Echo Lake in adjacent corn fields and old stubbles on May 28, 1907, and June 2, 1910, and near Pompton Lake on May 16 and 22, 1909. At Sterling Forest, Greenwood Lake, two broods were observed on the 10th and 11th of June, 1907, in company with the adult birds feeding along the lake shore.

(16) *Oxyechus vociferus*—Killdeer. Common migrant and occasional summer resident. Arrives in the spring from March 26 to May 15 and returns in the autumn from September 3 to October 1. Found at Echo Lake on June 20, 1908; Mud Pond on July 4, 1908, and July 16, 1909; Greenwood Lake on August 2, 1910, and along the Pequannock River near Charlottesburg on six different occasions between the 15th and 24th of August, 1911. Nests with eggs found at Echo Lake on May 23 and May 25, 1909, and at Greenwood Lake on May 2, 1912.

(17) *Colinus virginianus*—*Bob-white*. Permanent resident in the sparsely settled sections. Nests with eggs found at Haskell along a rail fence on May 3 and 5, 1908, and one near Charlottesburg in a similar position on May 1, 1911. These nests in each case contained twelve eggs.

(18) *Bonasa umbellus*—Ruffed Grouse. Permanent resident wherever the preceding species is found. Nests of this species located at Ringwood and Midvale each year since 1909. Prior to this time one with fourteen eggs was found near Echo Lake and one at Upper Macopin on June 7, 1906, the latest date on which the writer has ever located a set of this species on which the female was incubating.

(19) *Zenaidura macroura carolinensis*—Mourning Dove. A common summer resident. Arrives during the latter part of March and early April and remains with us until October. Nests are to be found each year in the sparsely settled districts always in cedar and scrub pines.

(20) *Circus hudsonius*—Marsh Hawk. A common permanent resident. Wherever there is low marshy ground this hawk is sure to be present and their nests are occasionally found in these swamps.

(21) *Accipiter velox*—Sharp-shinned Hawk. A common permanent resident. Found breeding at Echo Lake (April 10, 1907), Sterling Forest, Greenwood Lake (May 3, 1909), Upper Macopin (April 14, 1912), and Pompton Lake (April 28, 1913).

(22) *Accipiter cooperi*—Cooper's Hawk. A common migrant, occasional summer resident and winter visitant. One nest with three eggs found on April 10, 1908, in a beech tree near Echo Lake.

(23) *Buteo borealis*—Red-tailed Hawk. An occasional winter visitor. Individuals observed as early as September 29 and as late as April 30. Never present during summer months.

(24) *Buteo platypterus* — Broad-winged Hawk. A common spring and fall migrant. Occasional during summer and very rare during winter.

(25) *Archibuteo lagopus sanctijohannis*—Rough-legged Hawk. A regular winter visitant. Occasional during spring and fall migrations.

(26) *Haliæetus leucocephalus*—Bald Eagle. Occasional about Greenwood Lake. Observed on June 18, 1906, and October 20, 1910, near Sterling Forest. Also one was seen near Echo Lake on July 15, 1912.

(27) *Falco peregrinus anatum*—Duck Hawk. Occasional transient visitant. Also rare winter resident. Observed on November 3, 1907, and February 6, 1910, at Greenwood Lake, and September 29 and October 18, 1912, at Echo Lake, and one at Midvale, April 14, 1913.

(28) *Falco sparverius*—Sparrow Hawk. A common permanent resident. Nests found each year since 1902 throughout the section, usually in hollow trees or deserted Woodpecker nests.

(29) *Falco columbarius*—Pigeon Hawk. Common transient visitant. Present occasionally during summer months, but no record of their breeding and building homes has been recorded for the section.

(30) *Pandion haliætus carolinensis*. Abundant migrant. Found breeding at Pompton Lake, on the east shores of Greenwood Lake, and once at Echo Lake. Appears locally about April 15. Individuals observed as late as October 10.

(31) *Strix varia*—Barred Owl. A rather common permanent resident. Nests located at Midvale, Upper Macopin, Ringwood, Sterling Forest and Haskell during the past seven years.

(32) *Otus asio*—Screech Owl. A common permanent resident and breeder throughout the section.

(33) *Coccyzus americanus*—Yellow-billed Cuckoo. Common sum-

mer resident. Arrives May 4 to June 1 and departs October 1 to 10. Breeds and nests commonly in both townships.

(34) *Coccyzus erythrophthalmus*—Black-billed Cuckoo. Common summer resident. Arrives May 16 to June 4, slightly later than the preceding species, and departs usually ten days earlier in the fall. Nests are occasionally found, but not as often as those of the Yellow-billed Cuckoo.

(35) *Ceryle alcyon*—Belted Kingfisher. A common summer resident and breder. Observed at Pompton Lake as late as December 18. Found nesting at Echo Lake and Sager's pond on May 28 and 29, 1908, and at Greenwood Lake on June 2, 1911.

(36) *Dryobates villosus*—Hairy Woodpecker. Permanent resident. To be found in the wooded sections throughout the year. Two nests with eggs found near Ringwood on May 16, 1907. Only records of their breeding here ever obtained.

(37) *Dryobates pubescens medianus*—Downy Woodpecker. A common permanent resident and breeder. More abundant during the winter than at other times during the year.

(38) *Sphyrapicus varius*—Yellow-bellied Sapsucker. A common visitant throughout the year. Never resident.

(39) *Melanerpes erythrocephalus* — Red-headed Woodpecker. Rather common permanent resident. Never abundant, but individuals present on each stroll out in the forested sections. Nests occasionally are found and the adults and young seen more often wherever they are sure of little interference at the hands of mankind.

(40) *Colaptes auratus luteus*—Flicker. A common permanent resident. Some winters these birds are more abundant than others. In 1907 and 1910 they were to be found daily, but in other years from December 1 until March 15 but few are met with. Breeds and nests in every available dead stump and tree throughout the section. This species during the past three years have been the especial enemies of the *Sturnus vulgaris* after their nesting holes have been completed and it is a common sight to see noisy conflicts on each walk between these two species. Usually the Flickers best their combatants, but in a number of cases the *vulgaris* has routed out the owners and taken possession of their homes.

(41) *Anthrostomus vociferus*—Whip-poor-will. Common summer resident. Arrives from May 7 to 26 and departs from September 9 to October 4. Breeds and nests throughout the section in the sparsely settled sections.

(42) *Chordeiles virginianus* — Nighthawk. Common summer

resident. Arrives May 15 to 30 and departs September 9 to October 1. Nests are occasionally found but not as often as the former species. This species is seen in the day more often than the former.

(43) *Chætura pelagica*—Chimney Swift. Common summer resident. Arrives April 26 to May 15 and departs September 15 to October 23. Nests abundantly throughout the section in unused chimneys of the farm houses.

(44) *Archilochus colubris*—Ruby-throated Hummingbird. Common summer resident. Arrives May 7 to 15 and departs September 4 to 15. Nests are occasionally found, but because of their seclusive habits they are widely separated and usually in out of the way places.

(45) *Tyrannus tyrannus*—Kingbird. Common summer resident. Arrives May 6 to 24 and departs September 2 to October 8. Breeds and nests abundantly throughout the section.

(46) *Myiarchus crinitus*—Crested Flycatcher. Common summer resident. Arrives May 6 to 30 and departs August 20 to September 15. Common breeder and home-builder throughout the section.

(47) *Sayornis phœbe*—Phœbe. Common summer resident. Arrives March 16 to 25 and departs September 26 to October 24. Nests under bridges in open sheds throughout the section.

(48) *Myiochanes virens*—Wood Pewee. Common summer resident. Arrives May 6 to 26 and departs September 24 to October 10. Common breeder and home-builder throughout the section.

(49) *Empidonax flaviventris*—Yellow-bellied Flycatcher. Occasional visitant. Observed September 8, 1911, and September 29, 1912, at Haskell.

(50) *Empidonax minimus*—Least Flycatcher. Common summer resident. Arrives April 28 to May 5 and departs September 19 to October 15. Nests throughout the section.

(51) *Otocoris alpestris*—Horned Lark. Occasional autumn and winter visitant. Observed at Echo Lake on September 29, 1908, and October 2, 1910 (Pompton Lake), and December 6, 7 and 8, 1912, at Charlottesburg.

(52) *Cyanocitta cristata*—Blue Jay. Common permanent resident. Breeds and nests throughout the section.

(53) *Corvus brachyrhynchos*—Crow. Common permanent resident. Breeds and nests throughout the section. Of later years these birds have been particularly destructive to young chicks of the barnyards in this section.

(54) *Sturnus vulvaris*—European Starling. Common perma-

nent resident. These birds first appeared in the more populous sections about 1905 and increased yearly, until at the present time their numbers have become so abundant that they have spread out over the whole section and are nesting wherever places are afforded to them. In this section these birds, probably due to their abundance, have become very pugnacious to the resident species and are continually harassing them both while home-building and while in search of food.

(55) *Dolichonyx oryzivorus*—Bobolink. Common summer resident. Arrives in early May and departs from September 15 to 29. Numerous nests are located each year throughout this section.

(56) *Molothrus ater*—Cowbird. Common summer resident. Arrives March 15 to April 15 and departs October 1 to November 11. Their eggs have been located in the nests of the *Vireosylva gilva*, *Lanivireo flavifrons*, *Dendroica æstiva*, and *Setophaga ruticilla*.

(57) *Agelaius phœniceus* — Red-winged Blackbird. Common summer resident. Arrives March 12 to 30 and departs October 7 to November 29. Nests wherever available grounds are located.

(58) *Sturnella magna*—Meadowlark. Common permanent resident. Breeds and nests throughout the section in old fields and wherever they are afforded sufficient protection from the invasion of mankind.

(59) *Icterus spurius*—Orchard Oriole. Common summer resident. Arrives about May 15 and departs between September 10 and 15. A male was observed at Echo Lake on October 3, which is the latest date on record for this species in this vicinity. Their nests may be found in most every orchard well away from the habitations of man.

(60) *Icterus galbula*—Baltimore Oriole. Common summer resident. Much more abundant than the former species. Arrives from May 4 to May 10 and departs September 15 to October 1. An abundant breeder and home-builder.

(61) *Euphagus carolinus*—Rusty Blackbird. Common migrant. appears locally from March 20 to April 14 and departs September 19 to October 2.

(62) *Quiscalus quiscula*—Purple Grackle. Common summer resident. Individuals present in sheltered swamps throughout the winter. Abundant breeder and nest-builder wherever the conifers abound.

(63) *Quiscalus quiscula æneus*—Bronzed Grackle. Individuals of this species appear during the migrations each year.

(64) *Passer domesticus*—English Sparrow. This exotic is about the same here as it is in all rural sections.

(65) *Carpodacus purpureus*—Purple Finch. An abundant migrant and winter resident. Arrives from the south in the spring from April 10 to May 25, and returns in the fall about September 15.

(66) *Loxia curvirostra minor.*—Red Crossbill. Individuals of this species have been observed on three occasions: October 29, 1908 (Echo Lake); December 2 (Midvale), and April 17, 1910 (Upper Macopin).

(67) *Astragalinus tristis*—Goldfinch. Common permanent resident. Abundant breeder and nest-builder throughout the section.

(68) *Plectophenax nivalis*—Snowflake. Irregular winter visitant. Located on January 4, 1906, February 8, 1909, and January 14, 1910, on the eastern slopes of the Bearfort Mountains in West Milford Township.

(69) *Pooecetes gramineus*—Vesper Sparrow. Common summer resident. Arrives March 16 to April 10 and departs November 1 to December 2. Nests located in open fields always adjacent to a ready supply of water.

(70) *Passerculus sandwichensis savanna*—Savanna Sparrow. Regular but not common migrant. Arrives April 1 to May 10 and departs from September 15 to October 1.

(71) *Ammodramus savannarum australis*—Grasshopper Sparrow. Common summer resident. Arrives about April 30 and remains until October 10. Nests abundantly throughout the section.

(72) *Zonotrichia albicollis*—White-throated Sparrow. Common migrant and winter resident. Arrives in the fall, October 1 to 15, and departs in the spring from April 30 to May 20.

(73) *Spizella monticola*—Tree Sparrow. Common winter resident. Arrives about October 10 and departs about April 1.

(74) *Spizella passerina*—Chipping Sparrow. Common summer resident. Arrives March 15 to April 8 and departs October 20 to November 1. Observed as late as November 29. Nests abundantly throughout the section.

(75) *Spizella pusilla*—Field Sparrow. Common summer resident. Arrives about March 25 to April 9 and departs October 15 to November 10. Common breeder throughout the section in the open dry fields.

(76) *Junco hyemalis*—Slate-colored Junco. Abundant winter resident. Arrives about November 1 to 15 and departs April 15 to May 1.

(77) *Melospiza melodia*—Song Sparrow. Common permanent resident. Most abundant during migrations when their songs are

particularly beautiful. Abundant breeder throughout the section.

(78) *Melospiza georgiana*—Swamp Sparrow. Common summer resident wherever water and low marshy tracts prevail. Arrives March 10 to April 15 and departs October 20 to December 1. Nests occasionally found.

(79) *Passerella iliaca*—Fox Sparrow. Common migrant. Occasional winter resident, especially when the berries of the low bushes have not been destroyed by fires. Arrive in the spring, March 10 to 20, and depart in the fall, November 1 to 15.

(80) *Pipilo erythrophthalmus*—Towhee. Common summer resident. Arrives April 20 to May 1 and departs October 15 to November 10. Abundant breeder.

(81) *Cardinalis cardinalis*—Cardinal. Transient visitant, occurring at all times of the year. Observed at Echo Lake, Midvale, Greenwood Lake, and many places in the Bearfort and Kanouse Mountains.

(82) *Zamelodat ludoviciana*—Rose-breasted Grosbeak. Common summer resident. Arrives May 1 to 15 and departs September 15 to October 1. Nests occasionally found in the more restricted localities.

(83) *Passerina cyanea*—Indigo Bunting. Common summer resident. Arrives May 1 to 10 and departs September 15 to 25. Abundant breeder and home-builder.

(84) *Piranga erythromeles*—Scarlet Tanager. Common summer resident. Arrives about May 7 and remains until September 15. Nests wherever the oaks abound in the heavily wooded sections.

(85) *Progne subis*—Purple Martin. Occasional visitant during the summer months. Observed at Greenwood Lake June 20, 1908; July 15 and 16, 1910, and August 27, 1911. At Echo Lake two were seen on July 30, 1909.

(86) *Petrochelidon lunifrons*—Cliff Swallow. Common migrant and occasional summer visitant.

(87) *Hirundo erythrogastra*—Barn Swallow. Common summer resident. Arrives April 1 to 15 and departs September 5 to 15. Nests throughout the section in open barns and granaries.

(88) *Iridoprocne bicolor*—Tree Swallow. Common summer resident. Arrives about April 10 and departs about October 20. Nests are found occasionally in hollow trees near Greenwood and Echo Lakes.

(89) *Riparia riparia*—Bank Swallow. Common summer resident. Arrives about April 25 and returns about September 15. Nests in sand-banks and occasionally under bridges.

(90) *Stelgidopteryx serripenis*—Rough-winged Swallow. Rather common summer resident. Arrive April 15 to 20 and depart September 1 to 10. Nests wholly under bridges in this section.

(91) *Bonbycilla cedrorum*—Cedar Waxwing. Common summer resident; also irregular winter visitant. Nest in orchard throughout the section. Always very gregarious except during the breeding and nesting period.

(92) *Lanius borealis*—Northern Shrike. One male of this species observed near Midvale on February 22, 1909. Only record for the section.

(93) *Lanius ludovicianus migrans* — Migrant Shrike. A few of these have been observed from time to time near Haskell during the fall migrations of 1908 and 1909.

(94) *Vireosylva olivacea*—Red-eyed Vireo. A common summer resident. Arrive about May 8 and depart September 15 to 20. Abundant breeders and nest throughout the section.

(95) *Vireosylva gilva*—Warbling Vireo. Common summer resident. Arrive May 5 to 10 and depart about September 20. Nest throughout the section. This species is greatly imposed upon by the *Molothrus ater*, and out of seventy-five nests examined during the past decade, sixty-one contained eggs of this parasite.

(96) *Lanivireo flavifrons* — Yellow-throated Vireo. Common summer resident. Arrive May 1 to 10 and depart May 25 to October 2. Nest abundantly throughout section. Occasional eggs of the *Molothrus ater* are found in these nests, but the percentage is very small, probably not over five per cent.

(97) *Vireo griseus*—White-eyed Vireo. Occasional summer visitant. Never resident.

(98) *Mniotilta varia*—Black and White Warbler. Common summer resident. Arrive April 25 to May 4 and depart October 1 to 10. No nest of this species has ever been located, but they must certainly nest here, as they are present from the time that they arrive until they depart in the fall.

(99) *Helmitheros vermivorus* — Worm-eating Warbler. Occasional spring migrant and summer visitant. Rare in the fall. Arrive about May 5. Individuals have been observed at Greenwood Lake and on the western slope of the Bearforts during July and early August.

(100) *Vermivora pinus*—Blue-winged Warbler. Rather common migrant and summer visitant. Observed as late as October 3 near the southern edge of the section.

(101) *Vermivora chrysoptera*—Golden-winged Warbler. Rather

rare migrant. Passes north May 7 to 16 and returns about September 1. Observed as early as April 29 at Pompton Lake.

(102) *Compsothlypis americana usneae*—Northern Parula Warbler. Common spring and fall migrant. Arrives May 5 to 15 and departs October 1 to 10.

(103) *Dendroica æstiva*—Yellow Warbler. Common summer resident. Arrives April 26 to May 5 and departs September 20 to October 1. Abundant breeder and home-builder in this section. Imposed upon occasionally by the *Molothrus ater*.

(104) *Dendroica cærulescens*—Black-throated Blue Warbler. A common migrant and occasional summer resident at the northern limits of the section. Arrive May 7 to 15 and depart September 15 to October 3.

(105) *Dendroica coronata*—Myrtle Warbler. Common migrant and occasional winter visitant. Arrives April 9 to 20 and departs October 10 to November 5.

(106) *Dendroica magnolia*—Magnolia Warbler. Common migrant. Arrives May 7 to 15 and departs September 1 to 15.

(107) *Dendroica pensylvanica*—Chestnut-sided Warbler. Common summer resident. Very abundant during the spring migration. Rare during autumnal flight. Nests in many places in the sparsely settled sections.

(108) *Dendroica castanea*—Bay-breasted Warbler. Rare migrant. Located on May 5, 1909, May 14, 1911, and May 12, 1912, at Echo Lake. Only records for section.

(109) *Dendroica striata*—Blackpoll Warbler. Common spring and fall migrant. Arrives May 10 to 24 and returns September 15 to October 1.

(110) *Dendroica fusca*—Blackburnian Warbler. Tolerably common migrant. Most abundant during the southern migration. Arrives May 10 to 15 and departs September 1 to 15.

(111) *Dendroica virens*—Black-throated Green Warbler. Common migrant. Arrives May 4 to 8 and returns September 10 to 20.

(112) *Dendroica vigorsi*—Pine Warbler. Common migrant. Appears locally April 10 to May 5 and returns October 1 to 5.

(113) *Dendroica palmarum hypochrysea*—Yellow Palm Warbler. Common migrant. Arrives April 10 to 22. Returns October 1 to 15.

(114) *Seiurus aurocapillus*—Oven-bird. Common summer resident. Arrives about May 5 and remains until October 10. Nests abundantly throughout the section.

(115) *Seiurus noveboracensis*—Water-Thrush. Common trans-

ient visitant. Numerous birds are seen each year at Pompton and Echo Lakes, especially during the latter part of August. Have been met with at Greenwood Lake on two occasions during the early part of September.

(116) *Geothlypis trichas*—Maryland Yellowthroat. Common summer resident. Arrives about May 5 and remains until October 10. Nests abundantly throughout the section.

(117) *Icteria Virens*—Yellow-breasted Chat. Common summer resident. Arrives May 10 to 15 and departs September 15 to 20. Common breeder throughout the section.

(118) *Wilsonia citrina*—Hooded Warbler. Common summer resident. Usually found in the more sparsely settled sections, where their nests are occasionally located. Arrive about May 7 to 10 and depart September 10 to 15.

(119) *Wilsonia pusilla*—Wilson Warbler. Common migrant. Arrives May 10 to 19 and returns September 1 to 5.

(120) *Wilsonia canadensis*—Canadian Warbler. Common migrant. Arrives May 10 to 16 and departs September 5 to 20.

(121) *Setophaga ruticilla*—Redstart. Common summer resident. Arrives April 28 to May 5 and remains until October 1 to 10. Nests abundantly throughout the section.

(122) *Anthus rubescens*—Pipit. Common spring and fall migrant. Arrive March 28 to April 1. Return October 15 to December 1.

(123) *Mimus polyglottos* — Mockingbird. One male observed near Upper Macopin, just above Echo Lake on July 28, 1909. This is the only bird of this species which has ever come to the writer's attention alive. Two other males are in the possession of Mrs. George Brown, Midvale, which she claims her husband shot some twenty years ago near Ringwood, and were preserved by him.

(124) *Dumetella carolinensis*—Catbird. Common summer resident. Arrive April 28 to May 5 and return October 1 to 20. Nest and breed throughout the section.

(125) *Toxostoma rufum*—Brown Thrasher. Common summer resident. Arrives April 10 to 25 and depart October 10 to 15. Nest abundantly throughout the section.

(126) *Thryothorus ludovicianus* — Carolina Wren. Occasional summer resident, but more often visitant. One family of adults and four young observed at Pompton Lake, July 18, 1907.

(127) *Troglodytes aëdon*—House Wren. Common summer resi-

dent. Arrive April 25 to May 10. Depart September 25 to October 10. Nest commonly throughout section.

(128) *Cistothorus stellaris*—Short-billed Marsh Wren. Common summer resident, but not nearly as abundant as the following species. Nests found each year since the late nineties at Echo Lake and Mud Pond.

(129) *Telamatodytes palustris*—Long-billed Marsh Wren. Common summer resident wherever suitable grounds are located. This is by far the most common of the *Troglodytæ* of this section. Nest abundantly wherever they are found. Arrive about May 15 and depart about October 1.

(130) *Certhia familiaris americana*—Brown Creeper. Common winter resident.

(131) *Sitta carolinensis*—White-breasted Nuthatch. Common permanent resident. Present in greater numbers during the winter than at other times of the year. Three nests have been located in this section since 1903 in the Bearforts.

(132) *Sitta canadensis*—Red-breasted Nuthatch. Occasional winter visitant. Observed December 5, 1908 (Upper Macopin); January 17, 1910 (Pompton Lake); February 2, 1911 (Echo Lake), and December 17 and 22, 1912, at Ringwood.

(133) *Bæolophus bicolor*—Tufted Titmouse. Irregular winter visitant throughout the section. On rare occasions they are observed during June and September in the heavily wooded sections.

(134) *Penthestes atricapillus*—Black-capped Chickadee. Common permanent resident. Nests are occasionally located in the heavily forested sections well away from the habitations of man and where a ready supply of water and food are present.

(135) *Regulus satrapa*—Golden-crowned Kinglet. A common winter resident. Arrive about September 15 and remain until April 1.

(136) *Regulus calendula*—Ruby-crowned Kinglet. Common migrant. Arrive April 10 to 25 and return September 20 to October 15.

(137) *Hylocichla mustelina*—Wood Thrush. Common summer resident. Arrive about May 1 and remain until September 25. Nest commonly throughout the section.

(138) *Hylocichla fuscescens*—Wilson Thrush. Common summer resident. Arrive April 15 to 25 and depart September 15 to 20. Never during the past decade has a nest of this species been located in this section. But there is no doubt in the mind of the

writer but that they breed and nest here, as they are present from the time they arrive until they depart in the fall.

(139) *Hylocichla aliciæ*—Grey-cheeked Thrush. Common Migrant. Arrive May 1 to 20 and depart October 1 to 10.

(140) *Hylocichla ustulata swainsoni* — Olive-backed Thrush. Common migrant. Arrive May 5 to 15 and return September 20 to 25.

(141) *Hylocichla guttata pallasi*—Hermit Thrush. Common migrant. Occasional winter visitant, and during the years 1907-1912 they have been met occasionally during the summer months in the heavily forested sections of Bearforts west of Greenwood Lake. On May 27, 1910, a completed nest was located, and on June 10 contained four young birds about five days old. This is the only record I can find for this species nesting in New Jersey.

(142) *Planesticus migratorius*—Robin. Common summer resident. Also abundant during entire year in a few sheltered swamps. Nest abundantly throughout the section.

(143) *Sialia sialis*—Bluebird. Common permanent resident. Nest abuntantly throughout the section.

(144) *Phasianus colchicus*—English Pheasant. Common permanent resident. Breeds and nests in the more rural sections of the two townships.

THE CARDINAL AND THE BROWN THRASHER.

BY MARION E. SPARKS.

Miss Sherman's notes on the Brown Thrasher explain in part why books and birds do not always agree. In central Illinois the Thrasher, like the Rose-breasted Grosbeak, sings in town, from the tallest twig that will bear his weight, is cheerful and alive to the tip of each feather. In the country osage orange hedges or orchard trees provide the Thrasher with both singing and nesting places, the latter usually five to six feet from the ground, though one was found near the ground by means of the fuss the birds were making because a small child was looking into the nest. I have never found another lower than five feet from the ground.

The Catbirds of my acquaintance have been impudent, not shy, for while they can move more quietly than mice, they seem to fear nothing; however, they refuse to remain when

the Cardinal comes. The Thrasher and Rusty Blackbird, too, all three tenants of our yard for nearly twenty years, moved out or were driven away by this gay and noisy bird.

A pair of Cardinals made a nest in 1911 in a trellis against the house, about ten feet from the kitchen door, using chiefly bark from the grape arbor across the driveway. They had one young one, that left the nest while it could barely fly six feet, a tailless brownish, homely bird, in late June. It followed and teased the old birds for its food, till they left in the fall.

In 1912 a pair built in the same spot and raised, to nest-leaving size, one young one.

Soon the male was whistling and calling as in early spring, and in a few weeks a new nest was found, in a pear tree about two rods distant. It was like the others, made of bark stripped from grapevines, but seemed more flimsy and less well built than the other two. This nest was nearly eight feet from the ground; the others only five, but "protected" by a rose bush growing against the vine trellis. Again there was one young bird, and the amusing spectacle was presented of the two young birds of different sizes tagging after their parents and clamoring to be fed, and the bigger one tried to get the larger share.

This continued till the birds left in October. One male, however, remained late, calling and whistling till November.

On March 4, 1913, a pair came back, and it remains to be seen if they will continue the proceedings. They are certainly quarrelsome; even the Blue Jays give up the bathing pan to them in haste.

The musical whistle, repeated at short intervals nearly all day for several months, is monotonous and less pleasing than the variety provided by the Thrasher, the Catbird or the Rose-breasted Grosbeak. There was a little while in late September and early October when they did not whistle and call, but before leaving the whistling was begun again by the one male, who stayed late.

May 12, 1913. The Cardinal is whistling and calling yet.

The nest, if made, has not been found. There are two pairs here this year in the haunts where for the two years before only one pair had been.

May 31, 1913. No nest; no Cardinals.

THE EXTERMINATION OF THE WILD TURKEY IN CLAYTON COUNTY, IOWA.

BY ALTHEA R. SHERMAN.

Some brief reference to the history of Iowa may afford a better understanding of the early status, and speedy extinction of the Wild Turkey in Clayton County, following the occupancy of its land by the white race. After the treaty of 1804, made by the United States Government with the Sacs and Fox Indians, the whole of Iowa (excepting a few square miles in the northeast corner, which were claimed by the Sioux) was set apart as the tribal property of the Sacs and Foxes. It was held by them as their private hunting grounds and was jealously guarded by these warlike Indians from encroachment by other tribes. At the same time it was one of the duties of United States soldiers stationed in the frontier forts to protect these Indians in their rights by expelling any of the whites who ventured across the Mississippi River. Among the participants in this work of expulsion were two soldiers, who afterward became prominent characters in United States history, Colonel Zachary Taylor and one of his lieutenants, Jefferson Davis. There can be no doubt that their task of keeping white men out of this territory was well done; also that the Indians acting upon the principles of true conservation, maintained a great abundance of game.

In 1832, after their defeat in the Blackhawk War, the Sac and Fox Indians were forced to relinquish the eastern portion of their hunting grounds, which was thrown open for white occupancy the following year. The stream of immigration that slowly trickled into Clayton County was a feeble one, very unlike the tidal wave that swept over Oklahoma fifty-five years later. The early settlers in this part of Iowa

had no lack of domestic animals for food, hence the destruction of the Wild Turkey did not have its origin in the needs of mankind. The great abundance of this species in its neighborhood gave the name Turkey River to a stream that takes a southeasterly course almost diagonally across the county. This refers to its present boundaries, not to its early ones in the days of magnificent distances, when Clayton County stretched for unnumbered miles to the westward, and was bounded on the north by the Dominion of Canada—then called British America. In pioneer days all the land in the southeastern part of the county, upward of two hundred square miles, was covered with a heavy forest of hardwood trees, except the bottom lands at the mouth of the Turkey River, where it is said "horse-weed" grew in rank profusion, yielding a black, oily seed that was a favorite food of the Wild Turkeys.

Very few of the people are now living who came to this region in the late thirties; but ten years ago there were others, some of whom were contributors to "The Old Settlers Edition" of the North Iowa Times, published February 19, 1903. From its columns are taken the following excerpts from the story told by Mrs. Ann Dickens, who moved to Clayton County in April, 1836: "A view of Turkey River and its surrounding bluff at this time would hardly bring to mind what it was in the days of 1836. When I arrived there, the hills were covered with immense timber and no undergrowth, owing to the Indians' custom of burning the ground every fall to help the growth of feed for deer. The woods were full of panthers, bears, wild cats, wolves, foxes, deer and wild turkey; and I have often wondered how those wild turkeys lived and multiplied to such a great extent, where the woods were full of wild animals, for whom the eggs and the turkey's young would be such a toothsome meal.

"The Indians' name for the Turkey River was Sesick, Anashungara.

"At stated times during the year a regular trail was formed by the wild turkeys crossing the river, which, from this fact,

took its name. I have seen a train of them, two to four abreast, extending from the river's bank to the forest a quarter of a mile away.

"A great many of these turkeys were trapped, the trap a crude affair, but effective, to the extent that one night my husband secured twenty-four of them. The trap was simply an area about ten feet square, enclosed and covered. A trench extended from the outside, and gradually descending, ran under the wall, opening on the inside. Through this trench the turkeys walked, led on by the corn that had been generously sprinkled there."

Levy Springer, also a pioneer of 1836, contributed the following: "Deer and wild turkey were plenty, and I have seen as many as ten or a dozen of the latter at one time playing on a high point not over 150 yards from our house. They used to frequent that point in the spring of the year, but they were generally poor and we did not bother them."

Hon. Robert Quigley, at present senator from this district to the Iowa legislature, relates, that when a small boy he was present at the killing of the last Wild Turkeys on Buck Creek. They were two gobblers, weighing twenty and twenty-two pounds respectively, and were shot by his uncle, David Griffith, about the year 1853 or 1854; also that after that date a few other birds of this species were taken at different points near the Turkey River. From this it appears that a game bird, preserved in great numbers by the conservation of the Indians, did not survive the coming of the white man longer than twenty years. It is noteworthy that this is exactly half the period it took to bring the species to the verge of extinction in New England, according to the writings of John Joselyn, as recently quoted by Mr. E. H. Forbush in his "Game Birds, Wild Fowl and Shore Birds."

Concerning the species Dr. P. R. Hoy is quoted in "The Birds of Wisconsin" as saying that the winter of 1842 was practically fatal to them, "snow was yet two feet deep in March, with a stout crust, so that the turkeys could not get to the ground. They became so poor and weak that they

could not fly, and thus became an easy prey to the wolves, foxes, wild cats, minks, etc., which exterminated almost the entire race." Like weather conditions may have prevailed in Iowa, and a similar disaster may have overtaken the Wild Turkey; if so, its story has not survived their disappearance.

NOTES ON THE SAGE HEN.

BY S. S. VISHER.

[State Geological and Biological Survey, University of South Dakota, Vermilion, S. D.]

The Sage Grouse (*Centrocercus urophasianus*) is in many respects one of the most interesting of the birds of many portions of the west. The cock is almost as large as a hen turkey, so he is big enough to attract anyone's attention. All grouse are wonderfully effectively colored from the standpoint of protection. Some, of which the sage hen is one, have so much confidence in their invisibility that they have been dubbed "Fool Hens," because they allow such close approach. It is astonishing how completely hidden a sage chick can be, even on bare ground. Many a time I have come upon a mother walking conspicuously along with her brood. When she flew they would squat low on the short grass and disappear from sight. It is a mighty good test of acuteness of observation to then try to find all the young. Perhaps some may be located quite easily, but others, "in plain sight," will not be seen until they fly almost from under one's feet.

As the name implies, sage hens are found in areas where the sage brush (chiefly *Artemesia tridentata*) is abundant. Formerly they were found in many sections of western South Dakota and westward. The last ones recorded from this state, except in the northwestern corner, were found in Sage Creek in the Badlands in 1907. By 1910 all were gone except those in Harding and Butte Counties. Now (1913), after three more years of homesteading, Sage Grouse are restricted in this state to the Little Missouri Valley in Harding County and to the headwaters of Indian Creek in Butte.

In a very few years they will occur in South Dakota only as a rare winter straggler from Montana.

This widespread extermination of the Sage Grouse is in spite of the fact that the flesh of all but the youngest sage hens tastes so strongly of sage that they are not usually considered edible. Sage hens are somewhat destructive to gardens and are sometimes killed as pests. The young, which are easily shot with a 22 rifle, are used extensively as food.

Polygamy among wild birds is very rare and the Sage Grouse is one of our few examples. The mating dance takes place in April and May and lasts from dawn till well along in the forenoon. Upon an open grassy slope as many as fifty of these stately birds will gather. The cocks walk about with tail widespread and the neck much distended by the inflation of the air sacs. Upon approaching a female the male drags one wing on the ground. From time to time the cock utters a dull ringing note, which can be heard but a very few rods. The females seem to pay little attention to the dance, nor do they select mates in any obvious manner, since several are looked upon with favor during a single morning.

The nest is made in a slight depression and contains from seven to nine spotted eggs. The young remain with the mother until winter. They spend the night, not on the lower flats along streams, where most of the day is spent, but on the edge of upland, frequently near the border of a patch of sand grass. The flock sleep within a few feet of each other. The mother clucks to her very young chicks after the same manner as does the domestic hen.

During the summer the cocks congregate together, while unfortunate females are solitary. Sage hens require drinking water and are hence found near waterholes. Since a few small trees are usually found near our permanent pools the most frequent place to find sage hens in the heat of the day is sprawled out in the shade of the single tree, or under a nearby "cut bank."

THE WILSON BULLETIN

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Edited by LYNDS JONES.

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Editorial

It has not been possible to arrange for a meeting until after the close of the summer. Arrangements will be made and announced either in the September number or by letter. Keep it in mind.

The absence of the Editor for the summer will probably necessitate some delay in the appearance of the September Bulletin. You can lessen the delay by sending in something for publication at an early date.

The editor leaves on June 26. He will have for his postoffice until August 1, Kelleys Island, Ohio, to which address letters should be directed. The occasion of the change of address is a class of 18 students, who go for an intimate study of the breeding habits and summer distribution of birds, and for the study of breeding environment of the species. This work will occupy the first six weeks, and will be followed by a six weeks' study of the southward migration movement over the same region, until near the close of September, with a company of ten men. Please note the change of address.

The editor spent four days—May 9 to 12—in company with Mr. George L. Fordyce, of Youngstown, Ohio, studying the birds. The first two days were spent at Youngstown, where 116 species were recorded on the 9th, and 113 on the 10th. An overland automobile ride to Vermilion on the 11th and a study of the birds along the shore of Lake Erie on the 12th. completed the pleasant studies. The warbler migrations were at their height at Youngstown on the two days spent there, but did not reach the lake shore until more than a week later.

It has been suggested that the publication of May Day horizons would be valuable as showing the progress of the migrations the country over, as well as indicating the distribution of the birds. The editor would be pleased to receive expressions of opinion upon this point. He is entirely ready to give space in the Bulletin to such lists which give evidence of careful work, and believes that such a movement is worth while.

This is the time of year when breeding habit studies ought to be undertaken more generally. It is not difficult to find a nest, and it is not a serious task to give the whole of several days in the study of the feeding habits of many species of birds. Most of the sparrows, the wrens, and many others, permit so close an approach that even a blind is not necessary for close observation. One may sit in comfort while observing the feeding habits of the Field or Song Sparrow, for instance. Try it and prove or disprove this assertion.

General Notes

WINTER BIRDS OF NORTHERN McKENZIE COUNTY, NORTH DAKOTA.

These notes are from November, 1912, to March, 1913. The north line of McKenzie county is the Missouri River and south from the river is a collection of breaks, hills, cut-banks, gulches, ravines, creeks and coulees, which extend for about six miles, except along the larger creeks, where the adjacent land is more or less undulating. Between the creeks are broad stretches of level farming land. On the prairies there are no trees except what has been planted by the settler from about eight years ago.

On the Missouri River bottom are to be found groves of Cottonwood, Elm, Ash, Box-alder and Willow, with a mixture of Buffaloberry, Plum and Choke-cherry trees. In the breaks and gulches

are to be found Red Cedars and various other Junipers, and on the creek bottoms and side hills are to be found, besides the deciduous trees mentioned, Poplar, Diamond Willow, June-berry, Hawthorn, Birch-bush, Wild Rose-bush and occasionally Sage-bush. Wild Hops and Climbing Fake Butternut Vines abound.

Of the mammals, three or four species of field mice are altogether too numerous. Jack-rabbits are common on the prairies, and in the bush Snow-shoe rabbits and occasionally a Cotton-tail are found; Chip-munks are common in the timber; Coyotes and Weasels are to be found everywhere, judging from the tracks; Porcupines are also occasionally seen.

The temperature in winter is somewhat cool, occasionally going down to 50° below zero; generally always an abundance of snow, and winds that blow steady from one direction for a week at a time. There is a notable absence of birds of prey. Perhaps this accounts for the abundance of the smaller mammals mentioned.

1. Prairie Sharp-tailed Grouse—The commonest winter bird in the coulees, gathering in immense flocks and becoming rather *tame*, even alighting on barns and sheds. In what stomachs I have examined I have found the following seeds: Wheat, oats, flax, wild oats and rose-buds.

2. Short-eared Owl—Occasionally seen. Can be found almost anywhere.

3. Snowy Owl—Only one seen.

4. Desert Horned Lark—Becomes common in February after the first few warm days.

5. Hoyt's Horned Lark—Occasionally seen during the winter.

6. Magpie—Another common resident. The Magpie will eat any kind of flesh. They like to investigate refuse piles.

7. Redpoll—Rare. Two seen February 8.

8. Lapland Longspur—Occasionally seen during the winter, but becomes more common in February.

9. Snow Bunting—Common in winter on the prairies, gathering in immense flocks.

10. Bohemian Waxwing—Shot a solitary male on November 12. Stomach contained a few Buffalo-berries.

11. Northern Shrike—Seen only a few times; rather shy.

12. Long-tailed Chickadee—Common on the river bottom in the timber; not often found any other place.

13. Robin—Two seen January 26; certainly must have been stragglers.

14. English Sparrow—He is here well enough, and thirty miles from a railroad.

ADRIAN LARSON.

Keene, N. Dak.

BIRDS NOTED NEAR DELAWARE, OHIO, FROM DECEMBER 1 TO FEBRUARY 18.

1. Song Sparrow.
2. Tree Sparrow.
3. Junco.
4. Goldfinch.
5. Bluebird. One pair in January.
6. Robin. Small company in January.
7. Cedar Waxwing.
8. Mourning Dove. Not common.
9. Bob-white. Rare.
10. Meadowlark. Common.
11. Prairie Horned Lark. One company of 30 to 40.
12. Bronzed Grackle. A small company has lived in the suburbs of city all winter.
13. Downy Woodpecker. Plentiful.
14. Hairy Woodpecker.
15. Red-bellied Woodpecker. Rare.
16. Northern Flicker. Common.
17. White-breasted Nuthatch. Common.
18. Red-breasted Nuthatch. Plentiful for casual residents.
19. Brown Creeper.
20. Cardinal. Plentiful.
21. Crow. Common.
22. Red-tailed Hawk. Common.
23. Sparrow Hawk. Common.
24. Sharp-shinned Hawk. Rare.
25. Marsh Hawk. One record.
26. Barred Owl. Two records.
27. Screech Owl. Common.
28. Blue Jay. Common.
29. Purple Finch. Three records. Found them feeding on the seeds of the hornbeam.
30. Tufted Titmouse. Common.
31. Chickadee. Rare.
32. Belted Kingfisher. Three records. One in January and two in February. River has been open here all winter.
33. Golden-crowned Kinglets. Two records. Both in January.

The migrant Doves, Meadowlarks, Grackle, Red-wings (males) have come in considerable numbers.

C. R. Wallace.

Delaware, Ohio, March 14, 1913.

THE FOOD OF NESTLING GOLDFINCHES.

On page 21 of the Wilson Bulletin for March, 1913, there appears the following reference to the food of nestling Goldfinches:

"Then comes a busy time, for the parents must hurry around and catch enough insects, mainly plant-lice and flies, for their insatiable little charges."

In the year 1897 we had occasion to ascertain the food of nestling Goldfinches. We had become interested in moult and feather development and desired to rear a few young from the nest by hand. We easily located two nests in a piece of bushy pasture land within sight of a considerable area covered with American thistles and each contained five newly hatched young on August 25. We waited one week and then conducted an investigation of three hours' duration. In brief, we many times saw the parents gather thistle seed and fly directly to the nest, and after regurgitation the seeds could be felt in the crops of the young. We killed one while in this condition and its crop contained nothing but thistle seed, in a softened state, caused by a fluid that may have come from the parent. We took two of the young and succeeded in rearing one on a diet of boiled thistle seed, to which bread was added in a week and gradually replaced by crushed hemp seed soaked in water, and at the age of four weeks the bird was on a diet of the ordinary mixed seed for canaries and did not receive any food of an animal nature from the time it was taken from the nest until the first moult. In conclusion, the Goldfinches we observed did not look for insects, nor were there any in the crops examined, while the rearing of the nestling without insect food indicates that such food is not essential if used at all.

J, CLAIRE WOOD.

HAROLD BAILEY WILL PUBLISH BOOK ON BIRDS.

James E. Abbe, formerly of this city, but now representing the publishing firm of J. P. Bell Company of Lynchburg, arrived here Friday and yesterday closed a deal with Harold Bailey, the well known ornithologist of this city, for the publication of Mr. Bailey's new work on "Virginia Breeding Birds."

This book, with its many beautiful color plates and half-tone cuts, Mr. Abbe says, when published, will be equal to anything ever gotten out in the nature book line.

Virginia has up to now been without a publication of this nature, such as has been published in many other states, and the reputation for high-class publishing that Mr. Abbe's company enjoys, is an assurance that the book is to be a finished product.

Harold H. Bailey announces that the J. P. Bell Publishing Co. of Lynchburg, Va., have started work on the publication of this book, "Breeding Birds of Virginia," which they expect to have before the public on or about June 1, 1913. There will be fourteen full page color plates of birds, heretofore unfigured, which, with the one hundred and eight half-tones taken from nature, represents the greater part of the species figured in the text of over three hundred pages. Virginia being the overlapping boundary of many of the northern and southern forms, the field covered should be of special interest to the ornithologists. As this will be a limited edition, those desiring to secure a copy should notify the author at Newport News, Va., as early as possible. The publishers are noted for their high-class work, and both they and Mr. Bailey guarantee the whole work to be above the ordinary. The price will be $3.00 (three dollars).

EARLY ROOSTING FLIGHTS OF THE TREE SWALLOW AT BLOOMFIELD, N. J.

During the latter part of May and the first ten days of June, 1912, there occurred at this place daily flights of the Tree Swallow. These flights commenced on the 25th of May and lasted until the 10th of June. The birds would appear from the west at about five-thirty each evening in immense numbers and the flight would continue until seven p. m. As the birds flew low, they could be readily observed, and each flock, so far as could be seen, were composed only of the adult birds of both sexes. Prior to this time these flights have never been observed before July 25, at which time they become a regular happening in the course of the day's events.

After the 10th of June, however, these flights discontinued and only a few stragglers were observed wending their way towards the meadows until the usual time for them to begin flying again in late July.

LOUIS S. KOHLER.

A RUNT CROW (*Corvus brachyrhynchos*) AT POMPTON LAKES, N. J.

While making investigations as to the summer food of the *Corvus brachyrhynchos* at this place during the summer of 1912, among a lot of twenty birds shot, was one which was very abnormal in many ways. This bird measured in length 13.75″; wing (right) 9.90, (left) 9.95; tail, 5.85; exposed culmen, 1.60; depth of bill, .70; tarsus (right) 2.00, (left) 2.15. The plumage was a dead black totally devoid of gloss or sheen and the tarsi were deep

brown, tinged with bluish, especially on the upper parts. The other birds in this lot averaged as the normal bird would do.

Of the twenty stomachs examined the food consisted as follows: Corn, fruit and other grains, 40 per cent; beetles, 10 per cent; vertebrates, 23 per cent; lepidoptera, 15 per cent; spiders, 2 per cent, and miscellaneus invertebrates, 10 per cent.

Of the first division, corn (yellow) made up 75 per cent and the remainder consisted of oats and rye. In the second division ground beetles composed wholly the food of this class; of the vertebrates, were remains of several species of batrachians and field mice; of the lepidoptera were numerous caterpillars and moths; of the arachnida were numerous Geometrical spiders and an occasional crayfish, and the miscellaneous invertebrates consisted of earthworms and other unrecognizable materials.

LOUIS S. KOHLER.

Bloomfield, N. J.

TWO BREWSTER'S WARBLERS AT LEONARDO, N. J.

On May 4, 1913, at Leonardo, Monmouth Co., New Jersey, two specimens of the *Helminthophila leucobronchialis* appeared among a small group of second growth maples near the northern end of the town between the New Jersey Central Railroad tracks and the seashore. The first of these birds to be seen was an adult male and differed slightly from the typical male of this species by having a small circular spot of clear yellow in the center of the breast about one-quarter of an inch in diameter. The wing bars were white as in the *H. chrysoptera* and the side, just below the middle of the wings, was washed with a faint but conspicuous yellowish tinge.

The second was also a male and differed very slightly from the typical male. In this specimen the yellow on the breast was replaced by a very faint tinge of black appearing under the surface of the feathers of the breast. These two birds were in company with fifteen or sixteen *Helminthophila chrysoptera* and were present about an hour, during which time they afforded excellent opportunities for observing them at close range, as they were very sociable and allowed me to approach within five or six feet of them before moving off to another branch of the saplings in which they were feeding.

LOUIS S. KOHLER.

Correspondence

MADISON, WIS., April 30, 1913.

DEAR FRIEND:—If you are interested in birds and desire to have your name included on our mailing list for future circular letters concerning the conservation of birds or appeals for advice with regard to same, will you kindly drop me a card?

1. Thanks to the coöperation of Professor I. N. Mitchell's observers as listed in the 1912 Arbor and Bird Day Annual, the Wisconsin Conservation Commission, Doctor T. S. Palmer, et al. of the U. S. Biological Survey, obtained January 9, 1913, President Taft's signature to an Executive Order creating Gravel Island Reservation, Wis. This includes Gravel and Spider Islands. An officer of the National Association of Audubon Societies anticipated us by getting an Executive Order, February 21, 1912, to create the Green Bay Reserve, otherwise known as Hog Island. About fourteen acres of unsurveyed islands are now permanent Federal reserves, breeding gulls and terns. Wisconsin still lacks state reservations. $150 will buy a gull rookery, Gull Island, edge of the Apostle Islands, Lake Superior, and $2000 will buy North Strawberry Island, opposite the state park in Door County. Who can help?

2. What other colonial birds are worthy of state protection? Where? Who owns land? The Biological Survey asks where black terns breed, but no information as to owner of such lands is at hand. What further legislation for Wisconsin? Are you ready for the question to remove all shore birds (*Limicolæ*) and hen-like birds (*Phasianidæ*), at least the Bob-white and Prairie Hen, to the non-game list because of greater value to agricultural interests. Bills for wild game propagation or conservation are faring poorly at the legislature for lack of popular interest. If you don't want such bills, what seems to you better? The Biological Survey did work in Wisconsin last year so that in future more local information should be had. The Agricultural Appropriation Bill at Washington passed both Houses of Congress the month past and with it the migratory bird bill attached as a rider, now a law since March 9. Get a free copy through the U. S. Biol. Surv. This law means stopping of the southern slaughter of robins and smaller birds, we sincerely hope. It will probably prevent spring shooting in all states, although I have no authority for saying so.

3. Wisconsin was first to prohibit shooting for millinery (1887), among the first three to have salaried wardens (1887), of the first seven to prohibit spring shooting (1887), of the first eight to adopt the model law for protecting non-game birds (1901), of the first

eight to prohibit the sale of protected game (1903), fifteenth to obtain A Federal Bird Reserve (1912), although over fifty such reservations had been already created elsewhere in the United States, and though first in idea, yet of the first three to have a scientific summer school for game wardens (1912).

4. Wisconsin boasts the first thorough student of economic ornithology in the United States, the late F. H. King, Professor of Soils, Wisconsin University. The good work of Prof. S. A. Forbes of Illinois, began a year or two later than 1873, though published (1876) before King's work was out (1883), entombed in the state's four-volume work on "The Geology of Wisconsin."

5. Wisconsin's first close season for Prairie Chicken was in 1851. Since then, game laws have grown stricter, the non-game birds being removed from all molestation at all times, save by scientific permit. The quail should become a farm bird, since he eats about five pounds of insect pests and 9.75 pounds of weed seeds per year, a work valued from $10 to $20 a year per bird. Wisconsin's quail was being shot for game when it was most needed to help save the wheat crop from entire collapse in the chinch bug epidemic of the early seventies. A single quail has eaten 5000 chinch bugs at a meal.

6. The estimated annual insect loss for Wisconsin runs between $13,000,000 and $40,000,000. With this, link the value of birds and insectiverous mammals slaughtered in Wisconsin in 1912, $1,000,000. This figure decreases as the former increases. Already, our bird population is at least 20% less than it was.

I shall understad that no answer in the course of eight weeks will mean that you have no immediate suggestion.

A statement from me as to the possible moves that might be made in the progress of bird conservation, you will find in the newly issued Arbor and Bird Day Annual for 1913, obtained through the office of the State Superintendent of Schools.

Yours sincerely,

A. C. BURRILL,
Lecturer on Economic Relation of Birds.

Publications Reviewed

The Canadian Alpine Journal, Special Number, 1912. Published by The Alpine Club of Canada. Price one dollar.

This Journal takes the form of a report upon the Mammals, Reptiles and Batrachians, Birds, and Plants of The Alpine Club Expedition to the Mount Robson Region. The first four pages are devoted to the itinerary, a discussion of the life zones, and acknowledgements. Then follows the annotated list of species of Mammals covering about 38 pages, Reptiles and Batrachians, two pages; Birds, 28 pages; and Plants, 21 pages. The report upon the Birds is made by J. H. Riley, of the U. S. Smithsonian Institution. Seventy-seven species are here given. The Journal contains numerous excellent half-tones of specimens as well as scenery, and closes with a colored topographical map of the region under discussion. L. J.

Second Report of the Meriden (N. H.) Bird Club. 1912. With brief reports from other New Hampshire Clubs.

This report contains 17 half-tone figures and two maps, one of the Bird Sanctuary, known as the Allen Woodruff Smith Bird Sanctuary. It is a valuable treatise on the protection and care of birds, and should be in the hands of every one interested in bird protection. L. J.

The Practical Value of Birds. By Junius Henderson. University of Colorado Bulletin. Vol. XIII, No. 4. Boulder, Colo., April, 1913. 48 pp.

There is condensed in these 48 pages a wealth of material arranged in handy form. Judge Henderson will receive the hearty thanks of the large army of people who want to present facts in their arguments for the conservation of our birds. L. J.

Distribution and Migration of North American Herons and their Allies. By Wells W. Cooke, Assistant, Biological Survey. 1913.

The Flamingo and all of the Herodiones are treated in this Bulletin. The treatment of each species is accompanied with a map of America, and in each case the breeding range as well as the area in which the species occurs at any time is indicated. It would be impossible to speak too highly of the value of such maps of distribution. They show at a glance the exact status of the species without wading through a thicket of verbiage with the necessity of hunting up a general map in order to follow the description at all. L. J.

Fifty Common Birds of Farm and Orchard. Prepared in the Bureau of Biological Survey, Henry W. Henshaw, Chief. Farmers' Bulletin 513. 1913.

The fifty figures are from the pen of Louis Agassiz Fuertes, and all are colored. The mechanical work is for the most part good. This pamphlet is intended as a handy guide in the hands of the farmers, and besides the colored pictures contains much valuable information concerning the birds treated. L. J.

Birds of the Thomas County Forest Reserve. By John T. Zimmer, Nebraska Ornithologists' Union, Proceedings. April 14, 1913. Vol. V, Part 5.

This amounts to an ecological survey of the region of this Forest Reserve, as far as the birds are concerned. The two life zones treated are the sandhills of the Upper Sonora and the prairies of the Carolinian. Each zone is treated topically according to the character of the country, and the birds grouped under the several heads. Thus the birds are not treated according to their taxonomic relationships, but according to their habitat distribution. L. J.

A Revision of the Genus Chaemepelia. By W. E. Clyde Todd. Reprinted from the Annals of the Carnegie Museum, Vol. VIII, Nos. 3-4, 1913. Pp. 507-603.

This is a technical paper relating to the Ground Doves. A new genus, Eupelia, is here separated off from the one under discussion, and three new subspecies are described. The paper occupies almost a hundred pages and appears to be a thorough revision of this group of Ground Dove. L. J.

Cassinia. A Bird Annual. Proceedings of the Delaware Valley Ornithological Club of Philadelphia, 1912. Issued February, 1913.

The appearance of this annual upon our desk is always an inspiration. It is not merely the value of its contents, but the spirit of optimism which emanates from it. With an environment of an old settled country and a dense population, one who is favored by living in an open country might well question whether thre was anything in an open country might well question whether there was yet here is a thriving bird club, with a big city at it its center, and it is putting out every year the results of work of the first order. Long may it thrive and continue its work. L. J.

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The whole series (available numbers) $1.00.

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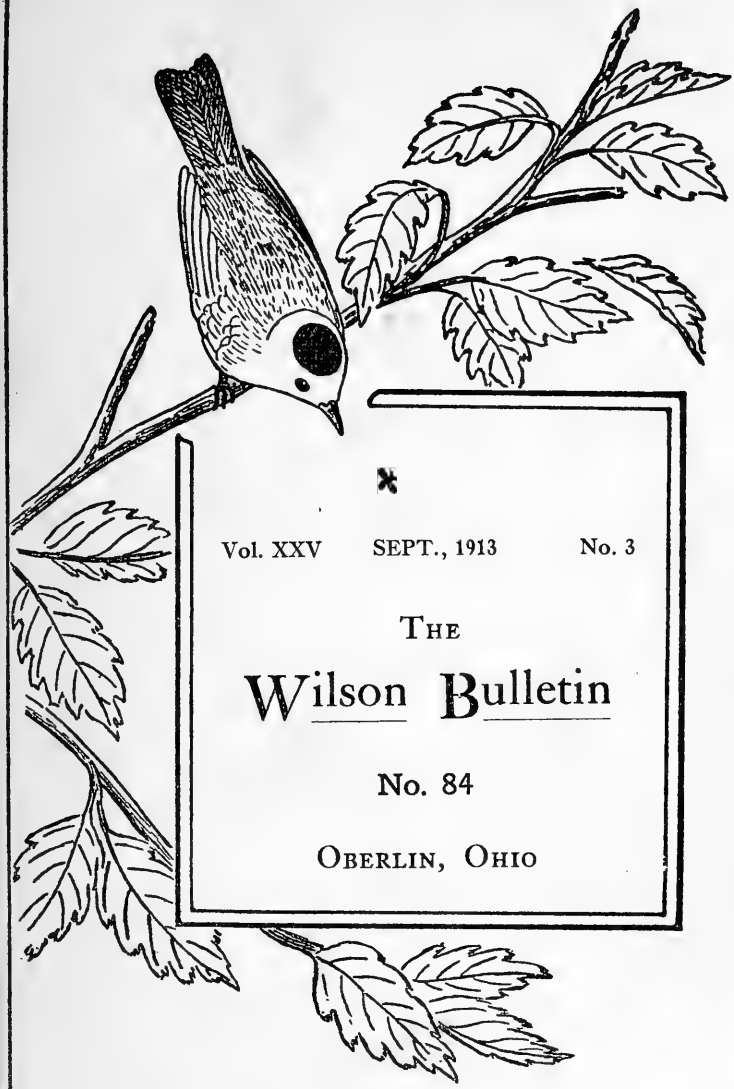
The other numbers consist of "General Notes." Price 15 cents and 30 cents each. The whole available New Series for $15.50.

Address all communications to

LYNDS JONES, Oberlin, Ohio



Vol. XXV SEPT., 1913 No. 3

The Wilson Bulletin

No. 84

Oberlin, Ohio

WILSON ORNITHOLOGICAL CLUB

CONTENTS

THE WILSON BULLETIN

is mailed on the fifteenth of March, June, September and December, by the Wilson Ornithological Club at Oberlin, Ohio, edited by Lynds Jones.

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Subscriptions may be addressed to the editor, or to Mr. W. F. Henninger, New Bremen, Ohio.

Advertisements should be addressed to THE WILSON BULLETIN, Oberlin, Ohio. Terms will be made known upon application.

All articles and communications intended for publication, and all publications and books for review, should be addressed to Lynds Jones, Oberlin, Ohio.

Articles of general interest relating to bird life are solicited. They should be in the hands of the editor not later than the fifteenth of the month preceding publication.

Entered as second-class mail matter at the Postoffice at Oberlin, Ohio

Adult Glossy Ibis (*Plegadis autumnalis*) and four young on nest.
The reward of 22 days' continuous waiting.
(Photo by Oscar C. Baynard.)

CORRECTION

Lines of explanation under half tones which face pages 124 and 126 of this issue of the Bulletin are transposed.

THE WILSON BULLETIN

NO. 84.

A QUARTERLY JOURNAL OF ORNITHOLOGY

VOL. XXV SEPTEMBER, 1913. NO. 3

OLD SERIES VOL. XXV. NEW SERIES VOL XX

HOME LIFE OF THE GLOSSY IBIS (*Plegadis autumnolis Linn.*).

BY OSCAR E. BAYNARD.

Early in May of 1909 was the first time that I ever saw a Glossy Ibis alive. Mere words cannot begin to describe the feelings I experienced as I saw this beautiful graceful bird spring up from her nest fifteen feet up in a willow tree and take wing, the bright sun glistening on her beautiful irridescent plumage was a sight that I will always remember with joy. Examination showed that she was incubating three beautiful dull greenish-blue colored eggs. These I collected. On arriving home I immediately got out all my bird books and began reading up on this bird. As everyone is aware this was not much of a job because information on either of the Glossy Ibises is conspicious by its meagerness. A few days later I visited the island again and found another nest of this bird with the old one dying on her nest. I took her home along with this set and made a good skin of her. I then decided I had collected a specimen of the White Faced Glossy Ibis instead of the Glossy Ibis, due to the white skin at the base of the bill, this I will explain more fully later.

In studying up what has been written of the Glossy Ibis I find that this species remained unknown in the United States until 1817 when a specimen was taken in New Jersey and

announced and described by Mr. Ord. Since then it has been found at irregular intervals along the coast. The A. O. U. Check List gives its range as, "Tropical and subtropical regions, mainly of Eastern Hemisphere. Rare and local in Southeastern United States from Louisiana to Florida, and in the West Indies; casual north to Missouri, Wisconsin, Michigan, Ontario and Nova Scotia." This very, very rare bird is most abundant in Florida, but abundant is hardly the word to describe it as nine pairs in 1912 bred in a protected rookery that I was guarding and this is a greater number than I can learn of anyone knowing of at any other place and time.

Glossy Ibis bred on Orange Lake for four years of the five since I first saw it there, this year they did not nest there for some cause. I have seen Glossy Ibis once in 1912 in the month of November on the flats of the Miakka River and on two occasions on the Canal that is the extension of the Caloosahatchee River leading into Lake Okeechobee. I have heard of it being seen by a hunter and trapper on the Kissimmee River, but it must be considered very rare in Florida. I have talked with scores of hunters and trappers, men who are observant and know their birds well and but two have described the "Black Curlew" to me, and neither of them saw it in the nesting season, so no doubt the only nesting records for Florida are from Alachua County where for four years I have found them nesting on Orange Lake. For the four years previous to 1909 I know it did not nest on Orange Lake as I spent too much time there to miss seeing it. It must have bred there formerly though, as I understand a set was taken in that section about a dozen or more years ago by a gentleman who was staying in Micanopy.

At this point a technical description might not be amiss. General color rich dark purplish-chestnut, opaque, changing on head, back, wings (excepting lesser coverts), and tail, to glossy dark purplish-green; sides and lining of wings and crissum dusky greenish; primaries greenish black. Bill blackish; legs brownish-black; iris brown; bare skin of head dark slate, with exception of being pure white where the feathers join the skin for the full length across the front of the head

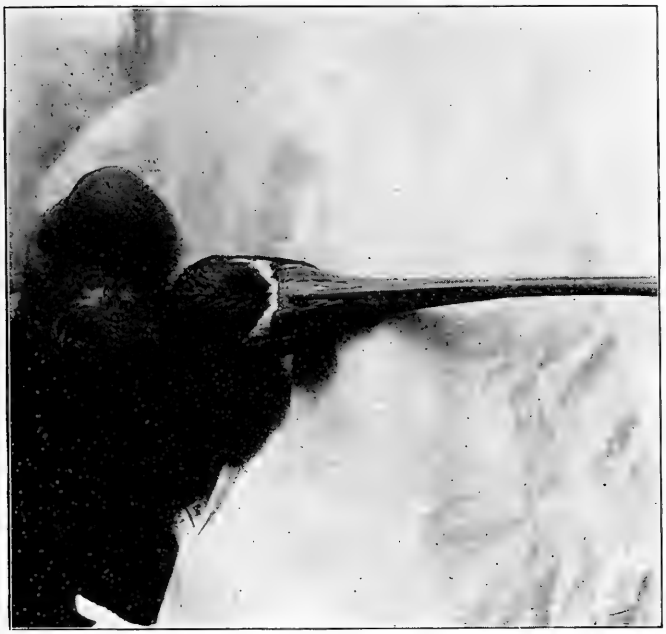
Glossy Ibis (*Plegadis autumnalis*), nest and eggs in situ.

extending down to the upper corner of the eye, where the feathers come all the way down to the corner of the eye for a space of about one quarter of an inch, starting at the lower corner of the eye the white streak extends down to the lower side of the lower mandible. The band of white is broadest across the top of the head, being over three-sixteenths of an inch wide, while the strip below the eye is barely an eighth of an inch wide. In an adult bird in the breeding season this skin is pure white and in the one mounted specimen I have it stayed nearly full color for over seven months and had not faded out over one quarter of its color when fresh. How long this would have retained any whitish color is not known as I had the part colored on the mounted bird just as it appeared in the fresh skin. A good idea of this white space at the base of the feathers can be seen from the two accompanying photographs which were taken of the bird's head about two hours after being captured. I can find no record of anyone describing this feature of the Glossy Ibis, with the exception of Audubon who mentions about the skin being purplish white in fresh specimens. The age of the bird has a lot to do with the amount of white skin. An old bird will be conspicious at a distance of one hundred feet while a bird a year old will appear not to have any white at all until within a distance of fifteen feet or less. Whether this white appears only in the breeding season or not I am unable to tell, am inclined to believe that it is present only during the breeding season, but like the White Ibis, which has the carmine bill and feet and legs only in the breeding season. For a year after securing my first specimen I was under the impression that I had the White Faced Glossy Ibis, not ever having particularly observed any specimens of that species. R. D. Hoyt of Seven Oaks, Florida, put me right on this point, however, and explained that the White Faced Glossy Ibis had white feathers around the base of the bill, while the Glossy did not.

The following observations were made during a period of eight weeks, during which time I had two pairs of these birds under daily surveillance. In looking for a suitable place to

put up my photographic blind I stumbled onto these two pairs just beginning to build their nests, the second for the season as all of the first built nests had been abandoned after being looted by the Fish Crows which swarmed in the rookery. While set up on a nest of the "Long Whites" (American Egret) I had a good opportunity to watch the actions of these two pair of birds. They evidently worked faster than they did on their first nests as time was flying and it behooved them to get the nest built before it became time for them to "hike" to other feeding grounds.

Both parent birds aided in the construction of the nest and I could not see that one bird did any more of the work than the other. I did note, however, that in one case the female selected the site and in the other the male did the selecting. Both nests were built at a height of about ten feet in thick elder bushes, and about three feet from the tops of the bushes, as plainly shows in the accompanying photographs. The nests were ready for eggs at the end of the second day, although the nests were not finished by any means. Glossy Ibis have the same characteristics as the White Ibis in that they continue to add to their nest even up to the time that the young are able to leave it, so that by the time the eggs are ready to hatch the nest will be almost double the size that it was when the first egg was laid. An egg was laid each day until one nest contained four and the other three. Incubation did not start until after the last egg had been laid a full day. After the first egg was laid, however, the nest was never without one or the other of the pair close by, something that was very necessary in this Rookery on account of the thieving Fish Crows. During the period of incubation, which lasted in each case exactly twenty-one days, I noticed that the female did most of the incubating; the male, however, put in about six hours out of the twenty-four covering the eggs. The female sat all night and until about 8:30 or 9:00 a. m. when the male came in from his morning hunt for food; on his approach to the nest he would give his call when about fifty feet away and his mate would immediately answer and spring up from the nest and



Glossy Ibis head showing the forehead marking.

pass him in the air sometimes twenty-five feet from the nest. The male would always fly directly to the highest twig above the nest and after about five minutes of careful preening his feathers he would give three or four calls in a medium tone and spring down to the nest, stand a few minutes examining the eggs and then go stalking through the bushes until he found a twig that suited him, break it off with his bill and take it back to the nest and after placing it on top settle down to a three hour job of incubating, getting off the nest, however, usually once during that time and getting another twig to add to the nest. The female would return and give her bleating note about fifty feet from the nest when the male would stand up and wait for her to alight in the bush over the nest, then would ensue about fifteen minutes of as neat courting and billing and cooing as one will ever see being done by a pair of doves. This loving disposition towards each other seems to be characteristic of the Glossy Ibis as every pair that I have observed have done it. The White Ibis will occasionally do it but not for any such length of time as the Glossy. They will stand erect and seem to rub their bill against the other one, all the time making cooing (gutteral, I must admit) notes of endearment, they will preen each others feathers and act just like a couple of young humans on their honeymoon; these loving scenes continued until the young were able to fly, never seeming to diminish at all. This trait I certainly admire and while it is known to exist in birds that mate for life, is seldom seen in birds that are *supposed* to mate only for a season.

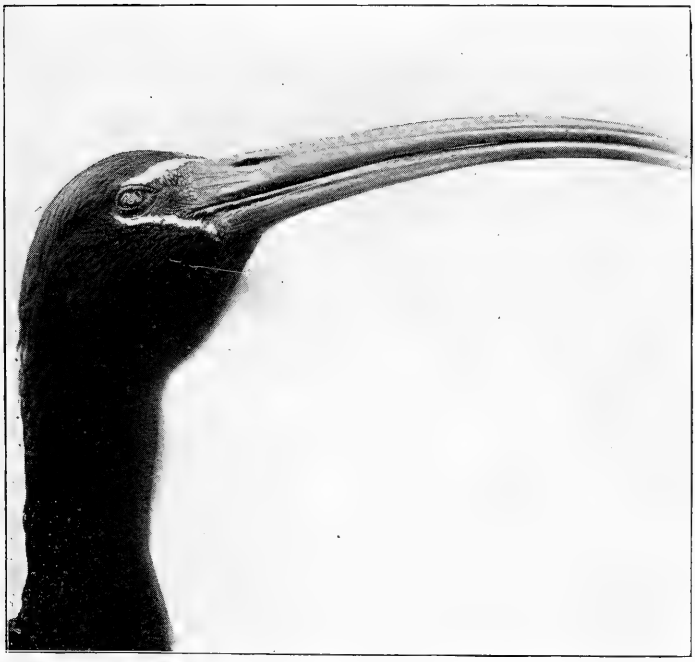
After the pair that laid only three eggs had been sitting five days the female laid her fourth egg. This seemed to me to be very unusual. After this episode I decided to devote all my time to this pair and moved my blind to a point of vantage at a distance of about ten feet. I still had the other nest in view but not in a position where it could be conveniently photographed, so all these photographs were taken from the pair that had originally had three eggs.

After twenty-one days had elapsed three of the eggs hatched. The same routine was carried on, however, as when

they were incubating; the female doing most of the covering, but both birds doing the feeding of the young. Until the young were five days old one bird always stayed at the nest and it was at this period that the last egg laid hatched. I hardly expected it to hatch. This last hatched bird was considerably smaller than the three others were at time of hatching and always seemed to me more or less dwarfed until about time for them to leave the nest, when there was little difference to be seen in the size, but lots of difference in their activity, the last hatched one being the most active of the entire lot.

One thing I noticed about the downy young and that was that they were entirely black, with the exception of the top of the head, which was a bright orange color crossed with a band of black about midway of the orange patch. The bill of all the young was bone colored and crossed by a band of almost black about half way the length. This shows up very well in cut No. 7 and No. 8. They carried these colors, both on the top of the head and on the bills, until the time they could fly and left the nest. Two of the young in each nest had a white patch on their throats about three inches from the head. This shows up nicely in cut No. 7 also. These patches were plainly visible when they could fly. Whether this was a mark of the sexes I am unable to say, but believe it to be.

The disposition of the young at all times in both nests was fine. All were very active and restless after a week old, and at the age of two weeks would not stay in the nest at all but stray out to the ends of the limbs of the bushes in which the nest was placed, returning, however, to the nest to be fed, as I never observed on any occasion the old one feeding the young any place but on the nest. In this they differ from the White Ibis as they will feed the young wherever they find them and seem to let the youngsters tyrannize over them. On several occasions I noticed one or the other of the young when at the age of about three weeks try to make his parents come to him to feed him, but it never worked, as the old one would pay not the slightest attention to him, and when it looked as though the parent was through feeding and about ready to



Glossy Ibis. To show the marking of the head.

go away the youngster would give in and come climbing down to the nest, where the old would treat him just as if he had been there all the time. I never noticed any of the young fighting among themselves like the Herons will sometimes do, but at all times they acted like well behaved children, the only exceptions being that the three older birds would often take turns in trying to apparently swallow the last hatched baby. He was sure a hardy scamp or he would never have lived through the treatment he had to undergo.

Right here is the time to record the feeding habits of the Glossy Ibis. They feed like the White Ibis, principally on crayfish, cut worms, grasshoppers and other insects, and young moccasins. When the young are over three weeks old over half the food of these Glossy Ibis would be moccasins. I kept a record of the food by making the young disgorge after the old ones had fed them. This itemized record will appear further along. The manner of the Glossy Ibis in feeding is to regurgigate the food up in the throat or mouth and for the young to put his bill, and many times head, down the old one's throat and take his portion. After one bird has been fed the second and third will get their turns, never longer than three minutes apart and usually immediately. I have seen the three young get two portions each in about seven minutes. Quick work this. They would each get four to five portions at each visit of the parent; when young, however, they would get as high as seven and eight turns. They would, of course, at this tender age, be unable to take on a very large quantity, and it would also be in a finer state of digestion, as many times I have seen the parent return from feeding and stand around and caress the young and not offer to feed until an hour had elapsed. This no doubt was to allow the food to digest to a point where the young would be able to eat it. But after the young had reached the age of two weeks and more this was never necessary, as they could at that age take anything from a portion of a half grown moccasin to a grown crayfish. At this age of the young the meal, if a moccasin, would be disgorged into the nest, and being half digested, be

pulled into small enough portions to be capable of being swallowed by the young, who would take this up from the nest themselves. In no other instances did I ever see them pick up any food themselves until after they were quite large, when they would re-eat the disgorged food that I had made them "cough up." In every case, however, the old bird fed from her throat, with the exception of the moccasins.

The old birds showed a great deal of intelligence in the feeding of the last hatched chick. They would feed the oldest three in every case three or four portions before they would ever notice the baby. This was no doubt due to the fact that it was unable to assimilate the food in as coarse a stage of digestion as its older brethren and apparently the parents knew this, because when they started to feed the baby they would give him as many meals as he cared to take and would never offer to give the older ones any more until another visit from the feeding grounds. As the young grew it necessitated many visits to the marshes for food because they were a hungry bunch all the time. I spent usually eight to ten hours a day in the blind photographing and making notes and no day during the four weeks after the young hatched did the parents make less than six trips each with food for the young and they made on some days as high as eleven trips each, the last ones being late, sometimes after dark. These last trips, however, were usually for their own food, as only on three occasions did I ever see the old ones offer to feed the youngsters when returning late.

Like the White Ibis there are six stages in the life of the young Glossy Ibis.

First stage, which is usually the first week, they are downy and very sluggish, sleeping most of the time.

Second stage, usually the whole of the second week they are beginning to feather out and are very alert, beginning towards the last of the week to show fear of man.

Third stage, during the third week, and with the Glossy, the fourth week is spent in traveling about among the bushes, returning to the nest to be fed. The White Ibis, during the

Glossy Ibis building.

Glossy Ibis shielding young from sun.

fourth stage, lives on the ground during the daytime, running around by the thousands like rabbits. It is during this period that the old White Ibis have the hardest time of their lives in hunting up their own offspring. The Glossy I never found on the ground except when they had sprung there in fright at my approach.

Fifth stage is spent among the tree tops away from the nest, venturing sometimes as much as fifty feet, returning, however, to be fed as related before.

Sixth stage, which is usually the latter part of the sixth week, is when they begin to fly, making short excursions at first, returning to the nest when the old one returns and calls to them. After the end of the sixth week the young spend all their time flying down to the edge of the island and wading and feeding in the shallow water, returning, however, at night to roost on the old nest. The old ones, at this stage, will feed them wherever they can find them, and after the young are about seven weeks old they will leave with the parents to their feeding grounds and stay with them, returning at night to roost. At about this time all the Ibis of both species are usually able to fly and it is not long then when some day they all leave as suddenly and mysteriously as they came in. They have probably pretty well cleaned up the hunting grounds of all the crayfish, etc., and move of necessity rather than choice. It is at this period that they are found in the northern states. At what time they return south I am unable to state.

The disposition of the old Glossy Ibis towards the other Ibis and Herons is not good. I will have to admit that the Glossy is pugnacious towards them, and one will never find an occupied nest of any other species as near as ten feet to a Glossy nest when they have reached the point where it is about time for the young to hatch. They will run off Ibis and Herons regardless of size and all the other birds seem to recognize their superiority and leave. Then happens a peculiar thing. The Fish Crows will, of course get the deserted eggs at once and then the Glossy Ibis will begin di-

mantling these old nests, pulling them apart and dropping the sticks down on the ground, or in the water, whichever happens to be underneath, saving any sticks that appeal to them and taking them back to their own nest. I noticed that it took six days for this pair to dismantle fourteen White Ibis nests and three little Blue Heron nests that they had made leave. The worst of it was that one of the White Ibis had baby young in and when they died the Glossies threw them out of the nest. It is barely possible, however, that the pair of White Ibis that had used this nest were killed on their feeding grounds and failed to return, as this is the only instance where I ever noted the Glossy dismantling a nest occupied by young.

The notes of the Glossy Ibis are very hard to explain so that any one would have the least idea how they sounded. The note of the White Ibis is three grunting notes, sometimes uttered distinct, but more often sounding like a continuous note. The Glossy starts off exactly like the White Ibis with a grunting sound and then uttering four distinct notes resembling, what to my mind best explains them, the bleating of a young calf or sheep. The Ibis sounds as though there was something in the throat that gives a gutteral sound. I became quite expert in imitating them, so much so that I could many times fool the young, but as for writing it, that is beyond me. This note is usually used in all cases when they approach the nest and when they are leaving and just as they take wing. They have another series of notes they use when caressing each other and when caressing the young and the female has a very soft note, sort of cooing, that she uses when feeding the young when they are only a few days old. The young themselves never appear to make any notes except when trying to avoid a person, when they utter a squawking note of fear. The two nests in question were placed quite close to each other and as the young arrived at the age of two weeks and more they could always recognize their parents' notes even before I could distinguish them. I always knew which old birds were approaching by the actions of the young birds

Glossy Ibis feeding young.

in the nest. They never in all the time I observed them made a mistake and put on the alert and expectant look for the parents of the other nest. I could not distinguish any material difference in the notes of the four adult birds, with the possible exception of the female of the nest photographed; she appeared to have a coarser tone to her calls.

Glossy Ibis appear to have less enemies than any other of the birds in the Rookeries. Fish Crows appear to be the only thing that bothers them and they in nearly every case secured the first sets. Man, of course, is their next enemy, as is usually the case with any species, but here in this Rookery they were not molested by man at all.

I would say that the first sets of eggs are deposited the latter part of April and the second sets usually about the middle to last of May, and practically all I noted laid their second sets and successfully reared their young. In the four years I have studied them I have found twenty-six nests in which young were successfully reared. The first year there were two nests, the second year six, and the next two years there were nine each. This year, 1913, I observed three pairs about the Rookeries, but as the White Ibis did not nest on the lake this year the Glossy Ibis did not either, there being in all probability a lack of the proper amount of food to accommodate the great army of Ibis. It is to be hoped that they will stick with the White Ibis and return in a few years again with them, as the White Ibis will return as soon as the food supply becomes sufficient again.

In the twenty-six nests my records show that there were raised four young in fourteen of them and in eight nests three young were reared and in the remaining four nests only two young were raised, these last two nests probably being raided by Fish Crows. I should say that half of the full sets of this species would be four eggs and the other half three eggs. In contrast to this set of the White Ibis in ninety-nine per cent of the sets will be three eggs. The eggs are dull greenish blue, Prussian Blue being the color that best describes them.

The amount of food consumed by these birds is immense,

almost beyond belief, and from the nature of the food collected showed that they had to be alert and capable of doing all kinds of hunting. From the following list it will be readily seen what great good these birds do to any section they decide to nest in.

An itemized summary of the food of the Glossy Ibis. First six days of the life of the young in the nests I did not investigate their food because of its being so nearly digested by the parent bird that it would be almost impossible to determine the number of any one kind of food. In the following list the first six days' record is of the three oldest nestlings, and commencing with the 12th day is a record of all four youngsters, and of two full meals of each, one in the morning and one in the evening, with the exception of the last three days, when I took a meal each in the morning and two in the evening. In this way I did not cause the youngsters much inconvenience as they soon became used to me and did not in the least object to being handled, and toward the end they would immediately eat the disgorged food if I put it back in the nest for them, which I usually did when the meals were in a state of digestion that did not necessitate my taking them back to camp to analyze.

Age days	Cut Worms	Grasshoppers	Crayfish	Snakes	No. of Meals
7	28	24	47	2	6
8	33	17	19	5	6
9	67	11	28	2	6
10	27	28	42	3	6
11	36	23	61	1	6
12	56	48	96	6	8
13	78	12	77	3	8
14	67	29	32	3	8
15	18	101	98	4	8
16	2	132	87	3	8
17		169	81	4	8
18		158	39	3	8
	412	752	707	39	86

Glossy Ibis feeding young. Shows the orange patch on head of young.

Bro't forward.	412	752	707	39	86
Age days	Cut Worms	Grasshoppers	Crayfish	Snakes	No. of Meals
19		162	71	1	8
20		172	81	5	8
21		160	72	3	8
22		193	37	7	8
23		208	30	6	8
24		47	96	9	8
25		23	77	8	8
26		108	23	10	8
29		13	29	18	12
27		76	93	9	8
28		16	38	17	12
29		13	29	18	12
30		34	37	15	12
	412	1964	1391	147	194

Total of 3914 vermin in 194 meals, or an average of 20 to each meal. As the young would average seven meals apiece each day this would mean twenty-eight meals, and twenty vermin to the meal would make 560 vermin for a day's feed for the young alone. The parents fed these young for about fifty days, making the total of vermin destroyed by this one nest of birds about 28,000, and this is saying nothing of what the old birds ate, which would be at least half of what the youngsters devoured, making a total of 42,000 vermin eaten while rearing one nest of young. When we stop to think that there were about nine thousand pairs of Ibis, including both the White and Glossy on this lake in 1912 that successfully reared nests of young, one can hardly conceive of the many millions of noxious insects and vermin of all kinds destroyed. The vast amount of good to any section of the country where this vast army of Ibis nests can hardly be reckoned in dollars. The cut worms and grasshoppers we all know what great damage to growing crops they do; the crayfish destroys the spawn of fish, which in turn live off the eggs and young mosquitos. The deduction is self-evident to anyone

when we consider the vast amount of territory in Florida that is covered with water. The crayfish also destroy levees on the rivers and cause the destruction of millions of dollars damage to growing crops.

Snakes, especially the moccasins, which by the way comprised 95 per cent of the snakes captured by the Ibis, do lots of harm. Moccasins in Rookeries destroy thousands of eggs and young birds, and even if they didn't they are so deadly poisonous that anything that helps to keep them down to reasonable numbers is welcome.

My observations show the Ibis with a clear record of doing 100 per cent of good, not a bad thing can be laid to his door, this fact in conjunction with its beauty makes it a bird that should be given the very strictest protection by all persons. Alas, though, the Ibis, or "Curlew," as it is called here in the South, is considered good eating and thousands of them annually fall victims to the guns of negroes, and the whites also who prize them highly as an article of diet in the summer. However, I never yet found a nest of young of the Glossy Ibis that had had the parents killed, although I have seen hundreds of nests of White Ibis that were left to starve for the reason of the fact that the old were killed on their feeding grounds. This is due to the fact that the Glossy Ibis is more alert and more suspicious than the White Ibis, and naturally harder to approach.

I trust this digression from the Glossy Ibis to the White Ibis will be pardoned because of the fact that the food habits of the two Ibises is so nearly alike that I feel that it is perfectly justifiable in noting the facts in the case.

I don't much blame the Glossy Ibis for putting on airs and being exclusive, as he is a handsome bird — none prettier as he stands proudly on his nest on his return from his breakfast with the early rising sun glistening on his damp, beautiful and irridescent plumage. It is a sight that few have seen, but one that would do any man's heart good to see. I waited twenty-two days to get the frontispiece picture, which is the

Young Glossy Ibis. To show the white patch on the throat.

adult pair and four young at the nest. I had plenty of opportunities of catching one at the nest with the young, as is shown in some of the other cuts, and on several occasions both adults were together above the nest in the top of the bushes, but were out of camera range on account of tree tops. I waited, though, as I felt that I would finally get it if I could stick it out, and the cut is evidence that anything will come to the fellow that will wait, if he will only wait long enough. This picture is one I prize very highly, of course, not only as a monument to my patience, but as showing the whole family of a bird that is practically unknown in life to any of our ornithologists, and one that has never been photographed before. I shall always remember the morning that I took it. I had shot off eleven of my plates and saved the twelfth, the last, for this picture, as I had been doing daily for twenty-one days. The female had been longer than usual in returning to feed and the young had become very restless and impatient when she at last arrived. She had just given them one round apiece, when with a gutteral grunt and usual call the male lit down into the nest beside the female. She immediately stopped feeding the young, and putting her bill up to his rubbed them together and made the cooing noise that I never heard except at such times. Waiting to get them broadside on so as to show up well I shot he shutter and the deed was done and at that moment I would not have traded that plate, as yet undeveloped, for a pass to Paradise. How I wish I were an artist so that I could paint that scene at the nest that morning — the dark green background, spotted thickly with elder blooms and the beautiful pair of Glossy Ibis with the bright sun scintillating on their beautiful irridescent plumage — it is a picture worthy the admiration of the gods. Well, I have seen what possibly no other ornithologist has seen, and am content.

THE OLIVE-BACKED THRUSH (*Hylocichla ustulata swainsoni*) AT HIS SUMMER HOME.

BY CORDELIA J. STANWOOD.

A more or less irregular line of woodland — evergreen, hardwood, mixed growth — stretches from Trenton, Maine, on Frenchmans Bay, opposite Bar Harbor, along the Union River, almost to the post office in the city of Ellsworth. When the Thrushes appear in the spring, they come from the direction of the river, through the cool, damp, mossy aisles of these woodlands. As the time draws near for the coming of the Thrushes, I take the overgrown footways that mark old woodroads, walk toward the river, and listen with bated breath for the first notes of the Thrushes — the Hermit, the Veery, the Olive-backed.[1]

The Hermit (*Hylocichla guttata pallasi*) the first to arrive, usually announces his presence by an early morning hymn. He comes about the middle of April, when the ground is still slightly frozen at sunrise, when a thin coat of ice silvers every pool, when a white frost glistens on each sere field, and the city of Ellsworth slumbers in a thick, white mist, from which the steeples and roofs just emerge. Sometimes he is overtaken, several days after his arrival, by one of those cruel sleet and hail storms that coats everything in ice, and makes life very hard for our tired, hungry migrant. The Hermit is with us about a month before our other two resident Thrushes, the Veery and the Olive-backed, appear. One year the Olive-backed calls before the Veery, the following year the order of their coming may be reversed. May 8 (1913), very early in the morning, I heard two or more Veeries in excellent voice. My earliest record for the call note of the Olive-backed Thrush is May 15 (1911).

Although at the time of the arrival of these latter birds, the foliage is beginning to appear on the trees, the catkins of some of the alders, willows, and birches are in full bloom,

[1] The Hermit Thrush at Home. By Cordelia J. Stanwood. Nature and Culture, May, 1913.

Nest of Olive-backed Thrush (*Hylocichla ustulata swainsoni*) in its environment.

and the hobble bush, wild pear, and arbutus cast upon the gentle breezes, the delicate, sweet odors that go to make up the bewitching, elusive essence of a spring day, even yet the ground is sometimes frozen in the morning, and there are occasional flurries of hail and snow, and heavy white frosts.

The Veery (*Hylocichla fuscescens fuscescens*) is but locally common, choosing the swales and adjoining thickets for his habitat, but wherever there is an estate with wooded grounds, or a farm with pastures and woodlands, here the Olive-backed Thrush and the Hermit erect their dwelling-places.

Summary of Facts.

1908—June 8, a nest completed; June 8, bird lining nest; June 9, bird incubating; June 19, nest completed; July 2, nest containing young ready to leave; July 3, bird incubating; July 8, nest containing young one day old; September 6, Olive-backed eating string cherries.

1909—May 31, Olive-backed calling; June 13, bird lining nest; June 15, nest containing one egg; July 4, bird lining nest; July 5, bird incubating three eggs; July 24, bird in full song.

1910—May 27, bird in song; July 5, nest of three young five days old; July 7, nest of three young seven days old; July 26, last heard in song; August 21, last seen.

1911—May 15, first heard calling; May 26, in song; July 8, last heard in song.

1912—May 19, bird calling; May 2, in song; June 9, bird building; June 10, bird incubating four eggs; July 26, last heard in song; September 7, Olive-backed calling.

1913—May 19, bird calling; May 26, bird in song; June 3, bird incubating; June 23, bird incubating; June 29, nest containing two eggs, later four; July 31, bird in song; October 1, last seen.

One season the Hermit Thrush is the more common; he builds in distant woods on the fringes of clearings and open spaces, or he may build in glades in the less frequented thick-

ets that skirt pastures, fields, and much traveled thoroughfares; the following season the Olive-backed is the more conspicuous in numbers, and locates his nest in the same spots, save that the Hermit constructs his nest under the tree, and the Olive-backed places his nest in the tree. At times the Olive-backed is so common in the vicinity of dwellings that I have heard his vigorous melody from the post office corner.

Though the Hermit and the Veery are more glorious songsters than the Olive-backed Thrush, I doubt if either of them can compete with the latter in intelligence and vigor. His call notes *whit! and whit-yer!* and his song are distinctive, but he has a way of slipping into the underbrush when disturbed, that renders it difficult to trace his notes to their source. For this reason the Olive-backed Thrush has been confused with nearly all the other Thrushes.

The spring of 1913 brought large numbers of Olive-backed Thrushes to our locality; they nested in the narrow strips of virgin growth just outside the hay fields, quite as commonly as in the far away woodlands. Sitting in an umbrella blind before the nests of two pairs of Olive-backed Thrushes, the stillness was broken every few moments by passing automobiles. While the young Thrushes are in the nest, the male bird sings nearly all the time. I could but wonder why they chose such noisy spots in which to give their kindergarten exercises, when a vast woodland stretched away before them.

The nest of the Olive-backed is a bulky, statant, increment structure, located in the tree much after the fashion of the Robin's nest. Its rough exterior gives it a greater appearance of size than it really possesses. Because the nests are so large and so conspicuously placed, very many of them are pillaged by Crows, squirrels and other wild animals, and the household cat destroys vast numbers of the immature birds. Most of the nests that have come under my observation, have been found anywhere from one to ten feet above the ground, in firs and spruces. One was constructed in a hemlock, and another in a gray birch.

The birds build their interesting domiciles the first of June

The Olive-backed Thrush hears a movement in the blind.
(Photo by Cordelia J. Stanwood.)

and again the first of July. Whether they raise two broods or not during the season, I have been unable to determine. A clutch consists of from three to four green-blue eggs, spotted all over with cinnamon-brown. The spots have a tendency to mass themselves around the larger end. The bird lays an egg each day before 10 o'clock in the morning, and begins to incubate by 12 o'clock of the day on which the clutch is completed. Although the eggs are hatched so irregularly, I have never seen the bird incubating before the clutch was completed. I found young in the nest in 1908 on the twelfth and thirteenth days, and in 1913 on the tenth, eleventh and twelfth days from the beginning of the incubation period. The nestlings mature sufficiently to leave the nest in from ten to twelve days.[1]

The summer of 1913 I found two nests of the Olive-backed Thrush on the borders of hay fields, not far from much-traveled High Street, the Bar Harbor road.

The first nest I moved fifteen feet into the sun, trimmed off the branches so as to get a strong light upon it, and spent nearly all my time at this nest in an effort to secure good photographs of the parent Olive-backed Thrushes and the young. I was careful not to expose the nestlings too long to the hot sun, and always tied fresh branches around the nest on leaving the blind.

The second nest I simply trimmed around so that I could observe the Thrushes clearly while feeding and caring for the little ones. This nest, also, I shielded with branches when not observing in the blind.

Since, so far as I know, there is no study of the nest life of the Olive-backed Thrush, a detailed account of my experiences at this nest may be of interest to my readers.

June 29, 1913, I came upon the nest of an Olive-backed Thrush containing two eggs. The nest was constructed in

[1] June 2, 1908, found new nest of Olive-backed Thrush.

June 3 to 6, four eggs; 12 M., bird incubating. June 18, two young Thrushes; natal down not dry at 11 A. M. 4 P. M., three birds in the nest. June 19, four birds.

the crotch of a gray birch, formed by the bole of a sapling and a rudimentary branch about three feet above the ground. The nest was surrounded by fir branches. Each day an egg was added to the set until there were four. The afternoon that the clutch was completed, when I approached the nest, the bird was quite oblivious of every duty save that of incubation. She seemed unaware of my presence. Until this time I did not see the bird around the nest, yet the eggs hatched, as before intimated, at very irregular intervals.

The eighth day of incubation I placed the blind in the neighborhood of the nest, that the birds might get accustomed to it. On the tenth day, when I went to observe at the blind, the female was off the nest; I peeped in, and to my astonishment, beheld two young birds on which the natal down was entirely dry. The next morning at 9:30 there were three nestlings in the nest, and at 5:00 p. m. the fourth egg was still unhatched. On the twelfth day of incubation, at 11:55 a. m., there was a fourth young Thrush in the nest on which the natal down was not entirely dry.

I have studied no other bird whose eggs were hatched so irregularly, save the Black-billed Cuckoo. The Cuckoo begins to incubate as soon as an egg is laid, and does not always lay on consecutive days.[1]

In the case of the Olive-backed Thrush, the fact that the young came from the egg at such long intervals, seemed to be a wise provision of nature. The mother bird brooded the young, except during the rest period, for the greater part of the time during the first three or four days. She moved back on the nest, stood astride the young, and cared for one fragile chick at a time; she pecked him and touched him with her beak until he gave the food reaction readily, fed him by re-

[1] July 11, 1908, I found the nest of a Black-billed Cuckoo containing two eggs. The bird was brooding. Two days later there was a third egg. As nearly as I could determine, the three eggs were hatched on two consecutive days. The two older birds left the nest at the beginning of the climbing period, and the parents, it would seem, devoted themselves to the mature nestlings. I found the youngest dead in the nest after a rain storm.

Olive-backed Thrushes coming with food for her young.
(Photo by Alfred A. Langewald, Jr.)

gurgitation, ate the excrement, burrowed under the young, ate the parasites in the nest and on the young. Sometimes she did this as often as once in four minutes. The male, from the beginning, called the female from the nest regularly for the rest period and fed the young both fresh and chrushed and macerated food. In such a well-ordered nest there was no opportunity for a nestling to starve to death.

To distinguish the birds in nest two, I tied a cord to the leg of each nestling, and named them No. 1, No. 2, No. 3 and No. 4, in order of their coming to the nest.[1] No. 1 and No. 2 I found at the same time. Those I numbered according to their weight — No. 1 was the heavier. I tied three cords to the leg of No. 3, but in some way they were all removed on the following day.

The rapidity with which the young mature is most remarkable. Three of the young measured at birth 1 and 11-16 inches, the fourth measured 1 and 9-16 inches, and the young weighed respectively, No. 1, 70 grains; No. 2, 60 grains; No. 3, 46 and 1-2 grains; and No. 4, 60 grains. No 2 was the most sleepy bird in the nest. No 1, at the end of the ninth day, was the lightest in weight and had the longest wings, 2 and 3-16 inches. On the tenth day I succeeded in weighing and measuring but No. 2 and No. 4. (This was the eighth birthday of No. 4.) No. 4 was by far the heaviest and most active bird in the nest, weighing nearly 480 grains. He was not so heavily feathered as the others, his wings were a half inch shorter than No. 2's and his length was one inch less than No. 2's. From birth No. 4 was the most vigorous of all the young. At his first weighing he stood supported on his belly, heels and wings, the latter spread wide apart, held up his head and gave the food reaction all the time he was out of the nest. He fully possessed the power of orientation. The increase in weight of this young bird was very marked. He very nearly multiplied his original weight by

[1] I borrowed this device for distinguishing the nestlings from "At the Sign of the Northern Flicker," by Althea R. Sherman. The Wilson Bulletin, Sept.-Dec. 1910.

eight in eight days. It was as if a baby that weighed ten pounds at birth increased his weight at the rate of twenty pounds on the second day, eighty pounds on the eighth day, and one hundred and sixty pounds on the sixteenth day. The gain in weight of No. 3 that weighed 46 and 1-2 grains in the beginning was even more remarkable. On the eighth day No. 3 weighed 420 and 1-2 grains.

Specific notes on the daily progress of the four young Olive-backed Thrushes.

July 11, the *beginning* of the first day in the nest. As before stated, on the tenth day of incubation, at 11:30 a. m. I found two limp young Thrushes lying prostrate in the nest. They had been out of the shell sufficiently long for the dark, burnt-umber, natal down, one-half inch long to dry. The birds, including their beaks, feet, and legs were a tint of burnt-orange. They rested on the belly, had a tendency to curl up in the form of an egg and roll until stopped by the legs and wings.

The *end* of the first day. The three oldest birds lay prone in the nest, vibrating as one. One gave the food reaction in the nest, but when removed from the nest, none gave the food reaction. Their beaks, feet and legs were a trifle yellower than the rest of the body.

The *end* of the second day. The three oldest birds bid not gave the food reaction out of the nest. The natal down on the fourth nestling at 11:55 a. m. was not entirely dry. When

Length of Body.	(ALL MEASUREMENTS IN INCHES.) Bird 1.	Bird 2.	Bird 3.	Bird 4.
July 11.....	1 and 11-16	1 and 11-16		
July 12.....	2	1 and 3-4	1 and 11-16	
July 13.....	2 and 3-16	2 and 1-8	1 and 7-8	1 and 9-16
July 14.....	2 and 9-16	2 and 11-16	2 and 1-16	1 and 13-16
July 15.....	2 and 13-16	2 and 14-16	2 and 9-16	2 and 1-32
July 16.....	3 and 1-8	3 and 3-16	2 and 11-16	2 and 1-4
July 17.....	3 and 1-2	3 and 5-8	3 and 1-8	2 and 11-16
July 18.....	3 and 5-16	3 and 5-16	3 and 3-8	2 and 7-8
July 19.....	3 and 3-8	3 and 5-16	2 and 13-16?	3 and 3-8
July 20.....	3 and 3-4	3 and 3-4	3 and 7-16	3 and 3-8
July 21.....		4 and 11-16		3 and 5-8

Young Olive-backed Thrushes, 10 days old,
begging for food.
(Photo by Alfred A. Langewald, Jr.)

Length of Wing.	Bird 1.	Bird 2.	Bird 3.	Bird 4.
July 11.....	1-8	1-8		
July 12.....	5-32	5-32	1-8	
July 13.....	3-16	3-16	5-32	1-8
July 14.....	3-8	3 8	3-16	5-32
July 15.....	9-16	7-16	3-8	3-16
July 16.....	3-4	11-16	9-16	5-16
July 17.....	1 and 1-8	15-16	13-16	5-8
July 18.....	1 and 7-16	1 and 5-16	1 and 1-8	13-16
July 19.....	1 and 7-8	1 and 9-16	1 and 9-16	1 and 1-8
July 20.....	2 and 3-16	2	1 and 15-16	1 and 11-16
July 21.....		2 and 5-16		2

Weight	Bird 1	Bird 2	Bird 3	Bird 4
July 11.	70 grains	60 grains		
July 12.	86 and 1-2 grains	70 grains	46 and 1-2 grains	
July 13.	125 grains	99 and 1-2 grains	84 and 1-2 grains	60 grains
July 14.	210 and 1-2 grains	180 grains	133 grains	91 grains
July 15.	273 grains	258 grains	206 grains	169 and 1-2 grs,
July 16.	320 and 1-2 grains	310 and 1-2 grains	258 grains	205 grains
July 17.	349 and 1-2 grains	358 and 1-2 grains	305 grains	285 grains
July 18.	364 and 1-2 grains	401 and 1-2 grains	375 grains	343 grains
July 19.	292 and 1-4 grains	418 and 3-4 grains	418 and 3-4 grains	418 and 3-4 grs.
July 20.	390 and 1-4 grains	422 and 1-4 grains	420 and 1-4 grains	440 and 1-4 grs.
July 21.		445 and 1-4 grains		Considerably more than 445 and 1-4 grs.

Birds limp, prostrate in the nest, a tint of burnt-orange, natal down one-half inch long. — All the Nestlings.

A swollen, powder-colored band extends across the wings, and down the upper part of the spine. — Beginning of the first day.

Eyes beginning to open. — End of the first day.

Tips of quills extend beyond the wings. Dark pores on head; a few enlarged pores on the underparts and rump, a dark, swollen band down the spine, across the coccyx and wings. — End of second day.

All the feather tracts well indicated. — End of third day.

Quills across the coccyx. — End of fourth day.

Birds well covered with quills and pin feathers. — End of the fifth day.

Quills look light at the tip as they do just before the feathers begin to protrude. — End of the sixth day.

Birds make the preening motion.

Feathers begin to appear. Birds preen. — End of seventh day.

Birds pretty well feathered out.	End of the eighth day.
Quill casings have nearly disappeared.	End of the ninth day.
Feathers practically free of quill casings.	End of the tenth day.

placed on my dress, No. 4 raised himself from his side, turned over onto his belly, supported himself by his wings and heels, and gave the food reaction all the time he was out of the nest; he threw himself about on the scale pan so that I had to guard him constantly to keep him from throwing himself out of the pan entirely.

The young, as before, nestled together in the middle of the nest, vibrating as one, their heads falling over each other.

The *end* of the third day. All the young, save one, gave the food reaction when out of the nest. They rested on their feet and wings as well as the belly and moved forward on my dress. Still their heads rested on one another in the nest, and they lay in a limp, vibrating mass.

The *end* of the fourth day. The young changed their position in the nest, twittered when being fed, panted with the heat, and gave the food reaction when they heard sounds around the nest. One young bird lay with his head held up against the rim of the nest, and one yawned.

The *end* of the fifth day. All the young seemed very strong and rested their heads against the rim of the nest, all gave the food reaction when out of the nest and moved forward on my dress. I had all that I could do to keep any of them on the scale pan. The two older birds grasped the edge of the pan with their claws. The rough interior of the nest enabled them to move about freely.

On this day, one of the birds fed a large, green caterpillar, the larva of the cherry spinx moth, I think, to one of the young in a peculiar manner. At both the first and second nest, the parent birds usually thrust the insects well down into the throat of the young. The Thrush laid this large caterpillar across the open beak of the birds several times. Nestling after nestling attempted to swallow the caterpillar, but if the end remained in sight, the bird drew it from the throat again.

Olive-backed Thrush bristling while shielding young from sun.
(Photo by Cordelia J. Stanwood.)

She continued this treatment very rapidly, until the young became so excited and eager for the caterpillar that when it touched a throat in which the food reaction was just right, it instantly glided out of sight.

The beaks of the young were much soiled with mud. Probably, some of it came from earthworms as I noticed the birds feeding them to the young in both nests. Aside from this, the young and the nest were immaculate.

The parent birds called to the young constantly when they were removed from the nest so that I found it almost impossible to take their weights or measurements. The muscles of the nestlings were so strong that they drew themselves up into the sitting posture, and were apparently uncomfortable when obliged to assume any other position. After this day their body measurements were far from satisfactory.

The *end* of the sixth day. One bird pecked slightly at his pin feathers and quills, but there were no loose casings as yet. Another snapped his beak as if at an insect. The tips of the quills were lighter as they are before the feathers begin to protrude. This was the closing day of the quill stage.

The *end* of the seventh day. All the birds had speckled heads. No. 1 walked readily on my lap, without spreading his wings to balance himself, leaped from the tray, looked into my face in an interested way, fell from a stool and alighted on his feet, twittered a great deal, gave the food reaction, and a chirp of alarm. The excrement of the older birds began to resemble that of the more mature bird. No. 1 and No. 2 preened a great deal. No. 3 not at all; and No. 4 was still in the quill stage. No 3 had very few feathers, but he did have a few.

The *end* of the eighth day. One bird winnowed the air with his wings, and scratched his ear with his toe; the birds gave the food reaction out of the nest. I had much difficulty in returning the two larger birds to their cradle.

The *end* of the ninth day. All the birds have speckled heads. The birds that hatched last have been much more active than those that came from the egg first. They have

gained their weight more rapidly than the more mature nestlings, but it has taken all the nestlings practically the same length of time to produce pinfeathers, quills and feathers. The two young birds that came from the egg last, gained their pin feathers, quills, and feathers a few hours earlier than the two that hatched first, I should say. Young Hermit Thrushes develop their feathers in the same length of time that young Olive-backed Thrushes do.

All the young beg for food in the nest and out.

The two older birds watch every movement of leaf or insect around the nest and listen to every sound. They notice particularly the mother bird when she unfurls her wings and flies away. They stretch frequently. Three of the young snapped at a mosquito several times. No. 1 stood on the edge of the nest a few seconds, walked a few steps, then hopped into the nest; the young clung to the nest lining with their sharp claws when I attepmted to take them out.

The *end* of the tenth day. The young Thrushes are large beautiful birds; at this stage a Thrush has flesh-colored legs and feet, a brownish-gray beak, hazel eyes, the beginning of an olive tail and olive wings, a golden mouth and throat lining, an arrow-shaped tongue, and a very slender, V-shaped groove in the top of the mouth; this groove, edged with spines, ends above a salivary gland at the base of the throat. The crown and nape are olive-brown, spotted with buffy, the eye-ring is buffy, the back is olive-brown with a buffy line down the middle of each feather. A black line runs down each side of the throat which is washed with buffy; the breast and sides are washed with buffy, and the breast and white belly are spotted with black. A young Hermit Thrush differs from a young Olive-backed chiefly in having *bright cinnamon tail coverts*.

The birds exercise constantly, changing position, panting with the heat, gaping, yawning, snapping at insects, stretching, preening, giving the food reaction, muting, standing to strengthen the legs, and winnowing the air with the wings. One hopped onto the edge of the nest, and then hopped back into it again.

Young Olive-backed Thrushes after being fed.
(Photo by Cordelia J. Stanwood.)

When I attempted to weigh and measure the young, No. 2 was very gentle after being well fed, but the parent birds called the young so tactfully that No. 4 began to respond, and at last became so wild that I was obliged to desist. I succeeded in getting the length of No. 2 and No. 4, the weight of No. 2, and the approximate weight of No. 4. The birds in the nest that I photographed left on the afternoon of the twelfth day. The birds that I weighed and measured, were driven from the nest by the parent birds after I attempted to weigh and measure them at the close of the tenth day.

After the young began to feather out, it was well nigh impossible to return them to the nest. No. 4 was the most troublesome of all the birds in this respect. On the eighth day of nest life, I had to resort to strategy to get any weights and measurements at all. I put the nest in a grape basket and tied the basket to the tree. This gave the nestlings plenty of room, and enabled me to move the nest into the tent without disturbing the young.

On the ninth day, I began to feed the young with bread and milk before moving the basket, and before returning it to the tree.

For the first few days of nest life, when I weighed and measured the young the parent birds disappeared; later a bird fed the young several times during the feeding process, and on the fourth day, the female returned to brood three times while part of the neslings were out of the nest. When I moved the nest to the blind, the feeling of the parent birds became very tense. On the last day their fears knew no bounds; they uttered a most seductive and elaborate vocabulary of baby-talk, they entreated, they scolded, they flew around the blind snapping their beaks; finally, as I related earlier in my story, the youngest nestling answered the calls of the parent birds and became very wild, I could do nothing with him but hold him in the nest. At last all were quiet in the nest, and the nest in place again, but the very tameness of the young, added anew to the frenzy of the parent birds. (Fear is one of the instincts cultivated in the Kindergarten of the birds).[1]

I hurriedly withdrew but heard the parent birds still calling to the young when I reached the street beyond the hayfield. Upon my return an hour later, the nest was empty.

The mother bird seems to both incubate and brood; when brooding, she frequently changes her position on the nest to accommodate herself to the wriggling young, she cleanses the nest and young of parasites, shields the young from the sun and rain. The male and female feed the young both fresh insects and by regurgitation. The male calls the female from the nest for the rest period. She flies to meet him with a *Phieu!* or a *Whit-yer!* of delight. The instinct of fear is more in abeyance in the female than in the male. Sometimes the latter after some change has been made about the nest, refuses to feed the young for long periods, but he calls lustily to his mate, if she suspends her attentions to the young for any unusual length of time.

The male alights on a conspicuous perch near the nest, off and on, where he flutters all over while he regards the mate on the nest or the young in it. After the young are hatched, the male seems to bring the food to the young instead of his mate. Whether he fed the female during the incubation period I was unable to learn as the eggs were so surprisingly prompt in hatching.

Both birds either eat or carry away the excrement. In the second nest, the bird carried away the ordure for the first time on the ninth day. At this age the young ate so much that the parents ceased to feed everyone at each visit. One or more was omitted at each feeding, and one excrement was usually carried from the nest. In the nest that I photographed, the parent birds still ate some excrement on the twelfth day.

Every time that I see the birds performing this rather abnormal act, it suggest a question. Why? It would seem as if there must be some very good reason for the instinct

[1] I saw something similar to this once in the case of a Partridge. I flushed a brood of very young Partridges; most of them scattered and concealed themselves, but one fledgling stood still in the open. The old bird called, then flew at the nestling and dealt it a fierce blow that caused it to seek shelter at once.

which prompts birds so universally to eat the ordure of the young for varying times in different nests.[1]

This summer, I made a discovery that may possibly throw some light on the question. When a Blue-Headed Vireo family vacated their nest, I found in it two dried excrements. The sacs had been in the nest so long that they were discolored; they were lost evidently when the gelatinous encasing sac was a conspicuous part of the excrement. The sacs were full of the eggs of the rosy maple moth.[2] This fact proves that during certain stages in the nest life, the food of the nestling is but partially digested. Some of the eggs were whole. Whether the eggs were fertile or not, I was unable to find out but it is just possible that this universal tendency of the birds to eat the excrement, is another of nature's wise provisions for our further protection from our insect foes.

As already attested the female Olive-backed feeds the young almost entirely by regurgitatin, sometimes as often as once in four minutes. When the female returns from her rest periods, she brings fresh insects with her, and the male also feeds the young regularly fresh insects as well as crushed and mascerated food. At first, small, soft insects are administered, later, larger, tougher insects.

I found the first two Thrushes in the nest at 11:30, and weighed and measured them a little after 12:00 o'clock. Each day the weights and measurements were taken as nearly at this hour as possible. For days and days we had a slight thunder shower at noon that interfered with work a trifle. When I observed in the morning, it was the end of an observation day, and the afternoon was the beginning of an observation day, in other words, I reckoned time from the noon that I found the two young Thrushes in the nest.

[1] Home Life of Wild Birds. By Dr. Francis Hobart Herrick. Page 191.

[2] Kindly identified by Prof. Charles P. Alexander of Cornell University.

The *end* of the third day and the *beginning* of the fourth, I observed in the blind eight hours — from 5:34 a. m. to 4:54 p. m. During this time I left the blind for two hours and one hour. This day the female fed the young seventeen times by regurgitation, and both birds made thirty-three visits to the nest with insects. Spruce bud moths were fed fifteen times during these visits. From two to twelve moths were fed at a time but they were mostly brought by the beakful. Caterpillars were administered thirteen times. The quantity varied from one to a beakful. Usually the birds brought a goodly number. We must remember that while some of these birds were three days old, the youngest was but one. All four were fed on all of these visits.

Near the *end* of the fourth day I observed five hours in the morning. The female fed the young twelve times by regurgitation. The birds brought food to the nest twenty-four times. During these visits, spruce bud moths were fed seventeen times, and caterpillars thirteen times.

Near the *end* of the fifth day, in the forenoon, I observed two hours and fifty minutes. The female fed the young once by regurgitation; the birds made eighteen visits to the nest, fed spruce bud moths ten times, and caterpillars seven times.

Near the *end* of the sixth day, before noon, I observed three hours. The birds fed the young twenty times. During this period, caterpillars were brought eleven times and spruce bud moths thirteen times.

The length of a feeding day of the birds consists of about fifteen hours. In making out these notes, I was unable to take into consideration the number of insects eaten by the two mature, active birds, those fed by regurgitation to the young, or those held in the mouth and throat when the birds came to the nest with overflowing beaks. From the observations, however, one can form a slight idea of the enormous quantity of spruce bud moths and caterpillars consumed during the ten or twelve fifteen-hour days of nest life. The parent birds continue to feed the fledglings for some time after they leave the nest.

Besides spruce bud moths, I saw the Olive-backed Thrushes feed to the young a large glow worm larva, I think, wild fruit, crane flies, flying ants, grasshoppers, orange worm-like larvæ, cut worms, all colored inch worms, geometrid moths, yellow-green caterpillars, gray-green caterpillars, tan, brown, black caterpillars, the caterpillar of the cherry sphinx moth, several caterpillars of the rosy maple moth, also *Holomelina opella,* many tan and brown moths, and I found one mutilated rosy maple moth under the nest.

Some excrement that the young left in the nest were kindly examined for me by Professor Charles P. Alexander of Cornell University. Professor Alexander found the remains of several ground beetles, myriads of scales of moths, part of an ant, and part of a spider.[1]

The young of the Olive-backed Thrush are extremely intelligent and vigorous. I took a young Olive-backed Thrush from the nest, ten days old, at 9 a. m. He was a wild, chirp-

[1] Excrements examined by Prof. Charles P. Alexander.

Six intermediate antennal segments of a beetle, apparently a ground beetle, (*Carabidæ*).

Myriads of scales from Lepidopterous wings, which shows that scores of these insects must have been eaten, wings and all. They are probably moths (*Heterocra*) rather than butterflies (*Rhopalocera*). The part of a membrane of wing of some moth of small to medium size, representing the cubital and anal fields of the wing.

Mandible and head of medium-sized ground-beetle (*Carabidæ*).

Elytra and abdomen of a small beetle, apparently a *Lathridid.*

Cheliceræ of a small spider.

Head of a large ant, probably *Camponotus.*

An abundance of femora, and tibiæ of various small insects, mostly being beetles, apparently.

Five heads of an hymenopterous insect thought (by Dr. A. D. MacGillivray) to be a bee; these heads exceedingly convex and very coarsly punctured.

Caudal end of a pupa of some insect, with four caudal hooks, and a broken ring of subcaudal hooks.

The most conspicuous single element of the excrement is the myriad of lepidopterous scales, which to judge from the great diversity in size, shape, and texture, must have represented a very considerable range of species.

ing, struggling, bit of bird. At 12 m. he would perch on my arm, or the edge of the basket, as we walked through the woods, snap at a mosquito, take a bit of strawberry with the tip of his beak, but he refused to open his beak to be fed. I placed him on the sill of a screened window; on a rug in the middle of the floor were water, grasshoppers, wild fruits, earthworms, and ants' eggs. I attempted to feed him bits of these with the scissors. He would have none of them. He did nothing but chirp. I was obliged to leave him until 4:30 a. m. As soon as I came in I sat on the mat, and took up the scissors to prepare some food. When the Thrush heard the scissors click, he flew from the window to the floor, and opened his beak for food. He ate two earth worms, cut up. After this, he perched on my knee and preened his feathers. He continued, in the future, to take his food with delight.

The third day of his visit with me, the Thrush flew from the window to my note book and nibbled at my pen. I smoothed his feathers with one finger. He perched on my shoulder and snuggled against my throat.

The fifth day after he came to me, I was again writing. The little Thrush flew from the window to my note book, backed across the page until his tail feathers touched my hand. I smoothed his head and back. He turned his breast to have that caressed likewise. I thought that, perhaps, it was all an accident. Twice, I returned him to the window sill, and the second and third time, he returned in like manner, and presented first his back and head, then his breast to be caressed.

The same day he picked up ant eggs from the floor, also an ant, and showed an automatic tendency to pick up everything. The little Thrush was very funny when he picked up an ants' egg or an insect. He opened his mandibiles far too wide, twisted them awry while he examined the morsel first with one eye, then with the other. All this time, he kept up an excited twitter. Later, he picked up thirty ants' eggs from the floor at one meal. On another occasion, he flew into my basket when I returned from the pasture, selected a grass-

hopper, flew away with it and ate it. He also began to sing an irresistable baby Thrush song on the fifth day.

It was several days after the Thrush was out of the nest before he would take a bath. I find that young Hermit and Olive-backed Thrushes will bathe instinctively on sight of the water but not until several days after they have left the nest.

The little while that I kept this Thrush in the house, he was a never ending source of wonder and delight.

The nest of the Olive-backed Thrush, likewise, is peculiarly interesting. It, too, gives rise to a question.

The typical nest of the Olive-backed consists of three parts, the foundation of twigs, stems, and moss, an interlining of dead wood, and the lining proper of skeletonized leaves, with occasionally a little usnea moss, or black, hair-like plant fibre. Twice in nests on the outskirts of a peat bog, the bird used the peat with roots for an interlining. One of these nests contained such a perfect cup of mud that if I had found it without the birds in it I should have said that it was an old Robin's nest.

Does this indicate that the Olive-backed Thrush once used a mud interlining in its nest, or does it simply show that under suitable circumstances the bird could easily adapt himself to such a style of architecture?[1]

The voice of the Olive-backed is wild, sweet, suggestive of the cool, damp woods, the misty, dewy splendors of early dawn and late twilight, although during the nesting season the bird sings all day long. The song of the Olive-backed may be characterized as energetic, that of the Hermit as tranquil. The spirit of the former is "Let us be up and doing!" — *Wher-a-whee-ŏo!* or Work-for-we-two! The spirit of the latter is, "Praise, Praise, the Creator!" "Peace, my peace I give unto you!" One entire afternoon, when sitting in a balsam blind near the nest of a Hermit Thrush, I tried to translate the song of an Olive-backed Thrush into words. This is what he seemed to say: "I'll roam the world; I'll

[1] Nest and Nest Building in Birds. Part 2. Page 263. By Dr. Francis H. Herrick

roam the world with thee; I'll roam the world with thee, with thee!"

The Olive-backed Thrush has many call-notes. One, suggestive of a profound sigh is identical with a call of the Hermit. It denotes the deepest solicitude. The note *Whoit!* is common to both birds. It is difficult to distinguish the *Chu!* of the former from the *Chuck!* of the latter. The *Whit!* of the Olive-backed Thrush is distinctive and corresponds to the *Peep!* of the Hermit Thrush. He utters *Schree!* very gently to the young in the nest. On similar occasions the Hermit says *Phee!* Besides these call-notes he has a delightful crooning twitter, a whistle that he gives when feeding the young, and the notes *Whit-yĕr!* and *Phieu!* The latter he uses when summoning his mate from the nest; they are little more than nasal snarls.

In the evening, when the Thrushes come to the swale around the boiling spring to drink and bathe, the Hermits exchange the calls *Peep!* and *Chuck!* The Veeries salute each other with the notes *Phieu!* and *Eureke!* while the Olive-backed Thrushes interchange the calls *Whit! Whit-yĕr* or *Whit-yĕr-ĕr.* After once having traced these calls to their source, there is not the slightest danger of confusing the birds that make them.

During the nest life of the Olive-backed Thrushes in the first nest the male sang nearly all the time (June 23, 1913), but it was not until the young were nearly ready to leave the second nest (July 15, 1913) that the Olive-backed began to preface each measure with one or two call notes, until he had exhausted his vocabulary. The song ran something like this: *Whit! Wher-a-whee-ŏo! Whoit! Wher-a-whee-ŏo-whee-chee! Whit! Whit-yer! Wher-a-whee-ŏo-whee-chee-tee! Schree! Wher-a-whee-ŏo! Chu! Wher-a-whee-ŏo-whee-chee!* I have heard the bird sing through his entire repertoire of call notes several times without stopping. This year he kept up this frenzy of song until the end of the song period (July 31, 1913).

The Veery is the first of the Thrushes to leave. Each year

he comes from the swales to the higher land with his entire family, about the last of July. He calls all about the house and grounds for a few days and then vanishes in the direction of the seacoast. Occasionally about a month later a few migrants are heard around the spring.

The Olive-backed Thrush remains until the wild fruits grow scarce, near the last of September, and the Hermit, the first to come, is the last to go. Rarely, he lingers into November.

General Summary.

The Olive-backed Thrush comes to his northern breeding ground from the district between Mexico and South America, about the last of May, and departs near the middle of September.

The first of June and again the first of July, they construct their statant increment nests, usually in an evergreen, anywhere from one to ten feet above the ground. Whether they raise two broods or not during the season I have been unable to determine. A clutch consists of from three to four green-blue eggs, spotted with golden-brown. One egg is laid on each consecutive day until the clutch is completed. The birds spend from ten to thirteen days in incubation, and the young remain in the nest from ten to twelve days.

The Olive-backed Thrush is modestly but richly garbed, gracefully proportioned, exquisitely light in motion, extremely intelligent and tractable. They devour and feed to their young an incredible number of our most injurious insect pests. The male bird is one of our rarest musicians. While not such a glorious singer as the Hermit or Veery, we could ill spare his voice from our inimitable Thrush concerts.

I would sum up the entire life of the Olive-backed Thrush, as a poem of service to his brother — man — set to stirring music.

A VACATION IN QUEBEC.

BY G. EIFRIG.

On the 21st of June the writer left Chicago for Ottawa, Ontario, for the purpose of renewing old acquaintances, among the human kind in the beautiful capital of the Dominion, and among the birds in the woods across the Ottawa River in old Quebec. Another useful purpose of the trip was to get out of the lungs the atmosphere and dust of the classroom and to temporarily blot out of the memory all recollection of it.

The study of Natural History from a moving train, while necessarily superficial and largely uncertain, is yet not to be despised. It is both interesting and instructive to see e.g., the prairie flora of northern Illinois, with its wealth of Phlox *tradescantia, eryngium, silphium, senecio,* etc., give way to the orchards and sugar beets of Michigan, to notice how large areas even in such a fine state as the Badger-state, and in such a fine province as Ontario, are waste land, utterly unsuitable for agriculture, how the Mourning Dove and Red-headed Woodpecker are common up to Toronto but absent north of it, how the farm houses there become smaller and farther apart, but granite boulders and lakes more plentiful. And here also the landscape is more and more dominated by those fine northern evergreen forests. To me the finest deciduous woods of oak, hickory and beech have never been so enticing, so mysteriously charming and attractive as those dark, silent evergreen forests of the northland.

My first station, by prearrangement, was to be at Inlet P. O., about forty miles northeast of Ottawa. The first half of this distance is covered in a Canadian Pacific train to Thurso, where connections had to be made with a mail driver, who takes one out the rest of the way. Here the numerous colonies of Chimney Swift and Purple Martin strike one. Of the latter, indeed, every, even the tiniest hamlet in these parts seems to have at least one thriving colony. House Wrens are also numerous in the towns, about farm houses, and also

right in the wilderness. On a knoll at the edge of the village, the site of the public school, were heard and seen the Pine Warbler, Veery, Hermit Thrush, Least Flycatcher, many Chipping Sparrows, also one each of Catbird, Baltimore Oriole, and Ruby-throated Hummingbird, while the Phoebe was on a nest in the woodshed.

Inlet is no town, no village, not even a hamlet, but just a post office, a log cabin, which is at the same time the home of the lively little Alsatian-German postmaster. It is situated in the Laurentian hills, granite; sand, woods, lakes and swamps everywhere, but extremely poor land for the agriculturist, and one can but wonder what induced the few scattered farmers here to come into such a wilderness, when good land was to be had just as cheap near the Ottawa River and the railway. There were slight frosts even as late as June 26th. But to return to the birds.

Despite the chilliness of the morning half-past four found me in the low-lying spruce-cedar swamp, which begins at the end of the post office farm yard. Here a chorus of tiny bird songs green one — the Chickadee's *tsree-tsray,* the Brown Creeper's and Red-breasted Nuthatch's feeble lisping song, and the Golden-crowned Kinglet's odd performance, which in volume and form stands between the songs of the Blackpoll and Black and White Warblers, but is more rapid and crescendo, making the impression that the performer is rapidly sliding from the interior of the tree out along a branch to its tip. A Parula Warbler sings from the top of a tall spruce, nearby are the Black-throated Blue and the Black-throated Green and Canada Warblers, while the Nashville is partial to stands of aspen and the Chestnut-sided to bushes on slightly higher ground.

Of Finches the purple one may often be heard pouring out his soul in song from the tip of a tree, and the ever-present White-throated Sparrow repeats his "Dear, dear Canada, Canada," as the song is paraphrased by loyal sons of King George's dominion. This bird is just as characteristic of bushy swamps and bogs as of dry knolls which are covered

with bracken and black stumps. The Indigo Bunting is sparingly found, the Goldfinch commonly. In the alders along the Inlet, the creek near by, may at times be heard the queer saw-filing of the Saw-whet Owl.

From the low woods, with the fine large white and black spruces (*Picea canadensis* and *mariana*) we now turn to higher ground, toward the lakes among the hills. Along the road are found families of Slate-colored Juncos (*Junco hyemalis*), the streaked young nearly full grown. However, here and there a male darts out from some well-concealed little pocket in the bank along the road, and on looking there we find nests containing four fresh eggs, evidently the second laying. Their nests would rarely be found, so well hidden are they, if the birds would not betray their location by flying out. In the higher woods, usually near a little gurgling brook, a loud *cha* may be heard, anxiously repeated, and then the song: "*Take care,*" plaintively uttered. This is the Yellow-bellied Flycatcher in its typical haunts, viz. mixed woods full of old tops of trees all moss and lichen covered. A female Ruffed Grouse (*Bonasa umbellus*) with her family of young is surprised, and at once raises a great disturbance, fluttering at our feet, clucking and gurgling in the most startling manner. They are common here.

At Gull Lake the Herring Gull is seen. It breeds there. From the stern towering walls of granite the laughing of the Loon and the rattling of the Belted Kingfisher are echoed back over the otherwise silent lake. Going to Hawk Lake a nest of White-throated Sparrow is found two feet from the ground in a small cedar bush. We found several nests on the ground or up in the bushes. While we were paddling across the lake a family of Hooded Mergansers (*Lophodytes cucullatus*) were started up. They pattered over the water, half flying, at a great rate of speed, until the bushes along the edge of an island took them into their protective shade. Here also the Kingbird sallies forth after its winged prey. It surprises one somewhat to find such farm-yard and orchard birds as Robin, Chipping Sparrow and Kingbird in

the role of true woodland and wilderness birds. Incidentally we caught some fine red and gray trout in Hawk Lake which, when prepared by the skilful hands of the wife of the owner of the lake, made a dish not soon to be forgotten. These trout are undoubtedly the finest food fish in eastern North America, if not in the world. They rapidly deteriorate in the sending, even if packed in ice. I can recommend Hawk Lake to sportsmen and fish connoisseurs as a place where both interests can be exceedingly well attended to.

Returning, an uproar among some Robins attracted our attention, and on investigating we found a Broad-winged Hawk (*Buteo platypterus*) in close proximity to a Robin family. This hawk had certainly much increased here since my last visit, three years ago; its loud whistle, *keef,* something like a Cowbird's only louder and huskier, was not infrequently heard. Speaking of bird voices, the song of the Winter Wren must receive honorable mention. It may be heard at any time of day, but sounds finest early in the morning, when its clear, sparkling tones always made the impression on me as though delicate strands of silver were being woven from branch to branch among the dark spruces and hemlocks, whence the song usually emanates. This bird is most often found in mossy mixed woods, but conifers must be close at hand. The song is a continuous performance, much more so than the songs of the Veery and Hermit and Olive-backed Thrushes, which, however, have a finer quality of tone and greater volume. Along the shores of Hawk Lake we often heard a strident song, something like that of the Red-eyed Vireo, but louder, which turned out to be a to me new song of the Scarlet Tanager (*Piranga erythromelas*). It was not often the *tick kerr,* usually heard, nor the soft decrescendo song to be heard in western Maryland, but a more robust and less attractive one. In the evening the Whip-poor-will usually started its song at 8:45 o'clock.

After having celebrated Dominion Day, July 1st, at Ottawa, I on the 2d went partly by rail and partly by boat up the Lievre to Notre Dame de la Salette, a French-Canadian

hamlet on the river, which had on Easter day of 1910, been overwhelmed by one of the none too rare landslides, with a resulting death list of thirty persons, the bodies of some of which have never been found. From there I was driven to the humble abode of a small farmer, in the midst of the wilderness, between Holland's Mills and High Falls. With several small patches of arable soil carved out of the dense tangled woods, more or less surrounded by high rocky hills, knolls of almost bare granite, with swampy ponds between, it seemed surprising that these German farmers are able, by sheer indomitable energy and hard labor, not only to eke out a bare existence, but are even able to lay aside small sums of money against a rainy day. Here the same birds were met with as at Inlet, with the addition of a few. A pair of Pileated Woodpeckers (*Phlœotomus pileatus abieticola*) apparently had their young in a hole high up in one of the large trees along the brook, which runs at the foot of a long, high hill. To the repertoire of notes which I had recorded in my bird ledger they added another, a clucking, soft *kyuck* Sometimes I started them from the ground. The Oven-bird and Northern Yellow-throat were a little more abundant here too, also the Yellow-bellied Sapsucker and the Rusty Blackbird. These last are on the increase. Their typical habitats are the ponds and watercourses in the woods where, on a former occasion, I found a family of young just out of the nest. The young were at this time fully grown. On Lac Ste. Helene a huge Osprey nest was seen on a tall dead tree called rampike here. From the marshy corners of the lakes, from the highest tip of the spruces, was heard the *"Hood, take care,"* of the Olive-sided Flycatcher, and in similar locations a brood of young Black Duck were seen. Nests of Chipping Sparrow, Slate-colored Junco, White-throated Sparrow, and Rose-breasted Grosbeak were found, all with fresh eggs, while nests of Cedar Waxwing and Kingbirds contained young, and one of Goldfinch in a small birch was ready for eggs. A pair of Mourning Warblers in the underbrush in a clearing showed by their anxiety their nest to be near at

hand, but search failed to reveal it. A Barn Swallow had built its nest on a pulley swinging from a rope in the small log barn, and House Wrens had their full complement of eggs in several hollow ends of fence rails. A Phœbe sat on the second set of eggs and they were nearly ready to hatch. The young of another Sayornis had died in the nest and were now dry and hard, but the parent would from time to time fly on the nest and brood them, as though trying to restore them to life. Certainly a pathetic picture!

Large bunches of the fine white admiral butterfly (*Basilarchia arthemis*) dotted the wood-roads. On the way to High Falls a Marsh Hawk was seen and a captive Goshawk (*Astur atricapillus*) awaited me. It had been caught in a trap and had lost all its accustomed ferocity. Here were great numbers of old and young Bank, Barn, and Tree Swallows, also Cedar Waxwings. The stomach of a young, but fully grown, Broad-winged Hawk, which had stupidly been shot by a farmer's boy contained at least a hundred black beetles. Another one was drying itself after a shower on a very warm day, by fanning the air with its wings. This was near the fine waterfall from which the locality gets its name.

Bidding the good and hospitable people good-bye, I again took the little boat on the Levre to go to Buckingham and thence back to Ottawa. This time the boat was nearly filled to suffocation with French-Canadians, who were on their annual pilgrimage to St. Anne de Beaupré — one of the dark spots of Quebec!

On July 16th I embarked on a gasoline launch at Pembroke, Ontario, a hundred miles west of Ottawa, to go to Tapp's Wharf, and from there to Pontiac Game Club, about fifteen miles north from the river. Between the many islands, one of which contained a heronry of Great Blue Herons, past an old Hudson Bay post, with Indian church, past Oiseaux Rock, on top of which is said to be a small lake containing excellent trout, we sped over the "Deep River," as the Ottawa is here called — it is said to be a thousand or more feet

deep. The Pontiac Game Club's preserve comprises 180 acres, no farms, only hills covered with fine forest which comes right down to the water's edge of the beautiful lakes, of which there are about 60 known. Moose, bear, deer and porcupine signs were extremely plentiful here, and I had the good fortune to photograph a bull moose which was standing in the shallow water of a creek connecting two lakes, eating lily pads. Beaver are also busy here. Of birds, about the same were seen as in the former places, only in varying numbers. Northern Flickers were common here, also warblers, of which I found a family of young Nashville just out of the nest. A solitary Hairy Woodpecker was noticed. They are rare, it seems, all over their range. I did not at this time meet with the two Three-toed Woodpeckers, although they are common in fall and winter, as are the Canada Jay and the Spruce Partridge (*Canachites canadensis canace*). Wood Pewee, Alder, Least, and Olive-sided Flycatchers were all represented here, and each lake naturally harbors its pair or two of Loons. Goshawks, Cooper's and Broad-winged Hawks were seen, and a single Canada Jay among a flock of Blue Jays. A number of pike and fine pickerel or doré were caught. Bidding good-bye to mine host, the keeper of the preserve, and his family, to the clear ozone-laden air, the beautiful lakes resembling so many artistically framed pictures, to the interesting fauna and flora, I next went to Lake Doré, near Eganville, Ontario, a few miles south of the Ottawa River. I put up in the humble cabin of a small farmer near the lake. To get to the lake one had to paddle in a boat down a creek with dark water — hemlock-stained — through a typical cedar swamp. The Wood Duck nests here, also the Great Horned Owl. Nearer the lake in the ash trees is a large heronry, with many fully grown young awkwardly flapping about. Then comes a stretch of swamp, with bushes and cattails, the home of the Swamp Sparrow, Rails, and Long-billed Marsh Wrens. Farther out are Coots, Golden-eyes, Buffle-heads, Grebes, Loons, and Herring Gulls. Four Loons were one morning seen flying over the farm,

calling loudly, and in the evening four, probably the same ones, returned to the lake. Rusty Blackbirds were abundant, and the farmer, a shrewd observer of nature, said he had never before seen them. He knew the Red-wings and Bronzed Grackles, plentiful in the swamp, well. Neither had I seen them here on my frequent visits several years previously. So there can be no doubt that this species, as also the Broad-winged Hawk and Indigo Bunting, are on the increase here. An Osprey was seen carrying a large fish lengthwise, and a Kingbird and Red-wings viciously assaulting a Great Blue Heron. Along the water's edge and elsewhere Solitary and Spotted Sandpipers are seen, and here and there a Water-Thrush daintily and measuredly walking under the overhanging bushes. The pike are so voracious that even a poor fisherman like myself can easily catch a goodly mess by trolling.

Finally I had to reluctantly leave this fine spot also and drive back to the station and to civilization. If one could only get away from its stress oftener and hie himself away into these places near the heart of nature! These vacation days spent in the Canadian backwoods will not soon be forgotten. However, in justice to any prospective sojourners in the Northland, I must also point out the drawbacks, viz. the swarms of mosquitoes, black flies and sand flies, which can make life miserable, which I overcame only with head-net. The roads to such places are bad. But these things are taken into the bargain by the true nature lover and are soon forgotten.

THE WINTER BIRDS OF ALGONQUIN PARK, ONTARIO.

BY ALLEN CLEGHORN.

Algonquin Park is one of the national parks of Ontario. It is situated about 200 miles north of Toronto and has been under government supervision for twenty years. It consists of over 2,000,000 acres (roughly speaking, about 45x50 miles)

and contains over 1200 lakes and rivers. It is all heavily wooded, in some places the forest growth being particularly dense — the only clearings in the reserve being the result of old lumber operations or forest fires. My period of observation was for a year and my area of observation was confined to the southern half of the park.

1. *Canachites canadensis canace.*—Canadian Spruce Partridge. Common.

2. *Bonasa umbellus togata.*—Canada Ruffed Grouse. Common.

3. *Astur atricapillus.*—Goshawk. Saw one kill a Whisky Jack (Canada Jay) in January.

4. *Aquila chrysaëtos.*—Golden Eagle. One took a wolf bait (raw deer meat charged with strychnine) and is now in the museum at Park headquarters.

5. *Haliæetus leucocephalus.*—Bald Eagle. Not at all common.

6. *Scotiaptex nebulosa.*—Great Gray Owl. Plentiful about clearings.

7. *Cryptoglaux acadica.*—Saw-whet Owl. Plentiful. Commonest of all the owls.

8. *Bubo virginianus.*—Great Horned Owl. Common.

9. *Nyctea nyctea.*—Snowy Owl. Rare.

10. *Dryobates villosus leucomelas.*—Northern Hairy Woodpecker.

11. *Dryobates pubescens medianus.* — Downy Wooodpecker. Northern species. Very common.

12. *Picoides arcticus.*—Arctic Three-toed Woodpecker. Few seen Am told they are very common further north.

13. *Picoides americanus.*—American Three-toed Woodpecker. Common.

14. *Phlæotomus pileatus leucolemas.*—Northern Pileated Woodpecker. Very plentiful.

15. *Cyanocitta cristata.*—Blue Jay. Plentiful and a nuisance; stealing baits from small traps.

16. *Perisoreus canadensis.*—Canada Jay. A nuisance also; steals everything.

17. *Corvus corax principalis.*—Northern Raven. Common and a curse; they steal the wolf baits.

18. *Pinicola enucleator leucura.*—Pine Grosbeak. Not so very common. Their numbers seem to vary in an irregular manner, independent of climate.

19. *Loxia curvirostra minor.*—Red Crossbill. Very plentiful where pines, balsams and spruce trees grow.

20. *Loxia leucoptera.*—White-winged Crossbill. Very plentiful, as the other variety is.

21. *Acanthis hornemanni exilipes.*—Hoary Redpoll. Sometimes appears in the flocks of the common Redpoll; none seen last winter.

22. *Acanthis linaria linaria.*—Redpoll.

23. *Spinus pinus.*—Pine Siskin. In great numbers.

24. *Plectrophenax nivalis.*—Snow Bunting. A few seen.

25. *Spizella monticola.*—Tree Sparrow. Common about settlements.

26. *Junco hyemalis hyemalis.*—Slate-colored Junco. Very common; do not seem to vary according to climate.

27. *Bombycilla garrula.*—Bohemian Waxwing. Common.

28. *Bombycilla cedrorum.*—Cedar Waxwing. Vary in numbers according to food supply.

29. *Lanius borealis.*—Northern Shrike. Not common.

30. *Nannus hiemalis hiemalis.*—Winter Wren. Common about clearings.

31. *Certhia familiaris americana.*—Brown Creeper. Common.

32. *Sitta carolinensis.*—White-breasted Nuthatch. Seem to vary, as none were found last winter.

33. *Sitta canadensis.*—Red-breasted Nuthatch. A few pairs found last winter.

34. *Penthestes atricapillus atricapillus.*—Chickadee. Very common about the rangers' shelter huts.

35. *Penthestes hudsonicus.*—Hudsonian Chickadee. None seen last winter. Why, I can't tell.

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Official Organ of the Wilson Ornithological Club.

Edited by LYNDS JONES.

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Editorial

Because the summer work of the editor extended into the middle of September, and he was where it was not possible to prepare copy for the present number of the Bulletin, there is this delay in publication.

The protracted illness of Mr. Swales and the absence from home of most of the officers of the Club during the summer has prevented the completion of arrangements for the proposed annual meeting. The plan has not been abandoned, however, and will be carried to completion in due time. Meanwhile let there be expressions of opinion as to the best time and place from those who are interested.

The Thirty-first Annual Congress of the American Ornithologists' Union will be held at the American Museum of Natural History, New York City, November 11-13, 1913. At these Congresses there are gathered many of the foremost ornithologists of America as well as many of those who do not consider themselves as much more than interested spectators. It is worth while for

those of a common interest to meet as often as possible, and in these meetings of ornithologists and just bird-lovers there is a something which seems to those who thus do get together which is much more than merely "worth while." The American Museum itself is worth all the expense and trouble of a long journey, for here are grouped the collections, natural objects in natural settings, many of which few persons will ever be privileged to see except here. But aside from what can be seen in the metropolis of our country, and even aside from the papers and discussions which feature these gatherings, it is worth any bird student's while to attend these gatherings. It is not possible to express in words the impression which they make. You ought to attend.

NOTICE OF NOMINATION.

All active members of the Wilson Ornithological Club are earnestly requested to send, within two weeks after receiving this number of the Bulletin, nominations for president, secretary, treasurer and three members of executive committee, to the undersigned.

G. EIFRIG, Secretary,
Addison, Ill.

P. S.—After November 1, the address of the Secretary will be: Concordia Teachers' College, Oak Park, Illinois—G. Eifrig.

Field Notes

THE INCREASE OF THE CARDINAL IN THE UPPER MISSISSIPPI VALLEY.

The recent appearance of the Cardinal along the banks of the Mississippi River in the territory lying on either side of the forty-third parallel of latitude has already received mention in the ornithological magazines; but the reports of its remarkable increase in numbers, together with additional data seem to warrant further reference to a twice told tale.

The mouth of the Wisconsin River is in latitude 43 degrees exactly, in about the same latitude that we find Milwaukee, Wis., Grand Rapids and Port Huron, Mich., Buffalo and Syracuse, N. Y., and Portsmouth, N. H., nevertheless its remoteness from a large body of water gives this Mississippi Valley point a decidedly colder winter climate than have most places into which the Cardinal has advanced in recent years.

The dates of the first observations of the Cardinal in the vicinity south of the mouth of the Wisconsin River have been given by Miss Elma Gertrude Glenn of Wyalusing, Wisconsin, in a recent letter a portion of which is given here: "In November, 1906, Mr. H. W. Brown, of Lancaster, Wis., a camping companion of my father, observed one, a male, just north of the village of Wyalusing. The following February, (1907), my father found one at the base of the bluff along the Mississippi River, near where the first was found about one mile south of the Wisconsin River. Since that time they have become more common each year until last year; during 1910-'11-'12 several pairs were noticed."

On the Iowa side of the Mississippi River, directly opposite Wyalusing, at the mouth of Sny Magill Creek, on April 17, 1908, I found a pair of Cardinals; until a year ago I supposed these were the first of this species identified in Clayton County, but the notebook of Mrs. Mary E. Hatch of McGregor, shows that she saw one there for a moment on December 11, 1906. The winter feeding of the Cardinal in McGregor began in the autumn of 1908, when one came to the yard of Mrs. M. A. Jordan; it has been continued since then with a gradual increase in the number of these birds. Last winter by the aid of the telephone it was learned that five Cardinals were eating at the same time in two yards, distance about a mile apart. The summer of 1913 has shown a very marked increase in the number of this species about McGregor, until people say of them: "They have become as common as Robins." About the village the summer locations of eight pairs, in private yards,

on the bluffs, and on neighboring islands have been mentioned. In the yard of Mr. B. A. Kinsley a pair built a nest, which was not occupied, but in the trees back of the home of Mrs. M. A. Jordan, two broods of young were brought out about a fortnight apart.

The progress of the Cardinal above McGregor to the mouth of Yellow River, a distance of five miles, has been marked. Mr. W. H. C. Elwell, who is on the river often in his launch, reports that he frequently sees or hears the species up to that point, but the bird has not yet appeared in Lansing, Iowa, a few miles farther up the Mississippi River. Its increase westward from the river has not been notable except up Sny Magill Creek for about four miles, where it has been found in small numbers. A farmer tells me that in April, 1913 he saw nearly a dozen Cardinals on the bluffs near this creek, and one was noted by the roadside in a severe blizzard on March 1. Still farther westward from this point the appearance of this species has been but temporary.

In Wisconsin the northern advance of the species has been at about the same rate of speed. It had pushed up the Wisconsin River as far as Blue River by the spring of 1909. In the next two years they had followed the course of the Kickapoo River for twelve miles to a point a half mile north of Steuben, where about the home of Mr. Lee Wanamaker they are fed in winter, and may be seen almost daily throughout the year.

In Wisconsin the northern advance of the species has been more rapid and over a wider territory than in northeastern Iowa. It had pushed up the Wisconsin River as far as the village of Blue River by the first of 1909. About the same time it was following the course of the Kickapoo River northward, until it was found in Gays Mills toward the last of December, 1908, a female Cardinal having been identified there by Miss Ellen Hammond. A year later she saw a pair of these birds six miles farther north, and not infrequently afterward the species was either observed by her, or reported to her as seen by others in various portions of the Kickapoo Valley.

A brief summary of the progress made by the Cardinal shows that from a very rare bird in 1906, by the autumn of 1913 it has become fairly common in several localities. From a point two miles below the mouth of the Wisconsin River it has pushed eastward along that stream upward of thirty miles, and northward along one of its tributaries a distance of thirty-two miles. On the Iowa banks of the Mississippi it has advanced and become common for at least eleven miles.

ALTHEA R. SHERMAN.

National, Iowa.

SOME LAKE ERIE SUMMER NOTES.

Studies of the feeding of nestlings in a dozen different nests of nine different species proved that all of the birds fed May-flies to their young in larger proportion than any other food. The May-flies were by far the most numerous insects in the vicinity of Lakeside, Ottawa county, where the studies were carried on.

In the woods north of the Marblehead lighthouse, a White-throated Sparrow was found breeding. One was found breeding at Cedar Point in 1911.

In the marshes in the vicinity of Sandusky, the Black Terns built their nests upon floating boards or other timber, almost without exception. This may have been due to the high water.

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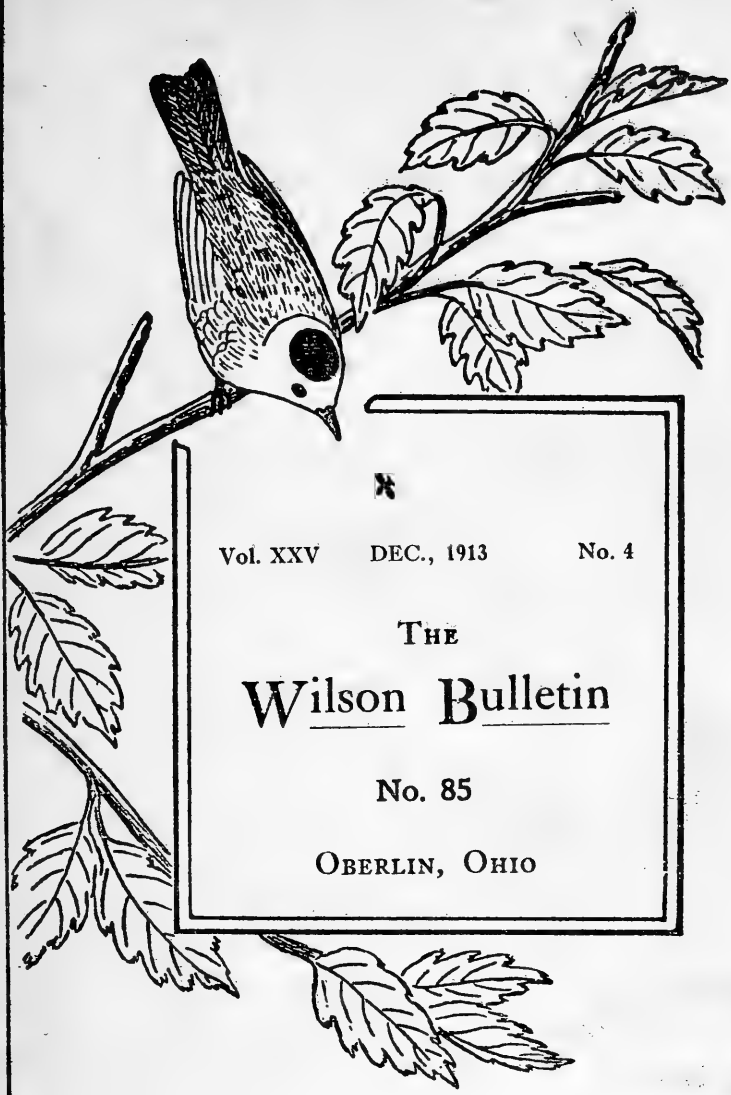

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No. 85

Oberlin, Ohio

WILSON ORNITHOLOGICAL CLUB

CONTENTS

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EXPERIMENTS IN FEEDING HUMMINGBIRDS DURING SEVEN SUMMERS.[1]

BY ALTHEA R. SHERMAN,
NATIONAL, IOWA.

The experiments herein described were begun without intending them to bear upon the question of the food naturally sought by the Ruby-throated Hummingbird (*Archilochus colubris*); the original aim of the feeding was to attract the Hummingbirds about the yard in the hope that sometime they would remain to nest there. The experiments have been conducted on independent lines without knowledge of any similar work that was being done by others until the autumn of 1912, except in one instance, where special acknowledgments are due Miss Caroline G. Soule of Brookline, Mass., who in Bird-Lore for October, 1900, described her success in feeding Hummingbirds from a vial, which she had placed in the heart of an artificial trumpet-flower made from Whatman paper and painted with water-colors. This suggestion of using artificial flowers was taken, but more durable ones were made from white oil-cloth, their edges were stiffened with one strand of wire taken from picture cord, and they

[1] Read at the 31st Annual Congress of the American Ornithologists' Union, New York City, Nov. 11, 1913.

were carefully painted with oil colors, the first to represent a nasturtium, and the second a tiger-lily.

In August of 1907 upon the appearance of a Hummingbird about our flowers the artificial nasturtium, tacked to a stick, was placed near a clump of blooming phlox, and its bottle was filled with a syrup made of granulated sugar dissolved in water. The next day a female Ruby-throat was seen searching the depths of tiger-lilies that grew north of the house; as she flew to the east of the house she was instantly followed, and was seen drinking from the artificial flower for the space of about a minute, after which she flew to a rose-bush, wiped her bill and rested a brief time before flying away. This was about noon. She returned at intervals of about a half hour for the next three hours, then at 3:10 o'clock she came back to search quite thoroughly the phlox blossoms, this being the first time she had paid any attention to them after finding the syrup. Ten minutes later she drank deeply from the bottle, and was seen no more that day.

In this way began the feeding of the Ruby-throated Hummingbirds, which has been continued each summer since 1907 with a varying number of birds. The first season it appeared that but a single bird found the bottled sweets. Perhaps it was the same bird that came the following summer, and was not joined by a second Hummingbird until the latter part of August. In 1909 the number was gradually augmented until seven of these birds were present together. The following year there were days when again seven came at one time; since then four have been the largest number seen together.

The days and weeks are calm and quiet ones when a single bird has the bottles to herself. More or less fighting ensues as soon as another bird comes on the scene, and the tumult of battle increases with each new arrival until the presence of six or seven of these tiny belligerents makes the front yard appear like the staging of a ballet. With clashing sounds and continuous squeaking cries they chase each other about, often swinging back and forth in

an arc of a circle with a sort of pendulum-like motion. Sometimes they clinch and fall to the earth where the struggle is continued for many seconds. So jealous are they lest others share the syrup that they seem more anxious to fight than to drink. When seven are present they are very difficult to count, and appear to be three-fold that number. We have read accounts of forty or a hundred Hummingbirds hovering about a tree or bush. Clearly these numbers must have been estimates, probably large ones, too, any one must believe, who has made sure that only seven birds have created the maze of wonderful and beautiful motion in which there seemed to be a dozen or a score of participants.

The number of bottles in use has been sufficient on most days to satisfy the needs of all the Hummingbirds present. Each new bottle has been added by way of an experiment. The first one was placed in an artificial flower painted to imitate a nasturtium, mainly yellow in color; the second flower in form and color closely resembled a tiger-lily. The experiment with the yellow and the red flowers was to test a supposedly erroneous theory which had been published to the effect that Hummingbirds show a preference for red flowers. In further proof of the fallacy of this statement the third flower, shaped like the nasturtium, was painted green, and was placed in a bed of green plants which at that time bore no blossoms. It was pronounced by other people to be "exactly the color of the surrounding foliage." It was staked out and filled on August 5, 1909, when no Hummingbird was in sight, but in about ten minutes some of the species had come, and fifteen minutes later one was drinking from the bottle in this green flower.

It was then suggested by my sister, Dr. E. Amelia Sherman, that I try a bottle without an encircling flower. The problem of supporting a bottle without an artificial flower was solved in this way: The bottle was encased in a piece of unbleached muslin, enough of the cloth extending beyond the bottom of the bottle to allow the tacking of it to a stick. The support of the bottle in a position slightly up from the

horizontal was furnished by a piece of leather with a hole in it through which the bottle was thrust, and the leather was then nailed to the stick. In this arrangement the most vivid imagination can find no suggestion of a flower. It was put out on August 8, and in forty-three minutes a Hummingbird was drinking from it. The bottle was then moved from proximity to the artificial nasturtium and tiger-lily, and a Hummingbird found it in its new location in thirty-two minutes. This place about eight feet from the artificial flowers has been its position in the four succeeding summers. In July, 1911, two more flowerless bottles were added to the group, making six in all. For convenience in referring to them the flowerless bottles will be called by numbers 4, 5 and 6.

Bottle No. 4 had not been long in use before it was noted that the Hummingbirds showed preference for it, while the nasturtium was sought least of all. This seemed due to the deep insetting of the bottle in the flower, which caused the birds to brush against its lower leaves, an unpleasant experience when sticky syrup adhered to it. For this reason the filling of the nasturtium was sometimes omitted for several days whereupon the Hummingbirds soon ceased to visit it, although drinking regularly from the tiger-lily a few inches away. When the filling was resumed the birds returned to it as they had been accustomed.

In the fourth season of experiments the bottle held by the green flower was put out when the others were, but was not filled for six weeks. During that time Hummingbirds were present and drinking on twenty-three days. It is safe to say that they were seen drinking fully four hundred times from the other bottles, but never once were they seen to approach the green flower. The first morning it was filled four of them were about the yard and one drank from this flower two minutes after the filling. The following year (1911) after dark on July 14 the green-flower bottle was set in its bed of green and was left empty for a few days. About noon on the 17th one of the Ruby-throats visited it, thrust-

ing in her bill; the bottle was then filled for the first time that year, and in a half minute a bird was drinking from it. To this is added a transcript from my journal bearing date of July 17, 1912; "About 9 A. M. before I had put out any syrup a Hummingbird was dashing from bottle to bottle and tried the green-flower one. It was bent over in the green foliage, and certainly has had no syrup in it for six weeks or longer. I filled it after I saw the bird visit it, and she came again to drink."

The new bottles No. 5 and No. 6 covered like No. 4 with white muslin and nailed to a weather-beaten fence picket were put out after dark on July 23, 1911, but neither was filled for one week. The next morning about eight o'clock a Hummingbird was searching one of these bottles for suspected sweets; four such visits were noted in one day and on several other occasions. At the end of the week the filling of No. 5 began but no syrup was put in No. 6 for two years. During these years a record was kept of each time a Hummingbird was seen to visit and search this unfilled bottle, and the total number was fifteen in addition to those visits already mentioned.

Thus far this writing has been confined to a description of the things seen; no theories have been advanced, no deductions have been made, no hypotheses have been carried to their logical conclusion. The first deduction offered is, that at the beginning of the experiments in 1907 the artificial nasturtium may have led the Hummingbird to explore its depths, and finding its contents to her taste she returned to it. Other birds may have found the syrup there in the same way, yet it seems more likely that most of them were led to the bottles by seeing another drinking. This probably was the case with the Catbirds that have drunk from the bottles on several occasions, although they have found it an inconvenient performance. The same may be true of a pair of Chickadees that drank as long as they remained with us. They clung to the stiff leaves of the tiger-lily and found no difficulty in the way of drinking. Only one Hummingbird

learned to perch on this flower and drink from it while standing. From the earlier experiments it was suspected that the Hummingbirds found the syrup through some sense, rather than stumbling upon it by chance or through imitation, but several things disprove such a supposition. The principal one is that migrants passing through the yard in the spring, but more especially in the fall, fail to find the syrup. That these migrants can be recognized as such by their behavior will be shown farther on.

The twenty-five or more visits paid to bottles No. 5 and No. 6 before they were filled for the first time show that the birds recognized them as receptacles for their food, though they were new bottles occupying new locations. To make sure that the birds should not be attracted to them by seeing me stake the pickets out this work was done after dark. The first summer that No. 6 was out frequent pretenses of filling it were made in sight of the birds, but no response followed. The next summer no such pretenses were made yet a Hummingbird was seen to search this unfilled bottle on May 12 and 31, twice on June 1, on July 21 and 26, on August 4, 7, 12, 23 and 26.

One is led to wonder if the Homeric gods on high Olympus were more deeply stirred by the appearance among them of the youthful Ganymedes bearing cups of nectar, than are the Hummingbirds at sight of their cup-bearer. When several of them are present the wildest confusion reigns. Possibly not one of them is in sight when the door is passed, yet instantly the air seems filled with them: some swinging back and forth in the air, squeaking and fighting, or darting from bottle to bottle thrusting in their bills as they pass, while an over-bold one will buzz about my head, sometimes coming under the porch in her zeal for the meeting; but the timorous ones fly from their perches into sight over the bottles then back into a bush. Some one of these types of behavior marks the bird boarder from the migrant. The latter pays no attention to cup-bearer or bottle but diligently searches each bunch of blossoms. For two or three weeks

after the drinking birds have left there is occasionally a migrant among the natural flowers. The bottles are full of syrup but it passes them unheedfully.

Habits seem to change when steady drinking is practiced, but in the case of the birds the habit does not appear to be a harmful one. At once she ceases to search the flowers and, like the typical summer boarder, she sits and waits for the food to be served. Each bird appears to have her favorite perch, a dead twig of syringa or lilac bushes on the north, or on the south in one of the snow-ball bushes; the telephone wires on either side of the street offer acceptable waiting-places at times. Not infrequently I have been intent upon other duties about the yard and looking up have found a Ruby-throat perched directly over-head, her bright eyes seeming to say "I want to be fed." So complete appears the cessation of the search for other food that it led to the keeping of a full record for the past three years of every time one of these birds has been seen catching insects or searching the natural flowers for food. Most of these instances noted were, if the whole truth could be learned, probably, cases of strangers just arrived within our gates, that had not yet acquired the drinking habit.

In 1911 the drinking birds were about our place on forty-three days. During that time on only four occasions was a Hummingbird seen catching insects or probing the flowers. A large number of plants called "Star of Bethlehem" had been raised, these flowers in previous summers having proved a great attraction to the Ruby-throat in the yard of a friend living two miles distant; but our drinking birds were never seen to visit these flowers. After their departure strange Hummingbirds searched them thoroughly as well as the phlox, tiger-lilies, sweet peas, nasturtiums and clover. These strangers were present on twelve days. In 1912 the drinkers were with us on seventy-seven days, and were seen but ten times seeking other food than syrup. In 1913 for forty-nine days the drinking birds imbibed, and on nine occasions a Hummingbird was seen gathering food elsewhere. In the

169 days that make the grand total for the three summers the Ruby-throats were seen drinking syrup between one and two thousand times, they were seen collecting food away from the bottles twenty-three times, but one cannot be positive that insect food was always taken then. Never for an instant was one of these birds in captivity, and there was the utmost freedom for it in choice of food.

This choice of a sugar diet together with the large amount consumed caused surprise and soon called forth the estimate that a Hummingbird would eat a tea-spoonful of sugar in one day. Some method of testing this estimate was sought, resulting in a plan for putting the bottles beyond the reach of the ants that swarmed about them: The stick that supported the artificial nasturtium and tiger-lily was nailed to a block of wood which was submerged in a flower-pot filled with water. For a short time this arrangement served very well until leaves and flower petals fell in forming rafts upon which the ants were able to cross. No myrmecologist was at hand to suggest a remedy, but at last ants' aversion to kerosene was recalled and the water was covered with a film of kerosene, which effectually debarred them. Nevertheless one day the ants were found taking the syrup as of old; an examination of existing conditions showed that a grass stem had lodged against the supporting stick, forming a bridge over which these wise little creatures were busily passing to and fro. Except when the bottles were isolated in this manner ants of various sizes and different colors fed constantly on the syrup often crowding a bottle to its very mouth, but this did not prevent the birds from drinking. I am not prepared to say that they never took an ant as food, but I have stood as closely as is possible to a bottle while a Hummingbird was drinking from it, and none was taken at such times. When a new bottle was placed, or the old ones were set out in the spring and filled it took from one to two days for the ants to find the syrup. A small red species generally, if not always, was the ant to make the discovery, the fruits of which it enjoyed

for a very brief season, a large black ant soon taking possession and holding the spoils for the rest of the summer.

The bottles, having been removed from the encroachments of the ants, were ready for the first test. One bird being the sole boarder at that time a level tea-spoonful of sugar dissolved in water was consumed by her daily. In time two, three, four and five Hummingbirds having joined her the quantity of sugar was increased accordingly, a spoonful or two being added to offset any possible waste. In this way more than a pound of sugar was eaten in twenty days, or to be more exact three cupfuls, weighing 9252 grains; which made an average of 462 grains per day. This for the six birds frequently counted as present confirmed the first rough estimate of a tea-spoonful of sugar daily for each bird.

Another method of estimating the amount eaten was devised. On several days the sugar and the water were carefully measured and weighed, then weighed and measured again, after which the syrup resulting from their combination was also measured and weighed, until I felt confident that in a dram of the thinnest syrup served there were forty grains of sugar, or two-thirds of a gram to every drop. But the syrup usually used was considerably richer than this, easily containing a grain of sugar in every drop; but it seems best in giving the estimates to keep them to the weakest grade of syrup ever served.

In making the test a dram of syrup was measured in a glass graduate, and bottle No. 4 was filled. This was always done in the morning when the bottle had been emptied by ants. A waiting Hummingbird came and took her breakfast after which the residue of syrup was poured back into the graduate, the bottle being thoroughly drained. Possibly a drop still adhered to the bottle, but the number of minims now in the graduate subtracted from sixty must have given very nearly the amount drank by the Hummingbird. In two summers a number of these tests were made. A bird took for her breakfast from eight to twenty minims, the average being fifteen. Using the low estimate of two-thirds of a

grain of sugar to each drop the average breakfast held ten grains of sugar. A better comprehension of the size of that meal may be gained by remembering that two large navy beans, or one medium-sized lima bean also weigh ten grains. Breakfast and supper were the Ruby-throats' heaviest meals, but there were many luncheons between them. By reckoning eight to nine such meals daily, (and beyond doubt there were that number), we reach again the first estimate of seventy to ninety grains of sugar as the daily ration. About this amount of sugar is held by a common tea-spoon when level full; such a spoon will hold from 110 to 120 minims of water, whereas one of those heir-looms, a grandmother's tea-spoon, is the measure of the standard tea-spoonful of sixty minims. Referring then to the standard measure the bird would be said to eat two tea-spoonfuls of sugar daily. An ordinary cube of loaf sugar contains the equivalent of this amount.

Reflecting upon the bulk consumed by so small a creature one naturally desires to know the weight of a Hummingbird. A little boy brought to us the body of a male, that had been shut into a machine shed, where its death may have resulted from starvation. Its weight was thirty-three grains. Naturalists in early days were vexed by the same question as is shown by a quotation given by Mr. Ridgway in his book on Hummingbirds. It is from "Philosophical Transactions," 1693, by Nehemiah Grew, who wrote: "I did weigh one (in those parts) as soon as ever it was kill'd whose weight was the tenth part of an Ounce *Avoirdupoise.*" From these weights one makes the deduction that our Hummingbirds are accustomed to eat of sugar twice their own weight daily. If human adults ate of sugar proportional amounts there would be required nearly three hundred pounds of this saccharine food daily for the average person.

No attempt has been made to tame the birds that came to drink, yet one, perhaps two of them, became bold enough to drink when a bottle was being filled; while she thrust her bill into the empty receptacle a spoonful of syrup was fre-

quently held touching the mouth of the bottle, but she did not learn to drink from the spoon. While drinking the tongue was extended about a quarter of an inch beyond the tip of the bill, and two or three drops were sipped before the bill was withdrawn. Once fifteen drops were taken with three insertions of the bill, and at another time the bird drank without the withdrawal of her bill for about the duration of a minute. At such times the bottle was free from ants, probably they were present when the drinking was done with numerous sips. Often a bird preferred to take her breakfast in courses, perching on a nearby dead twig for a minute or two between drinks.

During two of the seasons it was thought that some of the birds roosted on our place appearing as they did very early, and making a long day for feasting and fighting. In other years the birds were seen to fly eastward at night and their morning arrivals were not so early. One June morning a bird was ready for her breakfast at four o'clock, and took her last drink at night just before the clock struck eight. On some August days there are records of their presence at break of day, in one case it was thirty-eight minutes before sunrise. They usually lingered a short time after sundown, drinking long and deeply before taking their evening departure.

The conviction that the same birds were returning to us summer after summer began to be felt at the beginning of the fourth season. On May 26 of that year the first Hummingbird appeared on the place. The next day the flowerless bottle No. 4 was put out, and in a few hours a bird was drinking from it. For the next three weeks she was seen drinking from this bottle on every day except two, but not in the middle of the day; then for two weeks she was missed, returning again on the first of July.

The history of the fifth season was similar, Hummingbirds having been seen on May 22 bottle No. 4 was staked out and filled for a few days. No bird coming to drink, the bottle-filling had been discontinued, when on June 6 a Hum-

mingbird on suspending wings was seen searching this bottle, not finding syrup in it she flew to the spot always occupied by the flower-pot holding the artificial flowers, when they were in place. Over this vacant spot she hovered an instant before flying away. On a few other June days a bird of this species was present, and on the 17th one was seen drinking, but her steady summer boarding did not begin until July 9. In the sixth spring the species arrived earlier than usual. No bottles were out on May 7 when a Hummingbird was seen hovering over the customary place for the artificial flowers. As quickly as possible these flowers were put out, but before they could be filled the bird was thrusting her bill into the tiger-lily. She came to drink on most of the days thereafter until June 9, also June 14, 15 and 24, and on July 1 and 2; but it was not until July 16 that she came for constant drinking.

These dry and dull details have been given in full because two theories were based on them. That the birds of former years have returned to be fed seems unquestionable from their searching at once flowerless bottle No. 4, and from the other evidences offered. Because the birds came in May and at intervals in June and July, before becoming steady boarders about the middle of July, seems to indicate that they nested two or three miles away, too far for daily trips after incubation began. The supposition that these nestings were in the woods is founded on the fact that in leaving the birds flew in that direction, also because they were never found about the trees of the four farm-yards that intervene between our place and the woods. That in two summers a mother Ruby-throat returned with her daughter was suggested by seeing on several occasions two birds drinking together from one bottle, a phenomenon that needs explanation when we consider the pugnacious disposition usually exhibited by one drinker toward another.

In further confirmation of the foregoing is the history of the feeding in 1913. Bottles No. 4 and No. 6 were set out on April 30. For two months and a half no Hummingbird

visited them. It chanced on July 14 that the stick support of No. 4 was lying on the ground, leaving only No. 6 in position, when my sister saw a Hummingbird thrusting her bill into it. She hastened to fill this bottle, which was the first time it had ever been filled, and it lacked but eight days of two full years since it was first set out. Six days later I was in the orchard a hundred feet or more distant from the bottles, when a Hummingbird flew toward me and buzzed about my head as do no other birds except those that are fed. With greatly accelerated pulse I hurried to the house and filled the bottles. In exactly two minutes the Hummingbird was drinking from one of them; this was the first drinking witnessed in that year. It was one of my most thrilling experiences in bird study. Two marvelously long journeys of from one to two thousand miles each had this small sprite taken since last she had drunk from the bottles, yet she had not forgotten them, nor the one that fed her. She was quite prone to remind either of us when the bottles were empty by flying about our heads, wherever she chanced to find us, whether in the yard or in the street. Once having been long neglected she nearly flew into my face as I opened the barn door to step out.

The last experiment made was that of flavoring one of the bottles of syrup with vanilla, and later with extract of lemon, to see if the birds showed preference for the plain syrup or for the flavored. Both kinds were served at the same time, and of both the birds drank, showing no choice that could be detected.

It may already have been surmised from the gender of the pronoun used that it is the female only of this species that has the "sweet tooth." Never once in the seven summers has a male Ruby-throat been seen near a bottle. The drinking birds have been examined long and critically, with binocular and without, in order to detect on some of the birds the identification marks of the young males, but without success; moreover, had young males been present they, too, would have been apt to return in later years. This absence of the

males led to noting their scarcity in general, and to recording in note-book when and where a male at any time was seen. The entire number seen in the past five years has been six on our place and six elsewhere. It is impossible to do more than estimate the number of females that have been seen; but when it is remembered that on several days in two summers seven have been in sight at one time, it does not appear to be an over-estimate to place their number at twelve or fifteen for each year, or six times more of them than of the males.

The simple experiments herein described are such that they may be tried by any one having a yard frequented by the Ruby-throat. If any one doubts that the female of this species will choose a saccharine diet, when it is available, let him continue the tests until convinced beyond cavil or a doubt. It is especially desirable that the experiments be made in proximity to the nesting birds in order to see if the mother will feed syrup to her nestlings. Sometimes our Catbirds and Brown Thrashers have come into the porch to the cat's plate and taken his bread and milk for their nestlings. Upon this hint for needed aid I have put bread soaked in milk on the fence railing for them, and they have taken it also. It is reasonable to believe that in like manner sweet benefactions proffered to a hard-working Humming-bird mother might be acceptable to her, and shared by her with her nestlings.

NEST LIFE OF THE CATBIRD.

Dumetella carolinensis Linn.

BY IRA N. GABRIELSON.

The data, on which this paper is based, was obtained from partial studies of three nests of this species during the summer of 1913. One of these was watched at Sioux City during the last two days of the nestling period. This nest will be referred to as nest A in the paper. The other two nests were located at Lake Okoboji, Iowa. One was observed by Mr.

Arthur F. Smith for the first two days of the nestling period at the end of which time the young died. The second Okoboji nest was under almost continuous observation from the time the first egg hatched until a terrific rain storm destroyed the last of the young ten days later. The nest studied by Smith will be referred to as nest B, and the other one, as nest C in this report.

During the Sioux City work, Mr. Howard Graham, Rush Gabrielson, and my wife helped with the study. As far as I am aware Mr. Smith carried on his study alone. It was intended that the last nest (nest C) be studied and reported jointly with Mr. Smith. But he was detained, by other duties, from giving as much time to the work as was planned. However, the author is under obligations to him for frequent relief in the blind, and also for permission to make use of the data obtained from the study of nest B. I wish to thank Prof. T. H. Macbride for placing at my disposal the facilities of the Iowa Lakeside Laboratory. I am under obligations to a number of the students of the Laboratory for assisting in the work in various ways. I wish finally to express my thanks to Prof. T. C. Stephens for his advice and assistance thruout the work and in the preparation of this report.

Nest Location.

The Sioux City nest was discovered on June 15 and at that time contained three eggs. It was not visited again until June 28 when the young were about six days old. The nest was built in a partly broken down wahoo bush (*Evonymus atropurpureus Jacq.*) on the bank of a steep sided little ravine. The ravine was densely covered in most places by willows (*Salix sp?*), elderberry (*Sambucus canadensis* L.), and dogwood (*Cornus stolonifera* Michx.). The whole was overgrown with a tangle of vines of various species which made it almost impenetrable. Just across the fence was located a cherry orchard with blackberry and raspberry bushes between the tree rows. Nest B was discovered on June 24 in a small willow (*Salix longifolia* Mihl.) on the lake shore.

It was at the foot of a steep embankment and not more than twenty feet from the water's edge. No other vegetation was near except a few plants of *Stachys palustris* L. and *Polanisia graveolens* Raf. The nest was placed in a fork formed by four branches four or five feet from the ground. Nest C was found July 9 in a small, winding, densely wooded ravine leading back a short distance from the lake. It was placed in a small plum tree (*Prunus americana* Marsh.) which was growing in a dense thicket of wild raspberry bushes (*Rubus sp?*). The nest was built in a fork of the plum tree low enough to be covered entirely by the raspberry bushes.

In structure the three nests were practically alike. The lining was of fine roots and tendrils while the outside was of coarser material as twigs, string, and grass closely interwoven.

Nest A was discovered on June 15 and contained at that time three eggs. The blind was erected on the twenty-eighth and the nest was under observation June 30 and July 1 from 7:30 A. M. until dark. On the morning of the thirtieth the blind had been thrashed about by the wind until it required much repairing. While this was going on the parents were much excited, calling from the bushes and hopping nervously from place to place. Nest B was discovered June 24 and contained four eggs. The blind was erected June 31 at a distance of fifteen feet from the nest. On the second of July it was moved to within two feet of the nest and observations carried on the second and third. At the end of this time the nest was deserted. Nest C was discovered on July 9 and contained three eggs. On July 14 the blind was placed at a distance of thirty feet from the nest. From that point it was moved closer, daily, until on the twentieth it was five feet distant which was as close as it seemed necessary to bring it. This nest was under almost constant observation from 11:30 A. M. on the twenty-first to the evening of the thirtieth.

INCUBATION.

No data on incubation was secured in either of the first two studies and nothing very definite as to the length of the period in the last one. Nest C was found on July 9 and the first egg hatched on the twenty-first while the last one did not hatch until the morning of the twenty-second. This would make the incubation period at least twelve or thirteen days. The position the female assumed while incubating was characteristic. She came on the nest facing the blind and settled into it by a series of motions from side to side, working the feathers of the breast and belly well around the eggs. When she was down in the nest her tail stood almost perpendicular to the body and the head was well thrown back.

HATCHING.

Mr. Smith watched the hatching of one of the eggs in nest B while two out of three in nest C hatched during the time the nest was under observation. The first egg in nest B hatched before the study began but the second was observed to hatch on the morning of July 3. The other two eggs never opened as the nest was deserted on this same day. Mr. Smith says concerning the hatching of the second egg: "At 4:55 A. M. one more egg was pipped, evidently by the old bird, as it was chipped inward and directly around the center of the egg. This egg hatched at 5:55 A. M., the young bird forcing the shell open by rolling and plunging gently and by some use of the feet and wings. At 6:45 the female carried away half of the shell and returned at 6:48 with something in the bill which she swallowed, tho I could not determine whether it was the crushed shell or food. She left the nest at 6:53 only to return at 6:55 and take away the remaining shell."

In nest C the first egg was pipped at 9:00 A. M. on July 20 and at 7:00 P. M. all three were pipped in practically the same place. The first break in each shell came from within and was a little beyond the center of the egg toward the larger end. It was simply a slight bulging evidently pro-

duced by a blow from the beak of the young bird. A series of little cracks radiated in all directions from this place. The next thing noticed was the extension of a series of these bulges around the egg at right angles to the long axis. At 11:30 A. M. July 21 one egg had hatched and the shell had been removed. The two other eggs had four of these breaks extending about half way around the shell. From this time until three o'clock there was no change in appearance altho a number of times the female picked gently at the cracked places. On these occasions I could not see that she took anything away altho she undoubtedly broke the shell a little by these actions. At 3:00 P. M. she left the nest and was hardly out of sight when the egg she had been picking began to hatch. A dark line appeared around the shell and enlarged in a series of tiny jerks until I could see the young bird kicking and twisting within. The crack grew steadily wider until it was fully half an inch wide on the top of the egg, tho it had hardly opened at all on the side next the nest. At this point the female returned and immediately commenced picking at the shell membrane which still held the two pieces of shell together. As it came away a bit at a time, she swallowed it, repeating the process until the two pieces had fallen apart. She then seized the smaller piece (the big end of the egg and the one that contained the head of the nestling) and carried it away, leaving the nestling still in the remaining piece. In less than a minute she returned and seized the membrane still attached to the shell. As she pulled on the membrane, the nestling was lifted clear of the nest but fell back without injury. On the second attempt it pulled loose and tumbled the young one into the nest. The membrane was quickly swallowed and the remaining shell carried away. She returned immediately and picked the small bits of shell from the bottom of the nest, devoured them and commenced to brood. The actual process from the time the crack appeared until the last bits of shell were taken from the nest did not exceed ten minutes.

At 9:28 the next morning (July 22) the female partly rose from the nest displaying the separating halves of the last egg. The process was practically the same as that previously described. The parent again took the smaller piece of the shell first. She then returned and picked at the remaining piece two or three times and brooded for twelve minutes before any other move was made. At the end of that time she rose in the nest, picked the bird up in the shell and then let it down again. The shell then came away from the nestling and was removed, the small pieces being picked carefully from the nest as before.

In these three instances the hatching process seems to have been much the same. In each case it was due to the combined efforts of the parent and the young bird within the egg. In the first case the initial movement may have come from the female while in the last two it originated with the young. In all three the female assisted by pecking at the egg and by removing the broken shell from the nestling much sooner than it would have been able to free itself from the pieces.

In the Sioux City study the young were marked with string on the leg. One nestling A, being without any string, B with a brown string, and C, a white string. In nest B Smith marked the first one hatched with blue dye and the second one which died in a short time was not marked at all. In nest C two methods were tried. The nestlings were first marked with aniline dyes. In this way the first one hatched was marked blue, the second with brown, and the third was not marked at all by this method. The dyes did not give satisfaction as they had to be renewed several times a day to render the colors distinct to an observer in the blind altho they could be readily distinguished on a closer examination. After this method was tried, strings were fastened to the legs of the young and they will be designated as Blue, Brown, and White.

MARKING THE YOUNG.

Brooding.

The parents did no brooding during the time nest A was under observation. This study was made during the last two days of the nest life and the young birds were well feathered out. The weather was bright and warm, eliminating brooding as a protection from cold and rain and the nest was also well shaded thruout the day, likewise doing away with brooding as a protection from the direct rays of the sun. The study of nest B was too brief to obtain any data on brooding. Table I will show the time spent in brooding while nest C was under observation.

TABLE I.

BROODING TIME EACH DAY. NEST C.

Date	Brooding Time	Total Time	Per cent of Brooding
July 21.....	5 hr. 53 min.	7 hr. 35 min.	77.58
July 22.....	11 hr. 2 min.	15 hr. 50 min.	69.68
July 23.....	6 hr. 51 min.	13 hr. 40 min.	50.11
July 24.....	8 hr. 49 min.	15 hr. 30 min.	56.88
July 25.....	12 hr. 4 min.	15 hr.	80.04
July 26.....	5 hr.	14 hr. 35 min.	34.28
July 27.....	7 hr. 26 min.	15 hr. 40 min.	47.44
July 28.....	4 hr. 50 min.	15 hr. 15 min.	31.69
July 29.....	4 hr. 55 min.	15 hr. 20 min.	32.17
July 30.....	5 hr. 54 min.	14 hr. 45 min.	40.
Total	72 hr. 44 min.	143 hr. 10 min.	50.80

This table shows a tendency for the brooding time to decrease each day until it becomes about 30% of the observation time at which point it seems to reach the minimum. To warrant any conclusions in regard to this point it would be necessary to have practically the same weather and temperature conditions thruout the study. On two days, the twenty-second and twenty-fifth it rained steadily for several hours and the brooding time was proportionately increased, as the young were brooded most of this time. On the twenty-second it rained almost steadily from 11:00 A. M. to 5:20 P. M. and during this time the nest was uncovered only fourteen minutes. The absences, which were of short duration,

occurred at irregular intervals. The longest unbroken brooding period lasted for one hour and twenty minutes. Similarly on the twenty-fifth the nest was uncovered only nineteen minutes during the rain which lasted from 4:30 A. M. to 9:40 A. M. The longest brooding period on this occasion lasted three hours. Out of the total brooding time of 12 hours 4 minutes for this date, 5 hours 6 minutes were directly due to the rain. Leaving out of consideration these rainy days, the brooding time seemed to be divided into three more or less distinct periods. The first period from 4:30 A. M. to 7:30 A. M.; the second from 10:30 A. M. to 2:00 P. M.; and the third from 6:30 P. M. until dark. The first period was undoubtedly as a protection against the chill of the early morning which often made sitting in the blind uncomfortable work. During the second period the sun's rays fell directly into the nest and the brooding at this time was for protection against their heat. It was noticed that this period never commenced until the rays were falling into the nest and ceased as soon as the afternoon shadows were sufficient to completely shade it. Unbroken brooding periods for an hour or more were not uncommon at this time. The brooding in the evening was possibly merely preliminary to settling down on the nest for the night and was the most variable of the three. It commenced to become dark in the little ravine at about 6:30 and by 7:30 it was usually too dark to distinguish objects from the blind. On the twenty-ninth and thirtieth the noon period was very distinctly marked and consumed the greater part of the brooding time. On the twenty-ninth the early brooding totaled thirty-eight minutes, the noon period three hours and ten minutes, and the remainder was rather widely scattered thru the evening. On the thirtieth only twenty minutes were spent in brooding in the early morning, while four hours and fifty-four minutes were consumed at noon, and twenty minutes in the evening. The increase of the mid-day brooding on the thirtieth was due to the intense heat, local thermometers registering 100 degrees F. or more.

The position assumed in brooding depended on its purpose. In protecting the nestlings from rain or cold the positions were the same. The female settled down on the nest until it was completely covered and the feathers of the breast were well down over the young. It was also noted that she generally faced the wind. In brooding as a protection from the heat, she stood on the edge of the nest, with her back to the sun, wings spread, feathers of the breast ruffled and mouth open. From this study the brooding time seems to depend on three factors, viz.—temperature, rainfall, and age of the young. The temperature factor will of course be modified by the length of time the nest is shaded by the surrounding vegetation. As the young become older the brooding becomes less intense for heat or cold but remains about the same as a protection against rain.

Feeding.

Few feeding records were obtained from nest B as the parents were very shy and finally deserted the nest. Altogether only six feedings were recorded and in but three of these was the food determined. In these three feedings 1 larva, 1 fly, and 1 bug were fed. The parents both approached the nest at various times with food but either ate it themselves or went away still carrying it in their beaks.

NEST A.

During the study of nest A which was under observation twenty-five hours and twenty minutes, on June 30 and July 1, 206 feedings were recorded. On twelve of these feedings two nestlings were fed making a total of 218 in which 241 morsels of food were given. The fact that the undergrowth was so dense prevented accurate determination of the sex of the parent feeding. For this reason no attempt is made to state the amount of feeding by each parent. It is known that both assisted in this work as on several occasions they came to the nest together with food.

An examination of table II reveals two interesting facts.

First the great variety of food given to the nestlings and second the insignificant amount of fruit used as food considering its availibility. One cherry and nine blackberries were fed in the two days. This is about 4% or less than half the amount used by a pair of brown thrashers studied by the author[1] in the same vicinity in 1912 who fed 8.75% fruit.

TABLE II.

NESTLING FOOD FOR NEST A.

FOOD	JUNE 30	JULY 1	TOTAL
Unidentified	15	24	39
Cricket	23	12	35
Larvæ (moth and beetle)	3	4	7
Cutworms	19	3	22
Maybeetles	4	5	9
Tomato worms	3	11	14
Grasshoppers	9	5	14
Flies	3	5	8
Beetles (except maybettles)	4	13	17
Worms	8	20	28
Spiders	2	..	2
Caterpillars	4	..	4
Maybeetle larvæ	7	5	12
Butterflies	1	1	2
Katydid	1	2	3
Wireworm	1	..	1
Cankerworm	1	1	2
Centipede	2	1	3
Cabbage worm	1	1	2
Mayfly	1	3	4
Ant	..	2	2
Dragonfly	..	1	1
Blackberry	4	5	9
Cherry	..	1	1
Total	116	125	241

The remaining 96% of the food consisted of many insect forms of which the following total 116 or 48.29%:—maybeetles and larvae, cutworms, flies, crickets, grasshoppers,

[1] Proceedings of Iowa Academy of Science for 1913.

cabbage worms, and tomato worms or some closely related species. This list includes many of the most troublesome and injurious insect pests in this vicinity during the summer and any species of bird which aids in their destruction must be beneficial to some extent. The parent birds were not noted eating the cherries or blackberries themselves altho a few were fed to the young.

NEST C.

The study of nest C which was under observation for 143 hours and 10 minutes, yielded 517 feeding records. On 51 of these visits two nestlings were fed making 568 feedings during which 596 morsels were fed. There was certainly no regurgitative feeding in this instance as two of the nestlings were under observation from the time they hatched. At 11:55 A. M., July, 21, the female approached with a measuring worm an inch long and tried several times to give it to Blue. When after numerous attempts he could not swallow it, she devoured it herself. The first food Blue was observed to get was a smaller measuring worm, and the next, a small beetle. Brown hatched at 3:07 P. M. and in just an hour received a measuring worm, followed by a fly. White was given a mayfly as his first food. Many times during the first few days of feeding the female brought grasshoppers and worms too large for the young to swallow. The method of procedure in such a case was always the same. Each nestling was tried several times and if the morsel was not then taken it was swallowed by the parent. The female did all the work in caring for the brood while the nest was under observation. This included all the daylight hours from the hatching of the first egg until the feeding activities were over, with the exception of about four hours. The male was noted several times each day, singing and foraging in the near by shrubs. Twice he approached the nest with food but did not feed the young.

From the beginning of the study Blue, who was at least five hours older than Brown and twenty-two hours older

than White, was favored in the feeding. At every approach of the parent bird with food, he would climb over the other two, and, by reaching further up than they, succeed in getting most of the food. From the first day, all three nestlings raised their opened beaks at any slight noise or jarring of the nest. With Blue getting most of the food it was only a question of time before the other two would perish. Brown was the first to succumb. He was fed at 4:35 A. M. on July 24 but from that time was totally ignored. For a time he would raise his head, open his mouth, and give the peculiar coaxing call many young birds use, but gradually he grew so weak that this was impossible. He soon lay on the bottom of the nest under the others and died before noon. The body was still in the nest at dark but had been removed by 4:30 the next morning. It may have been removed at night but it is more probable that it was done before the observer entered the blind that morning. From noon on the twenty-fifth, White was noted to be getting less and less of the food. Blue was at least twice the size of White and, on every approach of the parent, would stretch far up out of the nest with loud cries, at times completely covering him. As Blue received more of the food he became more able to trample over White and crowd him out of place. If White did succeed in getting a favorable position, Blue, on the appearance of the female, would climb over him pushing him into the bottom of the nest. On the twenty-seventh he was fed only twice: once, at 5:00 in the morning; once, at 7:11 P. M. On the morning of the twenty-eighth an unsuccessful attempt was made to force the feeding of White by removing Blue from the nest. The female immediately tried to feed him but brought insects too large to be swallowed. Blue was finally replaced in the nest and instantly commenced to appropriate all the food as before. White gradually weakened and by 9:30 was dead. The body remained in the nest until 4:25 P. M. when the parent seized it by the posterior end and flew away with it. Blue was fed up to the evening of the thirtieth and was just about ready to leave the nest at that

time. The blind was closed at 7:30 with the female on the nest. During the night a terrific rain and wind storm occurred, and when I entered the blind the next morning at 5:00 the female was on the nest but it was wet thru and Blue was dead.

The death of the nestlings thru the feeding period and the lack of assistance by the male accounts for the much lower number of feedings as compared with the brown thrasher studied in the same vicinity in 1911[1] and the yellow warbler as reported by Bigglestone.[2] The brown thrasher made 775 visits in 56 hours, the yellow warbler 2373 in 144 hours and 53 minutes, and the catbird only 517 in 143 hours and 10 minutes. This total does not include visits where food was brought to the nest and then devoured by the parent.

The distribution of feedings thru the various days was as follows: July twenty-first, 10 feedings; twenty-second, 35 feedings; twenty-third, 38 feedings; twenty-fourth, 57 feedings; twenty-fifth, 39 feedings; twenty-sixth, 71 feedings; twenty-seventh, 55 feedings; twenty-eighth, 64 feedings; twenty-ninth, 96 feedings; and the thirtieth, 51 feedings. It will be noted from this data, that the daily number of feedings shows a tendency to increase. This is disturbed by three factors. First, after the death of each one of the two young, Brown on the twenty-fourth and the twenty-sixth when White ceased to receive food, there is a decided drop in the number of feedings. Second, on the twenty-fifth, one of the rainy days, the number of feedings is lowered. The other rainy day, the twenty-second, came too close to the beginning of the study to make it possible to say how much the number of feedings was affected. On these rainy days the female was almost constantly brooding during the storm and consequently the time for hunting was much shortened.

[1] A Study of the Home Life of the Brown Thrasher. (*Toxostoma Rufum* Linn.), by Ira N. Gabrielson. Wilson Bulletin, Vol. XXIV, June, 1912.

[2] A Study of the Nesting Behavior of the Yellow Warbler. (*Dendroica a. æstiva*), by Harry C. Bigglestone. Wilson Bulletin, Vol. XXV, June, 1913.

Third, the extreme heat of the thirtieth seemed to make the parent very sluggish as she did practically nothing but sit in the bushes during the greater part of the day. During the first two days of the feeding activity, the female gave a soft call as she approached the nest with food. At this call every head came up. At the end of the second day this call was practically discontinued and the nestlings had learned to detect her approach by the shaking of the bushes.

TABLE III.

FOOD GIVEN TO NESTLINGS IN NEST C.

INSECTS FED	21	22	23	24	25	26	27	28	29	30	Totals
Unidentified	3	4	21	20	12	11	17	27	29	17	161
Measuring worms	3	4	3	3	2	1	1	3	..	1	21
Beetles	1	1	2	16	..	16	2	1	8	8	55
Flies	1	11	6	7	26	26	5	8	8	1	99
Larvæ	2	4	3	5	5	10	5	2	9	7	52
Mayflies	..	5	5	3	5	2	6	1	13	2	42
Moths	..	3	3	..	2	6	7	3	4	7	35
Grasshoppers	..	2	2	6	..	6	6	7	10	1	40
Wireworms	..	2	..	..	..	..	..	3	..	..	5
Katydids	..	..	1	1	..	2	1	1	3	..	9
Worms, var. sp.	..	..	1	2	2	4	2	3	4	3	21
Spiders	..	..	1	..	..	2	..	2	7	5	17
Dragonfly	..	..	..	1	..	1	2	2	..	..	6
Caterpillar	..	..	..	..	1	..	3	1	3	..	8
Mosquito	..	..	..	..	..	1	..	..	..	..	1
Butterfly	..	..	..	..	..	1	1	..	..	1	3
Cricket	..	..	..	..	..	..	2	3	5	1	11
Raspberry	..	..	..	..	..	..	..	..	7	1	8
Small frog?	..	..	..	..	..	..	..	..	..	1	1
Gooseberry	..	..	..	..	..	..	..	..	..	1	1
Total	10	36	48	64	55	89	60	67	111	56	596

Under table III the unidentified includes those insects so small they could not be identified with certainty, those unknown to the person in the blind, and those so badly mangled as to be unrecognized. All of the beetles were put in one class as the number of each species was very small. Among the 55 beetles fed were recognized may-beetles, click beetles,

tiger beetles, water beetles, and snout beetles of various species. The flies were mostly fish flies tho house and stable flies were also noted. On one occasion a small frog was thot to have been fed. On the last two days of the study, wild raspberries and gooseberries were fed in small numbers. Under the title "larvae" is included all moth and beetle larvae. A few cutworms and may-beetle larvae were among them. Of all the insects used as food, flies were the most easily obtained. These and the grasshoppers were the two most conspicuous forms in the little ravine in which the nest was located. The flies were to be seen in large swarms over the bushes and the grass contained numbers of grasshoppers.

Of the 596 morsels fed, 99 or 16.61% were flies; 40 or 6.71% were grasshoppers; 142 or 23.82% were beetles, moths and their larvae; and 9 or 1.51% fruit (raspberries and gooseberries). The remaining 51.35% was made up of various insect forms in small numbers. The fruit consumed is not of any economic importance as it was all wild fruit. It is important only as further proof of the feeding of fruit to the nestlings when it is available. Deducting this 1.51%, we find that 47.14% of the nestling food in this case was composed of flies, grasshoppers, beetles, and moths, practically all of them injurious.

The most significant fact of the two studies is the great variety of insect species used as food. From these and other studies, the conclusion is drawn that the most available supply of food is largely used. Both of these little ravines teemed with insect life and as a result no one or two species stand out prominently as the source of food supply. In the study of nest C, flies were noted to be exceedingly plentiful among the bushes and many times were caught from the nest or near it but other insects were also numerous and flies do not furnish any unusual part of the food. In the case of the brown thrasher previously mentioned, it was found that grasshoppers, moths, mayflies, and cutworms totaled 1012 out of 1260 morsels fed or 80.31%. This was undoubtedly due to location. The nest was on a dry hillside with only a few scat-

tered trees and the insect forms to be found in any numbers were limited to the forms mentioned. The yellow warbler nest was located in the same kind of a ravine as the catbird nest C and the variety of insects was great, as is shown by the report. It would seem then, that the accident of location has considerable influence on the character of the food given to the nestlings. For example, location in a position representing a variety of conditions of vegetation, shade, soil, and moisture will cause a wide variety of insect species to be fed. On the other hand, a situation presenting few of these variations will limit the number of species fed and will very probably cause one or two forms to furnish a large percentage of the food. The surrounding area need not be large to furnish these conditions as all the birds yet studied seem to forage within a comparatively small area around the nest.

DISTRIBUTION OF THE FOOD TO THE NESTLINGS.

In nest A, nestling A who had left the nest at 11:16 A. M. on July 1 received 47 feedings while B and C who stayed until night received 83, and 88 feedings, respectively. Up to the time A left, B had received 41 feedings and C 60 to A's 47, or an average of 49 to each nestling. No regularity was noted in the feeding, the same one being fed three or four times in succession during some periods.

During the study of nest C, the distribution of the food to the nestlings was interrupted by the death of two out of the three nestlings while the nest was under observation. Table IV shows something of the distribution of the feedings and food during the ten days.

TABLE IV.

SHOWING THE DISTRIBUTION OF FEEDINGS IN NEST C.

DATE	UNDETERMINED	BLUE	BROWN	WHITE	TOTAL
July 21.....	..	6	6	..	12*
July 22.....	7	16	14	3	40*
July 23.....	10	18	13	12	53*
July 24.....	2	40	1	24	67*
July 25.....	5	29	..	13	47*

July 26.....	1	54	..	27	82*
July 27.....	1	53	..	2	56*
July 28.....	..	64	..	..	64
July 29.....	..	96	..	..	96
July 30.....	..	51	..	..	51
Totals	26	427	34	81	568

* On some feedings two of the nestlings were fed.

As shown by the table, Blue received an unequal share of the food almost from the first. This share increased rapidly until the death of White, after which, he of course received all of it. This is probably not an unusual happening in the bird world altho not often witnessed. From the studies already mentioned and from others whose results have not been published, it seems that the distribution of the food is governed to a considerable extent by the strength of the nestling rather than by the exercise of any instinct or judgment of the parent feeding,—that is the nestling which is able to make the greater outcry and also make himself the most conspicuous almost invariably receives the food. This fact stood out most markedly in the study of nest C but has also been noted in other studies. On the other hand if the nestlings were nearly equal in strength the food would be more equally distributed. With both parents feeding this factor might not operate rigorously enough to cause the death of any nestling, on account of the more abundant food supply. It did not appear in this case, that the male was kept away from the nest by fear of the blind, as he was continually noted in the bushes near by and one of his favorite perches while singing was a spot in the raspberry bushes much closer to the blind than was the nest. His action must have been due to some unknown factor as the male catbird, does in some instances, at least, assist in the feeding process.

SANITATION.

In the sanitation of the nest the catbirds, were in all the studies, found to be scrupulously clean. Not only was the

excreta rarely allowed to touch the nest but the parents were continually picking parasites from it and the young. On several occasions the female in nest C probed vigorously in the bottom until the nest and the tree in which it was located vibrated violently. The shells, even to the smallest piece, were carefully removed.

From nest A, the excreta was removed 73 times while it was under observation. 67 sacs were removed from the bird last fed. The excreta was devoured 54 times and carried away 19 times. The place of depositing the sacs was not discovered, as it was impossible to follow the movements of the parents in the dense shrubbery. On one occasion while both parents were at the nest, one of them took a sac from one of the young and started to devour it. The other parent seized it and tried to pull it from the first one. After several vigorous jerks the sac broke and each one devoured the piece retained.

In nest C, as in A, the excreta was rarely allowed to touch the nest but was taken directly from the young. During this study the excreta was removed 125 times, 88 times from the nestling last fed, 20 times from some other one and in 17 instances it was not determined.

TABLE V.

SHOWING METHOD OF EXCRETA DISPOSAL. NEST C.

DATE	DEVOURED	CARRIED AWAY	TOTAL
July 21	3	..	3
July 22	20	..	20
July 23	16	..	16
July 24	20	..	20
July 25	12	..	12
July 26	13	4	17
July 27	4	6	10
July 28	4	8	12
July 29	1	9	10
July 30	2	3	5
Total	95	30	125

Table V shows that up to the sixth day the excreta was always devoured. From this day part of it was devoured and the remainder carried away. The proportion carried away, increased to the end of the study. When carried away, it was usually taken across the ravine and out of sight among the trees. Occasionally it was taken around the blind and carried toward the head of the ravine. In either case we failed to get any data as to the final disposition.

MISCELLANEOUS BEHAVIOR AND INCIDENTS.

On approaching and leaving the nest, the behavior was fairly constant. There seemed to be, in nest A, little variation in the method of coming to the nest and both parents used the same path. They always came in sight at a certain point in the undergrowth and then came by hopping from one branch to another. Much of the time they used the same branches. In leaving a variation was noted altho in the majority of visits they returned over the same route as they approached. At other times they flew directly toward the blind from the nest and then either passed over or flew around it. In nest C the method of approach was less stereotyped. During the first five days one method was used but from that time others were used, altho the first one continued to be the favorite. The first method was to fly to the raspberry bushes at a point directly opposite the blind and come to the nest by hopping from branch to branch. The second method, and the one least used, was to fly directly to the nest, alighting on the edge next to the blind. The last method was to fly to one of the guy ropes of the blind and hop from there to the nest over the tops of the bushes. In leaving, the same three paths were followed, the first one being generally used.

The difference in the behavior of the catbirds toward the blind made an interesting study. At nest A the parents never exhibited any marked fear of the blind, even while it was being erected, but stayed in the bushes two or three yards away hopping nervously about and scolding harshly. After the blind was erected they soon became used to its

presence and used the guy ropes as perches. The blind was placed very close to nest B and may have had more effect on the parents for that reason. At any rate they became more timid and shy each day and finally deserted the nest. At nest C the female scarcely paid any attention to the blind while it was being erected or afterwards. Persons could pass in and out at any time and conversation in loud tones could be carried on in the blind without disturbing her in the least. She would hardly leave the nest long enough for us to mark the young and then generally sat a few feet away and watched proceedings without making any fuss. At one time during the study a platform was built inside the blind to level the floor. The sawing and hammering necessary to do this did not cause her to leave the nest. The male apparently paid little attention to it as he hunted right up to the edge and many times sat on the bushes within two or three feet of it while singing.

In this connection, I recently received some interesting notes from Mr. Harry C. Bigglestone regarding an attempt to study a catbird nest in 1912, and with his permission I will introduce them here. " * * * From my observations, the old birds would not feed when any one was in the blind. They would remain in the vicinity and call but would not approach the nest. I would sit in the corner out of sight of the nest and watch closely but never saw the old bird feeding. The young at times became nearly frozen and starved to death, so I would leave and sit in a path forty or fifty feet from the nest watching from there. The old birds soon started feeding but stopped again as soon as the blind was entered. This was repeated several times and always with the same results. After attempting observations for two days and the plan of staying even at intervals thruout the day had proven unsuccessful, the blind was removed." These instances show the amount of individual variation noted in the different pairs.

Nest C seemed to be quite a curiosity to the birds of the vicinity judging by the number of visitors it had. A king-

bird, brown thrasher, and yellow warbler. each came once and looked into the nest. The female paid no attention to the kingbird or warbler but was somewhat disturbed by the thrasher. Blue jays frequently came into the neighborhood and on these visits the catbird's actions were always the same. If she happened to be away from the nest, she flew to some perch from which she could watch both the nest and the jays, and remained there until they left. Her favorite perch at these times was the dead branch of an ash tree about thirty feet from the nest. If she were on the nest when they appeared, she merely settled down and remained motionless until they left. A flicker came blundering into the blind two or three times and hopped on the platform in pursuit of ants. Once he approached within a foot of my chair before he noticed me and flew out with a squawk of fright.

Of all the visitors, a house wren furnished the most amusement to those in the blind. Several times every day, he hopped to the edge of the catbird's nest and sat there inspecting it for some time, turning his head first on one side and then on the other. When the catbird appeared, he would fly around the blind. This particular wren seemed devoid of fear, as he entered the blind one or more times each day either thru the ventilator or the opening at the back of the blind. Twice he flew into the observation opening within six inches of my face to get away from the nest at the approach of the catbird. Usually she paid little attention to him, but twice flew at him and drove him away.

A chipmunk at one time climbed into a little plum tree next to the nest, during the absence of the catbird. On her return she flew at him with such violence as to knock him from the tree to the ground. On one occasion a cat, and on another a dog, passed thru the ravine near the nest. Both times she remained on the nest but was unmistakably uneasy as long as they remained in that vicinity.

The departure of only one of the nestlings was observed and that was nestling A from the Sioux City nest. His de-

parture was accomplished very simply. At about 11:15 A. M. he climbed to the edge of the nest and attempted to jump to a twig a short distance away. He fell short and tumbled to the ground without injury. At this time the parents appeared and coaxed him off into the thick underbrush in the ravine. The next morning both of the others were gone from the nest. In nests B and C the young all died before they were old enough to leave.

Marshalltown, Iowa.

BIRD NOTES FROM THE SOUTH-WEST.

BY J. L. SLOANAKER

It was with no little delight at the thought of new friends to be made in a new bird-world, that the writer prepared to leave his home in central Iowa during the intensely cold weather of middle January, 1912, and seek the warm sun and dry cactus covered sands of southern Arizona. Tucson, the metropolis of Arizona, and situated only 70 miles from the Mexican line, was our goal; and the period from January 25 to April 25 — the Arizona springtime — our stay.

Bird lovers who are wont to travel occasionally, especially those who come from the East and go into the far West or South, are indeed treated to a wealth of strange sights and new forms in the scientific world, pleasures which are not vouchsafed those who must remain in their home bird-world, but which, fortunately, can be partially enjoyed through the recorded experience of others. Stories concerning the great South-west had always intensely interested us, and we departed with a resolution not to permit other duties to rob us of the time necessary to experience as much as possible. And although there is more recorded information from Tucson than from any other part of the South-west we present our notes herewith, hoping that we may add something of interest.

By the 20th of January we were off and away, eagerly

scanning the stretches of new country which unfolded themselves as the train proceeded and straining our eyes, already half blinded by the dazzling snow, to catch a glimpse of any new bird that might be within range. Our interest was soon rewarded by the sight of numerous birds that in this day rarely breed in central Iowa, although rather common during certain winters, namely, the Prairie Chicken (*Tympanuchus americanus americanus*), most of which have probably gone to help decrease (?) the cost of living. Our railroad followed a creek and then a river, through a country composed of woodland and cornfields, and at almost every siding corn was being loaded into cars. Here there was much waste of corn on the ground, and after the train and wagons had departed, the "chickens" flew up to feast. One small tree in the edge of a pasture and the ground underneath was black with the birds, and from the great numbers seen we concluded that they were present in the greatest numbers in recent years.[1]

In the Centerville, Iowa, district, and from thence southwest to Kansas City the Rock Island takes us through a country underlaid with coal and chopped by deep, wooded ravines, an ideal country for hawks and owls. We wished that we could tarry a while to hunt them up, but the train rushed on as we dreamed of the rare finds we might have made could we have stopped there. Early the next day we were at Hutchinson, Kansas, noted for its saltworks, as is also Salina (hence the name). As we rushed onward we dreamed again, this time of the ancient days in Kansas when its billowy surface was the bed of an inland sea, where lived *Hesperornis* and others of its kind, in a world of their own, only recently (1873) made known to man. How we wished that we could take a side trip to the University museum to "view the remains"! The rest of the day, as we traversed the lonely plains of the Texas Panhandle, we were delighted and saddened in turn as we attempted to identify the hundreds of hawks circling about, low down, when disturbed

[1] More fully discussed in Wilson Bulletin No. 78.

and frightened from their feast — the equally numerous dead bodies of cattle that had perished in the recent blizzard. We closed our eyes upon the dismal scene, thankful that the approaching darkness would soon completely hide it, and that the night's travel would reveal to us a new country, the borderland of summer.

As if to welcome us, as we alighted from the train next morning to stretch our legs in the station yard at El Paso, the friendly though wary Ravens came sailing about, carefully watching the back door of the nearby restaurant with one eye, while with the other they followed the porters carrying supplies to the diner. Always looking for a "scrap"! So we tossed them one from the remains of our lunch and tried to make friends with them, but can only report that Mr. Raven is a very cautious gentleman, speaking his greetings from a distance. Good natured, though, for he accompanied us clear to Tucson, never being out of sight, and aside from the ever-present meadowlarks and blackbirds, the only new bird that we could safely add to our list, in that long stretch of country.

Our goal at last! We could hardly sleep last night, for to-day we will be afield, taking in the sights of "Queen City of Cactusland," and investigating the bird-life of the region. Violets and narcissus are blooming and the cottonwood buds bursting. We are bewildered by the wealth of bird life, and after listing a dozen species new to us and easily recognized, as well as the descriptions of a dozen others — puzzlers — we decided to wend our way to the University Museum, close at hand, for a season of study. Here we found the exhibit of birds second only to that of the Ores, and although mostly collected in 1885-'89 these bird skins are as clean and beautiful as if placed there only yesterday. All this was the work of the genial Mr. Herbert Brown,[1] the pioneer naturalist of that region, who, when we found him (he is a busy man) was most eager to assist us and explain our puzzles. Then

[1] Since deceased.

we unpacked our reference literature,[1] and the preliminary thrills over, were ready for business.

We found Tucson spread over a plain of about 2300 feet altitude, arid and cactus grown, except near the river (so-called!), and vicinity of artificial ponds and ditches. The surrounding mountains with their different zones of life from base to summit, widened the field of exploration for us. The city is in the lower Sonora zone. Creosote bushes abound in every vacant lot in town as well as covering all the adjacent country; the smaller cacti flourish as well, while at a distance are the mesquite groves, live oaks and giant cactus.[2]

The White-necked Ravens, as before, were the first birds to attract attention;[3] to an easterner they strike one as half a crow in size and voice, though not in speed of flight, and as they are protected by law, being valuable scavengers, are abundant and tame. We looked in vain for their white necks, but as the feathers of the neck are white at the base only, this could not be seen except when the wind was blowing hard.

In the afternoon, when hunger has been satisfied, a dozen or more go for a "social sail" high in the air. No trapeze man in a parachute ever performed such amazing feats as these jolly birds, chasing each other, dropping scores of feet with closed wings, turning on their backs with feet up, and even rolling completely over like a barrel, all the time laugh-

[1] Available literature necessary for the sojourner at Tucson:
Handbook of Birds of the Western U. S.—Bailey.
List of Southern Arizona Birds.—W. E. D. Scott and Herbert Brown. Found in Introduction of the Handbook.
Notes on the Birds of Pima Co., Arizona.—S. S. Visher. From the Auk, Vol. 27, No. 3. July, 1910.
File of the Condor, as complete as possible. Important specific references are:
Summer Birds of the Papago Indian Reservation, near Tucson, by H. S. Swarth, Condor, Vol. 7, Nos. 1, 2 and 3. Jan.-June, 1905.
Articles descriptive of Nesting Species, by F. C. Willard.

[2] See Habitat Group of Desert Bird-life. Opp. page 168. Vol. 9, Bird-Lore.

[3] This and the following four sketches reprinted from the Newton (Iowa) Daily Journal, March, 1912. The descriptions are adapted from Bailey's Handbook.

ing and chuckling — "cutting their teeth "— we called it, to each other.

When the sun strikes their glossy black plumage just right it is turned to white satin for an instant. After they become tired of their sport they descend for an evening lunch, and finally all go to roost in the cottonwood trees growing on the campus. A pretty picture, indeed, to see the setting sun lighting up these huge, white-limbed trees, studded with their families of black ghosts!

Next in interest to an Easterner come the Arizona *Pyrrhuloxias*. This peculiar name comes from the Greek and means flame-colored. They are relatives of the eastern grosbeaks and look like small parrots with their short, thick, yellow bills and raised crests. The face, throat, breast, thighs and lining of wings are a light rose red; the other parts a mellow gray color. Such a wonderful combination of colors, the exquisite rose-colored shirt front lighting up the soft gray coat, as the big yellow bill and raised crest thrown forward is seen coming towards you through the green, lace-like leaves of a creosote bush or pepper tree![1]

Next come the little vermilion flycatchers,[2] typical Mexican

[2] Colored Illustration opp. page 241, Vol. 9, Bird-Lore.

birds, and real gems for color. They look just like the small editions of the scarlet tanager, except for their crests; and they dart out from perches on the bushes to catch insects on the wing, just as the phœbes do. Would that we could persuade them to migrate to the north, where we could enjoy them occasionally, as we do the scarlet tanagers[3] and cardinals.[4] Scarlet, vermilion, cardinal, — what a display of shades! Could you tell them apart?

Of all the birds on our list the Roadrunner is doubtless the most unique; indeed, he is *queer,* and would certainly take first prize in the freak class at the Arizona state fair. He is about two feet in length, with a tail as long as his body, color

[1] See Illustration facing page 371, Handbook of Birds of Western U. S.—Bailey.

[3] Colored Illustration opp. page 147, Vol. 8, Bird-Lore.

[4] Opp. pg. 39, Vol. 8, Bird-Lore.

above brown streaked with black, bare space around eyes blue and orange, feathers of head and neck bristle-tipped, eyelids lashed, crest a glossy, bronzy green, with white thumb marks on his tail, — his whole plumage coarse and harsh Could you imagine such a looking creature? Try and think of a long striped snake on two legs, a feather duster on his head and another trailing behind; or a tall, slim tramp in a swallow-tailed coat, a black-and-blue eye, and a head of hair standing on end! There you are! All equally ridiculous looking.

To see our feathered what-is-it you must go to the high, dusty foothills as a rule, although he sometimes strays down into the suburbs. If you are driving he will run along down the road ahead of you, keeping ahead no matter how fast you drive. It is said he can outrun the swiftest horse. He belongs to the cuckoo family and is sometimes called ground cuckoo, lizard bird, or a chaparral cock; the Mexicans call him "little friend." As to diet, he eats mice, lizards, crickets, centipedes, crabs, snails, garter snakes and cactus fruit,— most any old thing. Perhaps this strange menu accounts for his looks!

Of Quails,[1] Arizona boasts four different species: the Masked Bob-white, so called because its face and throat are black; the Scaled Quail, whose bluish-gray feathers resemble scales; Gambel's Quail, the common valley quail of the west; and the Mearns Quail,[2] the United States form of the Massena Quail of Mexico. This is indeed a most striking quartet as you see them beautifully mounted in the University Museum; all of the greatest beauty of plumage, the Mearns being in addition quite odd looking. Its face is striped with black and white, its body is stubby and plump, the under parts dark brown, spotted with large, round white spots. Instead of raising its crest in the usual way it is said to spread it out laterally like half a mushroom. The Gambel and Scaled Quails can be found near the city, the others are found only

[1] See figures opp. pages 118 and 122, Bailey's Handbook and American Ornithology, Vol. 2, No. 1, Vol. 4, No. 1.

[2] See Condor, Vol. XI., pg. 39.

in the neighboring high mountains, where also, if one is fortunate, he may get a Wild Turkey.

Next in interest comes the doves, of which Arizona has five species. The Inca Dove is the most common, treading daintily along gravel paths, across front yards, barn yards, and often seen among chickens in the coop. As early as February 25 some were sitting upon their two pearl-like eggs in the pepper trees, while others were only selecting their brides, scrapping and fighting over them in the most undove-like fashion, batting each other with their salmon lined wings, and "pulling each other's hair," or rather feathers, with their small, sharp beaks. The feathers of this bird, especially when ruffled, are so arranged as to suggest scales. The Mexican Ground Doves are the smallest of all doves, really only half a dove in size, resembling nestling "turtle" doves. You might mistake one for a large gray mouse as it patters about on the ground hunting seeds; indeed they are so small and dear that you wish you could carry one about with you as a sort of living watch charm!

The White-winged Doves, — the Sonora doves of the natives — frequent the mesquite groves near water, where large flocks will gather to drink at evening, and where many meet their fate at the hands of the Mexicans and local "sportsmen."[1] The Band-tailed Pigeon is a large dove of general

[1] See Vol. 12, page 275, Bird-Lore.

distribution in the west, where they live in the oak regions of the mountains, feasting upon acorns and wild berries. The Mourning Dove, with which we are all familiar, completes the quintet.

There is no complete, up-to-date list of the Birds of Arizona. Scott's list, published in the Auk in 1886-'88, is good as far as it goes. It lists the birds of three counties in southern Arizona, mentioning some 230 species. Visher (Auk 27: No. 3) adds thirty new species to that and gives fuller notes on many others. This briefly annotated list purports to bring Scott's list down to date. Swarth, in the Condor (Vol. 7, Nos. 1, 2, and 3), has given us a valuable and com-

plete local list of the summer birds of the Papago Indian Reservation near Tucson. Notes from the great stretches of country comprising the northern part of the state are fragmentary or lacking.

The following brief notes are offered supplementary to the above. They cover the three months from January 25 to April 25, 1912, and were made mostly in the north part of town or upon the plains one mile to the north. Mrs. James Wheeler, who resides two miles northeast of Tucson, has done considerable hunting among the water birds and has also mounted quite a few of them. I had the pleasure of examining them and am indebted to her for data concerning same. The fact that the writer was supposed to be an "invalid" explains the brevity of the notes. Thirty skins were made up and properly identified. The other forty species observed furnished data identical with what has been already published.

By February 20 the fruit trees were in bloom and the cottonwoods had small leaves. Gnats became numerous and attracted thousands of Ruby-crowned Kinglets, gnatcatchers and warblers. On February 23 we had a hard dust storm, which confused the migrating hosts greatly, and prohibited food-getting for most of the day. Consequently the birds were up late and were heard beating around the buildings all that night. It rained the rest of the night, but as the morning was warm and clear, the hosts were out early, fairly swarming everywhere. Brewer's Sparrows were extremely common and next in abundance to the Blackbirds. The first small lizard came on March 1st, and the cricket chorus thereafter resounded nightly. March 9th it stormed in the mountains and I took a much-bedraggled female Cedar Waxwing that evening. March 12th we had a hard rain, which later turned to snow. From the custom of scratching their heads it was evident that the birds were either puzzled over the weather or else assisting the molting process. March 30 we had another rain, and a snow in the mountains. I searched the north part of town carefully for more Waxwings, but

was unsuccessful in finding any. April 1st the cottonwoods were in full bloom and many of the trees infested with the larva of some moth, so much so as to completely defoliate the trees. Although I watched carefully, not one of the thousands of migrating birds were seen to eat the larva, although the abundant House Finches often picked the seeds from the "cotton."

Pelecanus erythrorhynchos.—White Pelican.

Three shot by local hunters March 29th.

Marila affinis.—Lesser Scaup Duck.

Common March 16th in the Santa Cruz reservoir. So tame that one could row among them.

Clangula clangula americana.—Golden-eye.

Recorded as new species for the state. Condor, XIV; 154.

Erismatura jamaicensis.—Ruddy Duck.

Juvenile mounted by Mrs. Wheeler, March 16th.

Grus canadensis.—Little Brown Crane.

Recorded by myself as new to the state. Condor, XIV; 154.

Steganopus tricolor.—Wilson's Phalarope.

Several mounted April 7th by Mrs. Wheeler.

Recurvirostra americana.—Avocet.

Found common October 12, 1911, by Mrs. Wheeler.

Numenius americanus.—Long-billed Curlew.

Taken October 12, 1911, by Mrs. Wheeler.

Callipepla squamata squamata.—Scaled Quail.

Found common at Oracle, elevation 4500 feet on west slope of Catalinas, by Mrs. Wheeler.

Scardafella inca.—Inca Dove.

Abundant about the streets of Tucson, while not a specimen of *Chaemepelia passerina pallescens* was seen during my stay. Mr. Willard reports the opposite from Tombstone; viz. that the Inca Dove does not nest there, while the Ground Dove is common.

February 25—Nest building; first eggs found.

March 10—A nest with large young.

April 10—Many other doves just starting to build.

Cathartes aura septentrionalis.—Turkey Vulture.

First seen February 1, soaring high. Next seen March 20; then April 10, after which they became common. We were told by several different parties that "when the vultures come they drive the ravens away."!

Falco columbarius columbarius.—Pigeon Hawk.

One seen darting through the bushes of the campus February 18.

Buteo borealis calurus.—Western Red-tail.

Quite common during our whole stay, beating over the plains. I prepared two skins, one a mature male in the dark chocolate plumage, and the other an immature male, light phase. These had been shot by boys. The stomach of the first contained a squirrel, which had been beheaded, neatly "quartered" and taken in five swallows as follows: four entire legs, to one of which the skin hung, and the viscera in a ball. The feet and roof of mouth of both hawks were full of cactus spines.

Sphyrapcus thryoidens.—Williamson's Sapsucker.

One seen March 3 on the campus.

Chordeiles acutipennis texensis.—Texas Nighthawk.

Seen only once, March 17th.

Æronautes melanoleucus.—White-throated Swift.

Common everywhere during April.

———— ————.—Hummingbird.

One seen February 14, had large, white patch on side of head, easily seen from a distance of forty feet. I thought the gorget to be purple, but only had one flashing glance at it. Upper parts green. It was evidently either a young male Broad-billed Hummingbird (*Iache latirostris*) or adult male White-eared (*Basilinna leucotis*), in either case, a rare seasonal record for that altitude. Although the writer is unacquainted with Hummingbirds in general, the description fits the above two birds only, with evidence in favor of the latter; the evidence, however, is given for what it is worth.

Pyrocephalus rubinus mexicanus.—Vermilion Flycatcher.

Common everywhere during our stay, the young males molting and consequently beautifully blotched with vermilion. See migration report, Bird-Lore IX., 265.

Nucifraga columbiana.—Clarke's Nutcracker.

Mr. Willard has always found them to be very rare in the high mountains. Mr. Lusk, through Mr. Visher, reported them "occasionally abundant."

Molothrus ater obscurus.—Dwarf Cowbird.

First seen February 18. Mr. Visher reported May 5.

Agelaius phœniceus sonoriensis.—Sonora Red-wing.

Two specimens I took were identified by Mr. J. Grinnell. Thousands of "blackbirds" nested in the bushes and trees in town each night, and I know of at least one man who regularly frightened them away with a shotgun on account of their noise and filth.

Icterus cucullatus nelsoni.—Arizona Hooded Oriole.

Arrived March 21.

Icterus bullocki.—Bullock's Oriole.

Arrived March 23.

Carpodacus mexicanus frontalis.—House Finch.

Their sweet warbling song heard from dawn until dark. February 9, commencing to build. March 20, birds setting everywhere, nests built about porches, on meters, and in cacti. April 6, nest with young about half grown.

Poœcetes gramineus confinis.—Western Vesper Sparrow.

First migrants arrived March 3.

Zonotrichia leucophrys gambeli.—Gambel's Sparrow.

Abundant everywhere, the young more common than the adults. Specimens taken after March 1 were molting on head, neck and legs. They gleaned the ground grain from the chicken coops and picked the leaf tips from the privet hedges for a relish.

Melospiza melodia montana.—Mountain Song Sparrow.

Noted February 21 and March 17 along the river. But a careful lookout failed to reveal *M. m. fallax* at any time.

Melospiza lincolni lincolni.—Lincoln's Sparrow.

Quite common during our stay, up till April 10. Four skins were taken February 20.

Cardinalis cardinalis superbus.—Arizona Cardinal.

Occasionally seen in the underbrush along the river; only noticed three males in town during the period.

Passerina amœna.—Lazuli Bunting.

One seen April 15, near San Xavier Mission.

Calamospiza melanocorys.—Lark Bunting.

Abundant in large flocks. The young molting males were handsomely blotched with black and white.

Bombycilla cedrorum.—Cedar Waxwing.

An adult female taken March 9 during the storm. Said to be occasionally driven out of the mountains by storms, although Mr. Willard tells me he has never seen a Cedar Waxwing in Arizona. My bird was alone, was bedraggled and half starved, for it had literally stuffed itself with pepper seeds. The whole digestive tract was crammed with these seeds, and needless to say, quite fragrant. The only specimens displayed in the museum are three in number, and labelled as follows:

Female, Yuma, June 4, 1899.

Male, Tucson, May 13, 1887.

Female, Tucson, May 14, 1887.

Lanius ludovicianus excubitorides.—White-rumped Shrike.

Rather common. One was seen to attack an Inca dove, drag it to a hedge, and decapitate it. I watched the body until it was carried away by a raven.

Dendroica coronata.—Myrtle Warbler.

One seen January 28.

Deadroica auduboni auduboni.—Audubon's Warbler.

Abundant. The February birds were all in dull, streaked winter dress, the March birds molting.

Geothlypis trichas subsp.—Yellow-throat.

First seen March 17. Mr. Willard writes me that the "early spring birds appear to be migrants on their way north and different from the breeding ones."

Toxostoma curvirostre palmeri.—Palmer's Thrasher.

Abundant. In full song and starting nest building when we arrived January 25. Said to be quite harmful in the fruit season; at one ranch some 200 were shot one spring in the strawberry and dewberry patches. Some fifteen nests were found in an area half mile square adjoining town. All were in the cholla cacti and contained usually three eggs; though often only two. March 5, two tiny black-haired young, although most of the nests contained complete sets. Their nests are large and bulky, average inside measurements 3.5x4.00x3 inches deep. Besides fine stems and rootlets the nests often contained hair, feathers, and old rope and twine. One bird taken had its leg off at the knee joint and was quite lousy.

Toxostoma bendirei.—Bendire"s Thrasher.

Not so common as Palmer's. April 3d, first set of two eggs, incubation started. The average inside measurement of nests were 3.5x3.5x2.5 inches deep, and they contained string, cotton, hair, cheesecloth, chips of newspaper and a few feathers. The stomach of the one specimen taken contained the elytra of small black beetles, white larvæ and some unknown pupæ.[1]

Heleodytes brunneicapillus cousei.—Cactus Wren.

Nesting commonly in the cacti out on the mesa. April 6, nest with three young ready to fly; nest with four young about five days old; nest with three eggs fresh. The sides of telephone poles and roofs of buildings are favorite vantage points.

Salpinctes obsoletus obsoletus.—Rock Wren.

Common on rocky hillsides. One came regularly to search the woodpile for grubs after I had split the wood each morning. I was told of a nest of this species that had three nails built into it!

Regulus calendula calendula.—Ruby-crowned Kinglet.

Became abundant after February 15; quite common before this date.

Polioptila cærulea obscura.—Western Gnatcatcher.

This form, as well as *P. plumbea*, were common at all times roving over the mesa. The stomach of one specimen was full of gnats, and its plumage full of lice.

[1] For further accounts of the nesting of Arizona Thrashers see Condor, Vol. XI., pg. 49.

Planesticus migratorius popinquus.—Western Robin.

Only a few were seen in town during our stay. They were sitting quietly in the trees.

Sialia currucoides.—Mountain Bluebird.

A roving flock seen February 19. Irregular winter visitant.

AN UNUSUAL FLIGHT OF WARBLERS IN THE MISSOURI VALLEY.

BY T. C. STEPHENS

An especially interesting flight of warblers was noted at Sioux City during the spring of 1913. The wave apparently first reached this point on May 8, but was more marked on the 9th and reached its maximum on the 14th and 15th. My records show that there had been a good deal of rain and cloudy weather prior to the arrival of the wave. May 3 was mostly cloudy, and was followed by three clear days. May 7 was cloudy and rainy; the 8th and 9th were cloudy and cold with some rain. On the 10th it cleared up but was still cool. By the 13th it was still clear, but was cloudy again on the 14th and 15th with rain both nights. An analysis of the weather conditions cannot be further attempted for more complete data covering a greater extent of the Missouri valley would be required to reach any significant facts. It will be noticed, however, that the warblers were present in considerable numbers during both clear and cloudy or cool weather.

The records when arranged as in the accompanying table show at a glance the wave as it came under the writer's observation. To many it may seem quite meager, but nothing like it has been witnessed by the writer in the five years of his observations at this point. The abundance of these small birds with bright colors attracted the attention of many people who were not accustomed to notice birds. Some more or less regular migrants of other years are singularly absent from the list, viz, the Palm Warbler, and the Mourning Warbler. The list is made up of records on both sides of

the Missouri river, in Nebraska and Iowa, but no distinction is made for the present purpose. May 10 and 17 represent all-day field trips; on the other days observations were entirely on the College campus and its immediate vicinity.

With the exception of a few of the species which breed in this locality, such as the Yellow warbler, the Redstart, the Maryland Yellow-throat, and the Yellow-breasted Chat, the Tennessee Warbler was the only one which I heard in song.

Below are a few notes on each species which are intended to show briefly the general status of these warblers in this vicinity in order that this year's records may have a proper setting.

1. Myrtle Warbler (*Dendroica coronata*).—This is a regular and very common migrant every year. This season, however, it was not observed with quite the usual frequency.

2. Yellow Warbler (*Dendroica æ. æstiva*).—A most abundant summer resident.

3. Black-poll Warbler (*Dendroica striata*).—A regular and common migrant in the spring, and more or less common also in the fall.

4. Black and White Warbler (*Mniotilta varia*).—This unobtrusive little warbler seems to be quite irregular from year to year. In 1912 it did not come under my observation at all. To see two or three in a single day, and without making any special search, makes this species seem almost abundant.

5. Black-throated Green Warbler (*Dendroica virens*).—Was noted several times. It has been observed occasionally in other years and is probably a regular migrant, although by no means common.

6. Wilson Warbler (*Wilsonia p. pusilla*).—Would be considered tolerably common this season. It was observed on a number of occasions, and in widely separated areas. Up to this year I have regarded this species as rather rare. While specimens were not taken, I hardly think there is any possibility of our having confused this bird with the Pileolated Warbler (*W. p. pileolata*), whose range is said to reach Nebraska. These warblers impress one with their activity, and their habit of picking insects from leaf or flower while pausing on the wing. Several years ago I saw one chased into a thicket by a small hawk, probably a sharp-shinned.

7. Redstart (*Setophaga ruticilla*).—A regular and tolerably common migrant, and occasionally breeding here. This year their

numbers seemed greatly augmented during the few days of migration.

8. Maryland Yellow-throat (*Geothlypis t. trichas*).—The form found here is often referred to as *G. t. brachidactyla*. It is a very common summer resident, and was present this spring in about the usual numbers.

9. Grinnell Water-Thrush (*Seiurus noveboracensis notabilis*).—A migrant. The Water-Thrushes were seen more frequently than my records show, because it was often difficult at a distance to satisfy one's self of the identity of this species from *S. motacilla*. I suspect, however, that if circumstances had taken me more often to its natural haunts it would have been found to be tolerably common. One of my records this year was obtained on the College campus, several miles from the nearest water.

10. Magnolia Warbler (*Dendroica magnolia*).—This species furnished one of the surprises. On the basis of my own observations I have considered this species rare in this region. This year, however, it must be credited with being abundant during the few days of its passage. It was observed practically every day and was well distributed. More inquiries were made about this little bird than all the other warblers put together.

11. Oven-bird (*Seiurus aurocapillus*).—This bird is considered a common resident here by other observers, and I have been chagrined not to have seen it until this spring. However, one of my records this season was made on the College campus, and another in a private yard a few blocks away. The other records were secured in the field where they might be expected.

12. Blackburnian Warbler (*Dendroica fusca*).—This must be rather a rare species for the Missouri valley. I have not before come across it, and no record of its occurrence in western Iowa appears in Anderson's *Birds of Iowa*. Bruner, Walcott and Swenk credit Aughey with having occasionally found it in eastern Nebraska. A few records of its occurrence in the lower Missouri valley are given in Widman's *Birds of Missouri* (p. 229). I can add a positive record for Sioux City, May 13, 1913. On the following day Mr. Arthur Lindsey saw two on the College campus.

13. Tennessee Warbler (*Vermivora peregrina*).—A regular and abundant migrant. I believe that, from year to year, this warbler will stand second only to the Yellow Warbler in abundance. Its migration seems to cover a longer period than other members of the family.

14. Cape May Warbler (*Dendroica tigrina*).—It seems to be generally agreed that this species is rather rare in most of the interior, at least. Two records are published from Nebraska, but

none from western Iowa. On May 14 I observed one in a cherry tree on the College campus and was able to make a positive identification. On the following day I was called to the office of Mr. Peters to see a captive bird which had been picked up from the street under some wires. It proved to be a male Cape May Warbler. As it had apparently recovered from any shock or injury Mr. Peters released it.

15. Chestnut-sided Warbler (*Dendroica pensylvanica*).—I do not get to see this species more than once or twice in a season. I noted it in 1909 and 1910, but missed it entirely in 1911 and 1912.

16. Nashville Warbler (*Vermivora r. rubricapilla*).—I have no other records of this species except those of this season.

17. Bay-breasted Warbler (*Dendroica castanea*).—The only previous record of mine is of June 4, 1910, on the College campus. This year Miss Pearl Woodford told me of seeing one at Sergeant Bluff on May 10. On the 14th Mr. Arthur Lindsey saw two on the campus; on the 15th I saw one; and on the 18th one was reported to me by Paul Chipperfield.

18. Louisiana Water-Thrush (*Seiurus motacilla*).—While only a few records appear in the table, it seems to be the more common of the two Water-Thrushes.

19. Yellow-breasted Chat (*Icteria v. virens*).—Not by any means common from year to year. This year my two records are probably of the same bird, or of a pair.

Sioux City, Ia.

THE WILSON BULLETIN

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Editorial

The increasing interest shown in the nesting behavior of birds and the considerable attention given to studies of this sort are indications of a rapid increase in our knowledge of the birds in this important field of inquiry. As the data accumulate and generalizations from them become more and more reliable we predict that light will be thrown on a number of problems which now seem all but hopeless of solution. We hope that the number of competent students of nesting activities will greatly increase the coming summer.

—o—

The editor enjoyed the thirty-first stated meeting of the American Ornithologists' Union which was held in New York City November 11-14, at the American Museum of Natural History. In some respects it was the best meeting which he has been privileged to attend. A larger number of Fellows were in attendance than ever before and the attendance of out-of-town members was gratifying. We were pleased to welcome several, for whom this was their first meeting. There should be a much larger attendance every year. Toward this end it is proposed to hold the 1914 meet-

ing in Washington, D. C., early in April to accommodate many members who cannot attend the November meeting because of school duties at that time. For the first time in the history of the Union the elections of Fellows resulted in filling up that class to the limit of fifty. Five were elected to the class of Members, which is the limit set for any one stated meeting. A large number of Associates were added to the membership. The finances were shown to be in a satisfactory condition. It is to be regretted that it does not now seem feasible to hold meetings of this organiza- in the interior of the country. The need for such a meeting will be only partly met by the proposed spring meeting at San Francisco in connection with the Panama Exposition in 1915. Members living in the Mississippi Valley might well bestir themselves for inviting the Council to appoint a meeting somewhere in the central part of the country.

—o—

So many persons are now interested in birds there is hardly a community where more than one bird student cannot be found. We offer the suggestion of a plan of study which is believed would result in much valuable information. All interested persons in a community arrange for simultaneous study in any selected region, each person studying a different locality. When the work is completed merge the different individual reports into one and study the results. In this way the whole region could be covered in a single day and the status of the bird life in it would be more accurately learned than where all go on a stated excursion together. If such studies could be carried through the year the result should be a more accurate list of the birds of that particular region than could possibly be obtained by one person in any number of years of study. But if such a scheme cannot be worked out for the whole year it should be entirely possible to arrange for such coöperative studies for one day at a time. It might well be tried for some January day to learn of the winter population, and as many days as possible during the spring migration, to determine the relative abundance of species on a given day as well as keeping track of the migrations as a whole. Try it.

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A large list of nominations for membership is nearly ready for submission to the members at large. It cannot be printed in this issue of the Bulletin, but will be submitted through the mails a little later.

General Notes

THE WESTERN GREBE IN OHIO.

On Tuesday morning, October 28th, 1913, while passing Lake Glacier in Mill Creek Park, near Youngstown, Ohio, I observed a Grebe on the lake, which I was satisfied was the Western Grebe (*Aechmophorus occidentalis*). I consulted Mr. Volney Rogers, the park superintendent, and he agreed with me that the appearance of the Western Grebe in this locality was of sufficient importance to justify the taking of this bird, and on Thursday, October 30th, I shot it. The skin of this Western Grebe is now at the Carnegie Museum in Pittsburgh, Pa.

George L. Fordyce.

The Cardinal Arrives at Lansing, Iowa.—In a report of the northward advance of the Cardinal, which I gave in the last number of Wilson Bulletin, it was stated that the Cardinal had not yet reached Lansing. My correspondent at that place, Miss Martha H. Hemenway, writes me under date of November 11, 1913: "The Cardinals have visited us at last, or at least this is the first sight of them I have ever had here. A few days ago I noticed some strange birds in the trees quite high up, but not near enough to be sure of their beings Cardinals. Later I saw some on the river bank and watched them closely until they flew; one came near me, and then I had no doubt of them, as they showed a flash of color, which identified them without question."

This extends the range of this species to a point within a few miles of the northern boundary of Iowa. Their first appearance in new territory, almost without exception, has been in the cold months of the year.

Althea R. Sherman.

National, Iowa.

Correspondence

Editor The Wilson Bulletin:

Dear Sir—If you can spare me a little of your valuable space in the Bulletin, I should very much like to invite the attention of ornithologists to the work just published by Mr. Jno. Henry Gurney, of Keswick Hall, Norwich, England, entitled "The Gannet, a Bird with a History." This beautiful volume, so perfect in all the requirements of book manufacture, is from the presses of Messrs. Witherby and Company (326 High Holborn, London), and it is most assuredly not only a credit to that House, but entirely worthy of the pen and labor of its distinguished author.

In my opinion, this work in its treatment exemplifies — anatomically, ecologically and otherwise — one of the very best methods of setting forth, in popular fashion, what we have learned up to date about some particular bird, — the Gannet in the present instance. It gives us maps of the world and special localities presenting the "Distribution of the *Sulidæ* ('Gannets and Boobies')"; there are fine half-tone reproductions of photographs showing many places, islands, and so on, where these birds still breed or are found in large numbers; there is a fairly good bibliography presented, and a history of the names of the Gannets. The ecology is admirable, and there are beautiful colored plates of eggs and young. We also have chapters on development; on the embryo and allied subjects, with fine, illustrated chapters on the anatomy of the Gannets which, while sufficiently extensive, are of a character so well within the lines of popular treatment as to be not only quite readable, but in no way calculated to alarm the pure systematist or to ruffle the waters of even-going ornithology.

We find some excellent history on the "Mortality among Gannets," "Gannets as Food," "Attainable Ages of Gannets," and even an admirable, illustrated chapter on "The Parasites Infesting Gannets," with a brief treatment on the known examples of fossil forms of these birds.

We have many bird-forms in this country which it would well repay some broad ornithological writer to work up as Mr. Gurney has the Gannet, — birds, too, which are now being rapidly exterminated. Among these I would suggest the flamingo, the limpkin (*Aramus*), road-runner (*Geococcyx*), and others.

Let us trust that American ornithologists will appreciate Mr. Gurney's "Gannet," and that many copies of it will be sold in this country.

Faithfully yours,

R. W. SHUFELDT.

Publications Reviewed

The Birds of Connecticut. State of Connecticut State Geological and Natural History Survey, Bulletin No. 20. By John Hall Sage, M.S., Secretary of the American Ornithologists' Union, and Louis Bennett Bishop, M.D., Fellow of the American Ornithologists' Union, assisted by Walter Parks Bliss, M.A., Hartford, 1913.

In an Introduction of four and a half pages the location of the state is given, and a glimpse of its topography and faunal areas, which are defined as Alleghenian over the greater part of the state, with a small area of Canadian in the north-western corner, or at least Canadian affinities. We learn that the first definite state list was prepared by Rev. James H. Linsley and published in 1843, the second by Dr. C. Hart Merriam in 1877, and thirty-four years after the first list, while the present list appears after an equal lapse of time. The Introduction closes with a plea for accuracy in making records which can be certainly secured only when specimens of unusual birds are collected. It is clearly shown that such collecting as this entails does not menace the bird life of any region.

In the treatment of the 329 native species known to occur within the borders of Connecticut the names and sequences of the Check-List of the American Ornithologists' Union are followed, but the numbers happily omitted. Divisions are made including orders, suborders, families, subfamilies, the scientific name followed by the vernacular name. There follows a statement of the status of the species in the state, the earliest and the latest seasonal records, breeding records of breeding birds and earliest and latest migration records of transient birds. In the case of unusual or rare occurrence all records are given. A statistical summary shows that the list comprises 80 resident species, 78 summer residents, 38 winter residents, 124 transient visitors, and 80 accidental visitors. There are five introduced species included. The grand total shows 334 for the state, which seems large for so small a state as Connecticut, with practically but one life zone. This may not appear so unlikely when it is known that some 150 persons are named as contributors in one way or another. In a bibliography of 57 pages there appears a further reason why the number of birds recorded in the state is so large. The book closes with about a hundred pages on Economic Ornithology, by Dr. Bishop. The treatment is systematically by groups, but many species are separately treated where their importance warrants such separate treatment. An excellent index adds much to the usefulness of the book. The typography and paper leave little to be desired. As a contribution to

faunal and economic ornithology it is a most welcome addition to our literature, and furnishes a model for similar works in other places. We congratulate the authors. L. J.

Some Birds of the Fresno District, California. By John G. Tyler. The Cooper Ornithological Club. Pacific Coast Avifauna Number 9. Hollywood, October 1, 1913.

This paper makes no claims to completeness, but is rather presented now that it may furnish a working basis for a future complete survey of the region which occupies the exact geographical center of the state. It is a lowland of not over 400 feet elevation, and lies within the Lower Sonoran Zone. The author states that the steady reduction of the swampy areas by drainage marks the doom of such nesting birds as depend upon the cover afforded by such a swampy environment. The check-list of species, which precedes the General Account of the Species, gives 161 species. The treatment is systematic, and each species named is accompanied with copious annotations relating to the occurrences, relative abundance, migration, nesting, food habits, and many side lights upon the life of the birds. We are seldom treated, in a paper of this sort, with such a wealth of interesting things as this author presents. May his tribe increase! In paper, typography, and general appearance this latest number of the California Avifauna series maintains the high standard set at the inception of the series. L. J.

Smithsonian Miscellaneous Collections. Three papers by Edgar A. Mearns.

Vol. 61, No. 10. Descriptions of four new African Thrushes of the Genera Planesticus and Geocichla. August 11, 1913. One is a new species — *Planesticus helleru* — from Mount Mbololo, altitude 4,000 feet, east of Mount Kilimanjaro, British East Africa, collected November 9, 1911, by Edmund Heller, on the Paul J. Rainey African Expedition. The other described forms are subspecies, one of Planesticus, the others Geocichla.

Vol. 61, No. 11. Descriptions of six new African Birds. August 30, 1913. "Four of the forms here described are from the collection made by the Childs Frick African Expedition, 1911-12; and two are from the Smithsonian African Expedition, 1909-10 collection, made under the direction of Col. Theodore Roosevelt." Five were collected by the author and one by Childs Frick. Five are new subspecies of Cisticola, one of Pyromelana.

Vol. 61, No. 14. Descriptions of Five New African Weaver-Birds of the Genera Othyphantes, Hypargos, Aidemosyne, and Lagonosticta. September 20, 1913. "Four of the forms here described are from the collections made by the Childs Frick African Expedition,

1911-12, and one from the Smithsonian African Expedition collection, 1909-10, under the direction of Col. Theodore Roosevelt." All were collected by the author. Two are new species and three subspecies. L. J.

Notes on the Occurrence and Nesting of Certain Birds in Rhode Island. By Harry S. Hathaway. Reprinted from The Auk, Vol. XXX, No. 4, Oct. 1913.

"During the interval which has elapsed since the publication of the 'Birds of Rhode Island' by Howe and Sturtevant in 1899, and the supplement thereto in 1903, many records of rare and interesting birds have accumulated and are herewith published as a contribution to our knowledge of the avifauna of this state. The Western Willet, Arctic Three-toed Woodpecker, Evening Grosbeak, and Nelson's Sparrow have been added to the list of birds of the state. The Breeding of Henslow's Sparrow, Black-throated Blue Warbler, Pine Warbler, Water-Thrush, Winter Wren, and Hermit Thrush has been established, while an increase in numbers of the Laughing Gull, Common Tern, Sparrow Hawk and Carolina Wren has been noted." L. J.

THE ONTARIO NATURAL SCIENCE BULLETIN, No. 8, 1913.

In an article entitled "Conditions Against Which Bird Life is Contending, by Mr. Fred Mitchell, the Pileated Woodpecker and Winter Wren are mentioned as having entirely disappeared from the region. The forces mentioned as operating to decrease the bird life are the destruction of forests, the red squirrel, bird dogs allowed to run wild, and the destruction of nests and birds by boys and thoughtless men. A strong plea is made for the establishment of real bird preserves, where the adverse conditions may be reduced to a minimum. L. J.

BLUE-BIRD, FORMERLY NATURE AND CULTURE.

This much improved Ohio Audubon Monthly, under the editorial management of Dr. Eugene Swope, migrates regularly from 4 West Seventh Street, Cincinnati, Ohio. It is one of the best magazines devoted to the Audubon Society cause. The slight confusion regarding the number of the volume which seems to have been incident to the change of name will doubtless be remedied.

ORNITHOLOGICAL JOURNALS.

The Auk. The July and October issues have appeared since this journal was noticed in these pages. Of the ten articles in the July number the leading article by Witmer Stone, "Bird Migration Rec-

ords of William Bartram, 1802-1822," and "The Nest Life of the Sparrow Hawk," by Althea R. Sherman, are the most noteworthy. Mr. Stone appends a comparative table of arrival dates to show comparisons between Bartram's dates of arrival of 26 common species and the arrivals as noted by the members of the Delaware Valley Ornithological Club. While there are some considerable difference shown in the two records Mr. Stone concludes that there has been appreciable change in the time of arrival. The writer fully agrees with Mr. Stone in his contention that for comparative purposes the arrival of the "bulk" is more likely to yield reliable data. It must also be true that data gathered by a large number of observers in a given region must be more reliable than if records of one or few observers are taken. But after all constant daily study of bird movements by competent observers is the only sure means of securing data of sufficient accuracy to warrant sweeping general conclusions. The station of one observer may be within a definite fly-line, while that of another not many miles away may be wholly without any definite fly-line. The one is pretty certain to obtain earlier dates of arrival than the other. Thus the "personal equation" may be largely a "locality equation." All factors must be considered. The October number contains eight papers, besides the usual long list of interesting and valuable General Notes. Of these eight papers the leading one "A Biological Reconnaissance of Okefinokee Swamp: The Birds," by Albert H. Wright and Francis Harper, with six plates, and "Morning Awakening and Evensong. Second Paper," by Horace H. Wright, are perhaps most worthy of notice. One of the most valuable features of the Auk is the careful and full reviews of recent literature. L. J.

The Condor. Nos. 4 and 5. The leading article of No. 4 is a valuable comparative study of the eggs of the North American Limicolæ, by Dr. R. W. Shufeldt, with six full page half-tone plates representing 25 species. The remarkable similarity in shape and markings of all of the eggs, except those of the three species of Oystercatcher, and their clear dissimilarity both in shape and markings, and their similarity to nests of the Longipennes might afford a legitimate excuse from some questionings in regard to the two groups. Dawson's all-day list at Santa Barbara is a large one, and his prediction, amounting to almost a challenge to the Oberlin region, may warrant comment. It is hardly likely that another all day individual list will be made in the Oberlin region; but that there will be a company list made by as many competent students as can be induced to coöperate, each two doing careful work in some restricted and easily covered area, is as certain as available persons will

make it. In such an all day study Oberlin challenges the world! The leading article of No. 5, by H. S. Swarth, "A Revision of the California Forms of Pipilo maculatus Swainson, with Description of a New Subspecies," with a map showing the ranges of the five forms, is a welcome paper on a difficult subject. The new form is *P. muculatus falcinellus*, Sacramento Towhee. This new form occupies the range formerly ascribed to *megalonyx*, which now is shown to belong in the southern part of the state. Mr. J. Grinnell's "Call-notes and Mannerisms of the Wren-Tit" is an intimate study of this wee bird. Other articles and notes maintain the high standard of this magazine of western ornithology. L. J.

Bird-Lore. Vol. XV, Nos. 4 and 5. The continuation of the color plates of the sparrows and color plates in the Audubon Department adds five excellent color plates to an already long list. In No. 4, the student of faunal ornithology will find the leading article, "The 'Old Man,' A Maine Coast Bird Study," a valuable addition, while students of nesting life will read with pleasure the story of "Five Little Waxwings and How they Grew." The law to protect migratory birds is printed in full. In both numbers the migrations and plumages of the sparrows are continued. No. 5 continues the presentation of intimate studies of birds in most of the articles. In both numbers the "Notes from Field and Study" are well selected and interesting. We regret that space will not permit of a more extended review. L. J.

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