

Under date the 29th he writes: "Major Hamilton and Mr. Audubon walked down to the Fort after breakfast and I followed in about an hour. I very fortunately took my cane gun with me and shot by the way two Black-headed Grosbeaks, a bird which has not before been found this side of the table lands of the Rocky Mountains, which is the case with a number of the birds we have found. Mr. Audubon,—Bell,—Squires and I walked two or three miles across the prairie in the afternoon to a village of prairie dogs which Bell had discovered in the morning." Mr. Harris then speaks entertainingly of the movements of the interesting little animals and refers to the great difficulty in shooting them.

On the 31st they reached Fort Pierre, a point on the river which they had long been striving to gain. No further points of ornithological interest are referred to in the letter. The plant life of the region is, however, described at considerable length for the benefit of Dr. Spencer, to whom the letter was addressed, he being a botanist of some note. The letter was left at Fort Pierre to be taken down the river by the next trappers who were going in the direction of civilization. The last entry is made on June 1, just before the boat starts on up the river towards the Yellowstone, that being the final destination of the party.

BIRD MIGRATION AT GRINNELL, IOWA.

BY LYNDS JONES.

II.

FALL MIGRATION.

THE fall migrations differ from those of spring in certain particulars. It is not so simple a matter to study the southward movement of the birds, but rather one requiring a great deal of time, unlimited patience, and a speaking acquaintance with the

birds in all sorts of dress. For almost all birds are in their plainest attire on their journey southward. Then birds are wary and timid, instead of bold and fearless. No songs announce their arrival. All is quiet.

The majority of records in spring are of arriving birds. In the fall they are of departing birds. No records are more difficult to make accurately than those of the departing birds. A great deal of time was spent in the field in the fall, but the records are always fewer than those of spring.

We have seen that the weather greatly affects the spring movements of the birds, severe and adverse winds combining with inclement weather to retard the northward movement. In the fall the weather has an opposite effect. Late in the fall this is more apparent and of much more significance than early.

The charts for the fall migrations are made on the same general plan as those for the spring migration, with the addition of a weather record at the top, represented by a sinuous line. The downward curves indicate the occurrence of a falling temperature and cold northerly winds. A rise in the line indicates a rise in temperature and southerly winds.

A study of the charts makes the relation of the bird movements to the weather clear. Each dip of the line representing the weather is accompanied by a corresponding activity among the birds. There is either an influx of more northern species or an efflux of summer residents, or both combined. Usually it is of both combined. Frequently the movement follows the unfavorable weather; sometimes it slightly precedes it. Warm days and south winds retard the southward movement instead of accelerating it, as in the spring.

August is marked by almost uniformly warm weather, there being no marked changes from warm to cold. Yet some birds move south even in August. These are the Yellow-breasted Chat and Yellow Warbler, with a possible migrant or two from the north. The movement is not well marked.

Our first evident movement occurs early in September, when the first breath of winter is felt. Then there is not only a marked efflux of summer residents, but an influx of northern species. It will be noticed that the birds moving at this time are those which

came latest in spring, for the most part. A glance at the accompanying charts and at those of the spring migration, will reveal the fact that the last great movement of the spring of 1886 and 1889 occurred later than that of other years, and that the first movement in the fall migration for these two years is correspondingly late.

A second movement occurs about the middle of September, followed by a rather scattered movement until late in the month or early in October, when another definite movement occurs. A middle of October movement is apparent, but it is not so well marked as the others, either earlier or later. There is really but one movement in November, but it is often much scattered, and may occur either early or late, according to weather conditions. This movement is marked by a diminution in the number of the resident birds, as well as of some of the winter residents.

These later movements seem to bear no relation to the spring movement whatever, but are largely influenced by the weather. The last movement is manifestly due to weather conditions, the movement being retarded by warm weather, and occurring only when the next storm sweeps in from the north.

We have seen that certain of the spring migrants may be grouped together as regular migrants at a certain time each year, being always or nearly always found moving together, at a certain time, relative or absolute. No such grouping is possible in the fall migrations. Each species seems to suit its own convenience in the matter of its southward journey, having no regard for any company but its own kind.

In the spring, the last movement of the season was by far the largest in the number of species moving at one time, while the first movement was of very few species. The fall movement is just the reverse, but with a very much less tendency toward any massing of species at any time. The whole movement is far more scattering and irregular as regards definite dates of movement.

It can hardly be said that there are any definite dates of greater activity of movement, as we have seen to be true in spring. In general there might be said to be more birds moving in early September than at any other time. Early October is

also well filled with moving birds. But these periods of activity cannot be compared to the March and May activity. They are weak and scattering. The migrants from the north are so few, compared with the spring migrants, that they make a poor showing among the summer residents.

September is the month of greatest activity in the fall migration, nearly half of the records of any year occurring in that month. The remaining records are about equally divided between October and November, with a scattering few in both August and December, which may be regarded as unusual, if not accidental. While the bulk of moving individuals is to be found in September, that month's movements are in no way comparable to the great May movement. It is not condensed, but scattered over the entire month, as it was not in May.

With the exception of a few species, and of the more common migrants from the north, the birds do not move in such masses in fall as in spring. They seem to grow gradually less in numbers, until the last one journeys southward. There is a marked exception to this in November, when the first driving snow-storm sweeps in from the north, bringing the Ducks and Geese in clouds, accompanied by circling flocks of Cranes and Pelicans. It is well worth frosted ears and cold feet to watch the huge flocks and droves scurrying before the storm blasts, seeking a shelter behind some woods in which to gain a hurried rest. Often the night air is resonant with the notes of the birds which are journeying to their southern winter homes. Sometimes they seem to become confused by the bright lights of the city, and fly about overhead for some minutes before moving on. Such occurrences are always during a dark night, or in thick weather. I have noted the water birds in such situations more often than any other birds.

The last individuals of any species noted in the fall migrations have been young of the year. After the bulk of the species has departed, it has been almost impossible to find old males, or even old females; while any males at all are very scarce. Hence, I conclude that the order of departure in fall is much the same as that in spring—the old males leading, followed by the young males and old females, the rear being brought up by the young females.

Some species seem to be changed in habits in the fall migration, as the Myrtle Warbler and Harris's Sparrow. In the spring we find them in the woods and brush-lands, but in the fall they are largely confined to the fields and hedges separating bare fields. In the spring the Myrtle Warbler bears the other Warblers company, but in fall he seems to prefer the company of the Sparrows, always being found in company with the Chipping Sparrow. The Harris's Sparrow is found in the near vicinity of houses or barns in spring, but is never seen there in fall, preferring the hedge-rows.

Some birds are more numerous in fall than in spring, and some regularly found in spring are just as regularly not seen at all in fall. I think that it has never been true that a species has been found in the fall which has not been noted in spring.

A further reference to the charts will reveal the fact that when the spring movement is hurried and the stay short, the fall migration will be more leisurely and protracted. This applies to some species of birds which do not nest here, but pass further north, but it is not true of all such.

We thus see that the two movements differ in two very important particulars: the one is noisy and full of life, the other quiet and unobtrusive. The one is in gala-day attire, the other in the somberest dress.

III.

BIRD MIGRATION AT OBERLIN, OHIO, FOR 1894.

Probably no better opportunity will ever be afforded for a direct comparison of the migrations in Iowa and Ohio than the present one, so I will briefly discuss the migration of 1894 as a type of what we may find at Oberlin.

The village of Oberlin lies twelve miles south of Lake Erie, and about midway between two rivers twelve miles apart, which flow northward into the lake. Except the immediate river banks, which are bluff, the region is flat and was originally swampy with a heavy growth of timber. At present nothing but the fragments

of swamps remain in the scattered timber patches, or along streams near the lake. The timbered tracts consist of tall trees skirted by a little fringe of brush, or second growth sprouts, lacking the true brush lands of Iowa. The trees composing the woods do not materially differ from those of Iowa except in being much taller and more slender, without low branches as a rule.

While the region is an excellent one for the nesting of many species, it is not adapted to migration routes of many other species, they following the river courses in preference to crossing the flat higher lands. Scarcely any water birds are seen away from the rivers, which are not easily accessible in early spring.

The accompanying charts differ from those already explained only in covering both spring and fall migrations for one year instead of a single migration for several years. Hence, the line or lines following the name of any species represents the whole time during which the species was present during the year, unless it is a resident or winter visitor.

These charts give an excellent idea of the waves of movement during the year. Not until March is any movement perceptible. Then the season opens with the arrival or increase of four species, followed in a few days by five more, these followed a little later by four more, making a triple wave of thirteen species. This wave accompanies the first warm wave of March.

Omitting three species which were probably overlooked, and therefore belong to the first wave, the next wave occurred about the first of April, when five species arrived and one departed. Then nearly three weeks passed without any perceptible movement, due to continued damp and chilly weather and northerly winds.

A warm wave about the 20th of April caused the movement of twenty-seven species, seventeen of which were arrivals and four departures. Then followed the great May movement — somewhat more scattered than we have seen in Iowa, but none the less marked — of forty species, all but three of which were arrivals.

The last movement occurred wholly in May, and was more scattering than the one preceding it. With the exception of one species, it was composed of departing migrants.

The spring migration thus closely corresponds to the same migration in Iowa, but with no movement in February and none in June. Yet it must be admitted that movements do often occur in February. There are fewer well defined waves, and more scattering records, except early in March and early in May.

Making allowance for the slight differences in the bird fauna of the two places, the birds forming these waves are of about the same species as those forming the corresponding waves in Iowa. The presence of the Song Sparrow, Robin, and Bronzed Grackle all winter, and the absence of Ducks and Geese in the migrations, would make a change in the individuals composing the first wave, in any case.

There is a tendency towards earlier movements at Oberlin than at Grinnell, especially early in the season, the difference not being so apparent later. The first wave is often later, however, followed more closely by the second wave.

With the small amount of material at hand it is not possible to determine if there are any such groups as were found in the Grinnell migrations. Notes taken during three years seem to indicate that there are, but composed of somewhat different species.

Here, as in Iowa, the most of the birds arrive in May, a little more than one-half of the whole movement occurring in that favored month. April is also well filled. March suffers from the lack of water birds. May absorbs the June movements.

Were it possible to make the round of the whole country, it is probable that the percentages for the different months would closely correspond to those for Iowa. The nearness of Lake Erie, and the presence of rivers both east and west, have combined to make some important records wanting.

The nearest routes of maximum migration across the State lie a considerable distance westward, where there is a much less expanse of water for the birds to cross to the Canada shore. Hence, ours is a relatively small migration. It does not compare with the Iowa migrations in point of the number of moving individuals. Scarcely any birds can be called at all abundant at Oberlin. Many are common.

I have noticed that the migrants at Oberlin remain rather longer than the same species did at Grinnell, and that more of

them sing during their stay. There does not seem to be the rush and hurry among the migrating birds at Oberlin that was so evident at Grinnell. I have wondered if the nearness of the lake may not in part account for this more leisurely journey and happier mood. It is certainly true that not a few of the species which do not nest at Grinnell are found nesting on the lake shore. Such close proximity to the summer home might well cause greater ease of mind, and thus result in the changed conditions which we have seen. It may be, however, that the birds are only resting longer in order to be more fully prepared for their long flight across the lake. As I write, the Blackburnian, Black-throated Green, Chestnut-sided, Black-poll, and Bay-breasted Warblers are singing. I never heard them at Grinnell. Not one of the transient Thrushes ever condescended to sing for me at Grinnell. Only the Hermit Thrush refuses to do so here.

Lack of opportunity to study the bird life of the lake shore carefully makes it impossible to speak intelligently, at this time, of the direct influence of the lake upon the migrating host. That it is considerable is made evident by the secondary effects already noted. There can be no question that it acts as a barrier to the further movement of some of the birds, causing them to nest on its south shore. This is made evident by the immense numbers of nests to be found, at the proper season, within a very restricted area in the brush, trees, and swamps skirting the shore. In a few hours I have found more than a hundred nests containing either eggs or young, within a space of a few acres. I probably discovered not more than one in ten of the nests actually in the area.

Turning now to the fall migration, we note at once that there is a marked tendency for the earlier spring arrivals to remain later in the fall, and for the later spring arrivals to return south earlier. But there is no such definite order of departure as is apparent in the spring. Irregularity is the rule. This is especially true of the transient visitors. The species which migrate earlier in the fall are more irregular than those which migrate later.

The order of departure of the different species does not materially differ from that at Grinnell. The late August wave

BIRD MIGRATION AT OBERLIN, OHIO.		Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
Weather.										
<i>Dendroica castanea.</i>				—	—	—	—	—		
<i>Turdus mustelinus.</i>				—	—	—	—	—		
<i>Dendroica pennsylvanica.</i>				—	—	—	—	—		
<i>Mniotilta varia.</i>				—	—	—	—	—		
<i>Icterus galbula.</i>				—	—	—	—	—		
<i>Vireo gilvus.</i>				—	—	—	—	—		
<i>Dendroica maculosa.</i>				—	—	—	—	—		
<i>Dendroica palmarum.</i>				—	—	—	—	—		
<i>Spinus pinus.</i>									—	
<i>Piranga erythromelas.</i>				—	—	—	—	—		
<i>Myiarchus crinitus.</i>				—	—	—	—	—		
<i>Tyrannus tyrannus.</i>				—	—	—	—	—		
<i>Dendroica caerulescens.</i>				—	—	—	—	—		
<i>Helminthophila pinus.</i>				—	—	—	—	—		
<i>Gothlypis trichas.</i>				—	—	—	—	—		
<i>Helminthophila peregrina.</i>				—	—	—	—	—		
<i>rusicapilla.</i>				—	—	—	—	—		
<i>Turdus fuscescens.</i>				—	—	—	—	—		
<i>Ammodramus vociferus.</i>				—	—	—	—	—		
<i>Chordeiles virginianus.</i>				—	—	—	—	—		
<i>Passerina cyanea.</i>				—	—	—	—	—		
<i>Sialurus aurocapillus.</i>				—	—	—	—	—		
<i>Dendroica blackburniae.</i>				—	—	—	—	—		
<i>Setophaga ruticilla.</i>				—	—	—	—	—		
<i>Vireo olivaceus.</i>				—	—	—	—	—		
<i>Vireo flavifrons.</i>				—	—	—	—	—		
<i>Zonotrichia leucophrys.</i>				—	—	—	—	—		
<i>Ammodramus s. passerinus.</i>				—	—	—	—	—		
<i>Turdus u. swainsonii.</i>				—	—	—	—	—		
<i>Empidonax minimus.</i>				—	—	—	—	—		
<i>Cotopus virens.</i>				—	—	—	—	—		
<i>Coccyzus erythrophthalmus.</i>				—	—	—	—	—		
<i>Habia ludoviciana.</i>				—	—	—	—	—		
<i>Dendroica caerulescens.</i>				—	—	—	—	—		
<i>Coccyzus americanus.</i>				—	—	—	—	—		
<i>Trochilus colubris.</i>				—	—	—	—	—		
<i>Ammodramus henslowii.</i>				—	—	—	—	—		
<i>Icteria virens.</i>				—	—	—	—	—		

BIRD MIGRATION AT OBERLIN, OHIO.	
Weather	Mar. Apr. May June July Aug. Sept. Oct. Nov.
Melospiza fasciata	—————
Sialia sialis	—————
Merula migratoria	—————
Quiscalus g. cinereus	—————
Scolecophagus carolinus	—————
Agelaius phoeniceus	—————
Sturnella magna	—————
Colaptes auratus	—————
Spizella monticola	—————
Junco hyemalis	—————
Pipilo erythrophthalmus	—————
Passerella iliaca	—————
Molothrus ater	—————
Zenaidura macroura	—————
Sayornis phoebe	—————
Lanius l. excubitorides	—————
Zonotrichia albicollis	—————
Spizella pusilla	—————
Pooecetes gramineus	—————
Troglodytes aedon	—————
Philohela minor	—————
Spizella socialis	—————
Bartramia longicauda	—————
Regulus calendula	—————
Regulus satrapa	—————
Melanerpes erythrocephalus	—————
Turdus a. pallasi	—————
Progne. subis	—————
Chastura pelagica	—————
Dendroica cerenata	—————
Dolichonyx oryzivorus	—————
Seiurus motacilla	—————
Harporhynchus rufus	—————
Petrochelidon lunifrons	—————
Chelidon erythrogaster	—————
Dendroica aestiva	—————
Galeoscoptes carolinensis	—————
Arctitis macularia	—————

is rather larger, being composed of five departures and one arrival, with a decrease in numbers of five species. An early September wave, consisting of five arrivals, six departures, and a decrease of six species, is well marked from a late September wave which consists of five arrivals, sixteen departures, and eight decreasing species. There are also two waves in October: an early one including six arrivals, thirteen departures, three increasing and six decreasing species; and a late one consisting of one arrival, eight departures, and four decreasing species. The early November wave is composed largely of decreasing species, all but two of which depart late in the month. The early wave is composed of twelve species, and the late one of thirteen.

It thus appears that September is the favorite month for the fall migrations, preference being given to the latter part of the month. In point of the number of moving species, there is very little difference between September and October; but moving individuals are far more numerous in September than in October. Eleven species were moving in August, forty-six in September, forty-one in October, and twenty-five in November. Thus November stands in much the same relation to September that March does to May, April corresponding to October. The relations of the movements by months may be more clearly seen in the following table. By species common to any two months is meant those found moving in both months.

Species common to March and November	12
“ “ “ “ “ October	5
“ “ “ April “ November	5
“ “ “ “ “ October	15
“ “ “ “ “ September	12
“ “ “ “ “ August	3
“ “ “ May “ November	2
“ “ “ “ “ October	9
“ “ “ “ “ September	29
“ “ “ “ “ August	2

It is a little singular that species which do not arrive from the south until May or April should be among the last to go south in fall. Yet there are sixteen such. Three of the species

which arrived in April departed in August. These irregular species seriously complicate the migrations. They refuse to be worked into any table of the movements of the birds.

I cannot forbear glancing hastily at the 1895 migrations, because they present some interesting characters. Great things were expected of them, and greater things have occurred.

As early as late January the Robins were becoming numerous and Grackles were seen. But then the long delayed winter came in earnest, and tarried until March. It was followed by damp and chilly weather, spring not arriving until April. The Robins and Song Sparrows braved the cold, but the Grackles left. Not until March 18 did we see the first arrivals, and the Bluebird was not among them. One was seen on March 23, one on the 29th, three on April 5th, and one—the last one—on May 1st.

All of the earlier arrivals have been less common than usual, while some have not appeared at all. The later arrivals are on time, but all others have been late. There have been no well-marked waves of migration.

There could be no better illustration of the effect of the weather upon the migrations than this season has afforded.

In drawing comparisons between the Grinnell and Oberlin migrations, nothing has been more strongly impressed upon my mind than the influence of local contour of country upon the migrating birds. That station which lies away from even small water courses, whose trend is north and south, is less favored by the birds. Species which are tardy at Oberlin may almost always be found at the rivers. I am convinced that the differences between the two places can be largely attributed to the difference in location of the two places, with reference to water courses, allowing for the proximity of the lake only a little.

With more time and increased facilities for travelling to the rivers and lake, there cannot fail to result a more complete record of the bird fauna of the region, and a closer correspondence to the Grinnell migrations.